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The Integration of Support Persons into Maternity Care and Quality of Care in Kenya: A Person-Centered Approach

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The Integration of Support Persons into Maternity Care and Quality of Care in Kenya: A Person-Centered Approach

A dissertation submitted in partial satisfaction of the

requirements for the degree Doctor of Philosophy

in Community Health Sciences

by

Michelle Kao Nakphong

2022

ABSTRACT OF THE DISSERTATION

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by

Michelle Kao Nakphong

Doctor of Philosophy in Community Health Sciences

University of California, Los Angeles 2022

Professor May Sudhinaraset, Chair

Background: There is an urgent need to improve both the clinical and person-centered dimensions of quality during intrapartum care to reduce maternal mortality and morbidity and achieve health equity in Kenya. Substandard care has been identified in 9 of 10 maternal deaths in Kenya and evidence shows that women of lower social position (e.g., younger, less educated, unmarried) have poorer access to quality care. The World Health Organization (WHO) quality of care (QoC) framework for maternal and newborn health has identified women's access to their preferred social and emotional support as one essential component of the experience of care, but facilitating social support tends not to be prioritized by providers and facilities. Many support persons (SPs) encounter policies barring their presence, endure negative provider attitudes, and lack means to interact with women and providers. However, a gap in the literature includes an examination of how health care systems can better facilitate the support that women need and want during maternity care.

Moreover, integrating SPs into maternity care and facilitating their supportive roles improves how providers' treatment and care for women. SPs can garner more respectful treatment and advocate on behalf of women, which is especially important in Kenya where women frequently encounter mistreatment and lack autonomy in their own health care. Although integration of SPs has been proposed to improve QoC, existing studies have narrowly focused on mistreatment and overlooked other elements of QoC (i.e., other experience of care measures, clinical quality), representing a major gap in literature.

Theory: The theoretical framework for this study builds upon the World Health Organization (WHO) quality of care (QoC) framework for maternal and newborn health, incorporating concepts from the person-centered care framework for reproductive health equity. The framework uses a systems-approach by situating these concepts within the socioecological model.

Purpose: This study aims to address these gaps and proposes a new concept in the support literature, the ***Person-Centered Integration of Support Persons (PC-ISP)*** into maternity care, which refers to the extent to which SPs are integrated into care that is respectful and responsive to women's needs and preferences. This includes communicating information to SPs, facilitating decision-making support, making them feel welcome, and engaging with their questions and concerns.

Methods: The objective of this study was to examine how PC-ISP in maternity care is associated with women's and SPs' reports of QoC. This research used novel data from the Strengthening Person-Centered, Accessibility, Respectful Care, and Quality (SPARQ) study in Kenya, which surveyed both women and SPs at six facilities in Nairobi and Kiambu counties about their experiences of maternity care. I developed survey questions based on the PC-ISP concept that

were administered to both women (n=1,138) and SPs (n=606) to better understand women's preferences for PC-ISP and women's and SPs' experiences of PC-ISP. I used multivariable regression models to examine PC-ISP by women's social status and SP types, assess how PC-ISP is associated with QoC outcomes specified by the WHO QoC framework, and assess how facility factors relating to capacity modify those associations.

Results: This study provides detailed evidence regarding women's unmet need for support, showing that women wanted support from their SPs in different ways than previously measured: consulting on decisions, wanting SPs to know and understand their condition and care, and opportunities for SPs to engage with providers about their questions and concerns. But, in practice, a substantial proportion of women reported that their SPs were not integrated in these ways. I found disparities in SP integration; for example, women with low-income, low-prestige occupations were less likely to report that SPs were welcome to ask questions and male partners were less likely to report being given information about women's condition and care compared to mothers/mothers-in-law. Facility factors, such as number of providers assisting delivery and SPs' perception of crowding, were consistently positively associated with SP integration, while facility types (i.e., public hospital, private hospital, public health centre/dispensary) displayed inconsistent positive and negative associations with SP integration. Findings also highlighted how women's experiences of PC-ISP is associated with women's positive experiences of care, better clinical care experiences, higher satisfaction with care, and greater willingness to return to facilities for care, but mixed evidence of SPs' experiences associated with QoC, finding positive associations with increased key practices and women's satisfaction, but negative associations with willingness to return to the facility. Results also showed that associations between women's experiences of PC-ISP and QoC were modified by facilities' capacity: I found evidence of

stronger positive associations between PC-ISP and Person-Centered Maternity Care (PCMC) and key practices at facilities with higher patient-volumes and higher patient:bed ratios (i.e., crowded).

Conclusions: Findings from this study provide insight into how health systems can practically increase support for women, address disparities in who has access to SPs, and improve clinical and person-centered QoC. Particularly in crowded facilities with high-patient volumes, integrating SPs may help facilitate high quality care. Greater efforts are needed to integrate SPs in ways that keep women at the center of their own care, including developing methods to assess and respect women's preferences for support during care, educating SPs in how to constructively provide support in conjunction with providers, training providers on how to integrate SPs in equitable yet standardized ways, and creating accountability systems to ensure policies and practices are implemented equitably. Interventions to better integrate SPs can be a low-cost and person-centered approach to improve QoC in maternity care in Kenya.

The dissertation of Michelle Kao Nakphong is approved.

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2022

DEDICATIONS

This dissertation is dedicated to all the women who birthed alone but needed and wanted support. May this research increase women's access to support persons and the advocacy they deserve. Thank you also to all the Kenyan women who participated in the SPARQ study and shared their experiences about maternity care.

Thank you to my incredible chair, Dr. May Sudhinaraset, for all of your mentorship and guidance throughout my Ph.D. program and the dissertation process. Years ago, I came to you with an idea about women's preferences for support during childbirth and you nurtured it into a dissertation and a research agenda. Thank you for your generosity and openness to welcome me onto your studies, add completely new questions to your survey, and collaborate with you on project after project. I have learned so much from you about being an investigator, a leader, balancing work and family life, and just being a good person overall. I have loved working with you and learned how to love doing research through your example. I look forward to continuing to work with you over the years.

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TABLE OF CONTENTS

List of Acronyms

Acronym	Meaning
PC-ISP	Person-Centered Integration of Support Persons
PCMC	Person-Centered Maternity Care
QoC	Quality of Care
SP	Support person
WHO	World Health Organization

List of Figures and Tables

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PEER-REVIEWED PUBLICATIONS

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SELECTED PRESENTATIONS

Nakphong MK*, Afulani PA, and Sudhinaraset M. Who wants and has access to support during childbirth?: An examination of integrating support persons into maternity care in Kenya. Poster presentation, Population Association of America, April 6-9, 2022

Nakphong MK* and Sudhinaraset M. Person-centered integration of support persons into maternity care (PC-ISP) in Kenya: Examining the context of access to support during childbirth. Oral presentation, American Public Health Association Annual Meeting, October 27, 2021.

Chapter 1. Background

Significance

The need to improve the quality of maternity care in Kenya

Sub-Saharan Africa accounts for approximately two-thirds (196,000) of the world's maternal deaths (The World Bank, 2019). In Kenya, it is estimated that 342 women die per 100,000 births between childbirth and the 42 days following pregnancy (The World Bank, 2017). These estimates still far exceed the Sustainable Development Goal target of reducing maternal deaths to less than 70 per 100,000 births (WHO, 2017a). The leading causes of death (e.g., hemorrhage, hypertensive disorders, etc.) are considered preventable, and highlight the need for appropriate diagnosis, treatment, and management (Khan et al., 2006; Partnership for Maternal Health, 2011; WHO, 2015).

While Kenya has made notable social progress in the past two decades, reaching several Millennium Development Goals including reduced child mortality and narrowed gender gaps in education (UNDP Kenya & Ministry of Devolution and Planning, 2013), maternal health indicators observed only modest improvements. For example, the annual rate of reduction for the maternal mortality ratio was only 4.3% between 2000 and 2017—these gains are short of the 6.1% rate of reduction needed to reach 2030 targets (WHO, 2019).

Low quality of care in Kenya is consistently cited as a crucial factor that must be addressed to increase utilization of maternal health services and improve outcomes (Escamilla et al., 2018; Keats et al., 2017; Sharma et al., 2017). This was underscored by the recent 2017 Kenyan Ministry of Health report which identified substandard facility-based care (e.g., delays in starting treatment, inadequate monitoring) for 9 out of 10 maternal deaths (Godia et al., 2017). Moreover, the experience of care has emerged as an important dimension of the quality of care

meriting attention. Expectations of negative attitudes and behavior of health care staff, such as harassment or neglect are among the most common reasons for avoiding facility deliveries, and reports indicate that some women call facilities in advance to check which staff are on duty to make decisions about delivering in certain facilities (Wubs et al., 2016). Mistreatment of women during maternity care is also prevalent, with studies estimating that one-in-five women in Kenya report being treated disrespectfully or feeling humiliated during maternity care (Abuya et al., 2015). Negative experiences of care can undermine efforts to improve maternal and newborn health (Bohren, Mehrtash, et al., 2019; Bradley et al., 2016a), and thus, a focus on improving women's experience of care as a crucial dimension of quality of care is needed. New strategies are needed to improve clinical and person-centered dimensions of the quality of maternity care.

Integrating support persons may improve the quality of maternity care

Giving birthing women (henceforth referred to as "women") access to their social support person (SP) of choice is one essential component of quality of care defined by the WHO Quality of Care (QoC) framework for maternal and newborn health (Tunçalp et al., 2015). In addition, the receipt of social support during intrapartum care is associated with multiple positive birth and health outcomes such as shorter labors, fewer cesarean deliveries, improved breastfeeding outcomes, and better postpartum mental health (Bohren et al., 2017; Hodnett et al., 2012).

However, women are still commonly denied SPs during maternity care in Kenya and lack advocates during care (P. Afulani, Kusi, et al., 2018; Sudhinaraset et al., 2019). Studies also show that SPs continue to face provider and facility barriers in providing support to women including negative attitudes from providers, denial of information about care, and lacking permission or space to stay with women in maternity wards (Bohren, Berger, et al., 2019; Kaye

et al., 2014). Consequently, women may have less opportunities to be involved in their own care, be neglected when they need medical attention, and are vulnerable to mistreatment (Balde et al., 2020; M. K. Longworth et al., 2015; McMahon et al., 2015).

Integrating SPs into maternity care is one potential strategy to improve women's experience of care and improve outcomes by centering SPs in the context of women's care (Bohren, Berger, et al., 2019). Integrating SPs by giving women opportunities to consult SPs on decisions, making SPs feel welcome, providing SPs with information, or engaging with SPs' questions or concerns, is posited to increase support for women and thus improve health outcomes (Bohren, Berger, et al., 2019). Research suggests that when SPs are integrated in care, providers behave differently and provide higher quality of care—a reason that may explain why social support is associated with positive outcomes (Keirse et al., 1989; Kozhimannil et al., 2016). Emerging literature supports this theory, showing that having an SP present during maternity care is associated with lower mistreatment and higher person-centered care in Kenya (Abuya et al., 2015; Balde et al., 2020; Kiti et al., 2022). This suggests that SP integration may also be associated with other dimensions of QoC, such as clinical quality.

Methodologically, current concepts and measurement of SP integration has focused mainly on labor and delivery companionship, although this may not align with women's preferences since studies have shown that up to 60% of Kenyan women do not want a companion during labor and/or delivery (P. Afulani, Kusi, et al., 2018; Oluoch-Aridi, Afulani, Guzman, et al., 2021). Instead, qualitative evidence suggests that women do want their SPs integrated into their care in other ways, such as bridging communication with providers and consulting for decisions (Bondas-Salonen, 1998; Tokhi et al., 2018). A more detailed

investigation of women's preferences for SP integration and the processes of support (rather than on the receipt of support) is needed.

In addition, although literature recommends greater SP integration in maternity care, there is little information about how much integration occurs in practice and whether SPs are integrated differentially according to women's or SPs' social status. Some studies have shown that the proportion of women who were allowed a companion in Kenya is still low (only 6-42% and 4-16% of women report being allowed labor and delivery companionship, respectively) (P. Afulani, Kusi, et al., 2018; Sudhinaraset et al., 2019). Moreover, evidence sugggests that providers discriminatorily allow women access to SPs, for example, wealthier, employed, and literate women are almost twice as likely to be allowed companion support compared to the poorest, unemployed, and literate women (P. Afulani, Kusi, et al., 2018). More information is needed about SPs' experience of care, the extent that SPs are integrated in various ways and if disparities exist in SP integration according to women's or SPs' social status.

Lastly, a health systems perspective is needed to effectively design interventions (Darling, 2007). Normalized provider practices, facility policies, and facility capacity contribute to the exclusion of SPs in maternity care and must be addressed for programs and policies to successfully integrate SPs (Bohren, Berger, et al., 2019; Kabakian-Khasholian & Portela, 2017). Furthermore, evidence suggests that integrating SPs in settings where SPs are not normally allowed has a greater effect on positive health outcomes (e.g., lower likelihood of cesarean deliveries, needing pain medication) (Bohren et al., 2017) indicating that SPs may critically interact with the context of the health care environment to influence the delivery of care and women's experiences of care. Little quantitative research has focused on what facility factors contribute to SP integration and potentially moderate associations between SP integration and

QoC. A multi-level examination will help illuminate facility-level factors that may be targeted for interventions to integrate SPs. The specific aims for this research are:

Specific Aims

This research describes and examines the new concept of Person-Centered Integration of Support Persons (PC-ISP), which is defined as the extent to which SPs are integrated into care that is respectful and responsive to women's needs and preferences, ensuring that women's needs and preferences guide clinical decisions (Institute of Medicine (US), 2001; Sudhinaraset et al., 2017). This includes communicating information to SPs, facilitating decision-making support, making them feel welcome, and engaging with their questions and concerns. Leveraging unique data of women and SPs from the Strengthening Person-Centered, Accessibility, Respectful Care, and Quality (SPARQ) study in Kenya. The SPARQ study surveyed women who recently delivered at six facilities in Nairobi and Kiambu counties before discharge. Data were collected from 1,138 women who had an SP (or SPs) and 606 of their SPs about their experiences of care. This study aimed to understand women's and SPs' experiences of PC-ISP, identify disparities in PC-ISP across women's and SPs' social status, and assess how PC-ISP is associated with PCMC and QoC outcomes. Figure 1.1 graphically presents the proposed aims and conceptual model for this study. The specific aims for this research are:

Aim 1: Examine the women's, support persons', household, and facility-level determinants of <u>women's</u> a) preferences for PC-ISP and b) experiences of PC-ISP.

Literature indicates that preferences to involve SPs in care have changed over time and that younger, more educated women desire greater involvement from their social networks. Thus, for **Aim 1a**, I hypothesized that women who are younger, more educated, born in Nairobi/Kiambu

counties (i.e., non-migrants) (individual-level), have an SP present during labor and/or delivery (SP-level), have more household decision-making power (household-level), and deliver at private facilities (vs. public) (facility-level) are more likely to prefer PC-ISP. **Aim 1b** investigated patterns of PC-ISP experiences and how they may be differentially associated with the social position of women and SPs. Maternal health care literature has highlighted that facility-based care is frequently marked by social hierarchy and that women of lower social position are subject to worse treatment from providers and lower QoC. I hypothesized that women of lower social position, that is, those who are younger, less educated, not born in Nairobi/Kiambu counties (individual-level factors), who have a type of SP (or SPs) who are of lower social position, for example, non-male partners (vs. male partner) (SP-level), have less household decision-making power (household-level), deliver at public facilities (vs. private), and whose deliveries are assisted by doctors/clinical officers (vs. midwives, nurses etc.) (facility-level) are less likely to report experiences of PC-ISP.

Aim 2: Examine the associations between women's, support persons', dyadic, household, and facility-level factors and <u>support persons'</u> experiences of PC-ISP. Given that women of lower social position are subject to worse treatment from providers, I also expected that SPs of lower social position are also more likely to experience worse treatment from providers. Literature also suggests that the facility environment (e.g., crowding, infrastructure) also influences the degree to which providers integrate SPs. For **Aim 2**, I hypothesized that SPs who are younger, have lower occupational prestige, are not male partners (SP-level), accompany younger, less educated women, who were not born in Nairobi/Kiambu counties (woman-level), report lower relational connectedness (dyad-level), assist women who less household decision-making power (household-level), deliver at public hospitals, and whose deliveries are assisted by

doctors (facility-level) are less likely to report higher PC-ISP. I also hypothesized that SPs who report poorer perceptions of the facility environment (facility-level) are less likely to report higher PC-ISP.

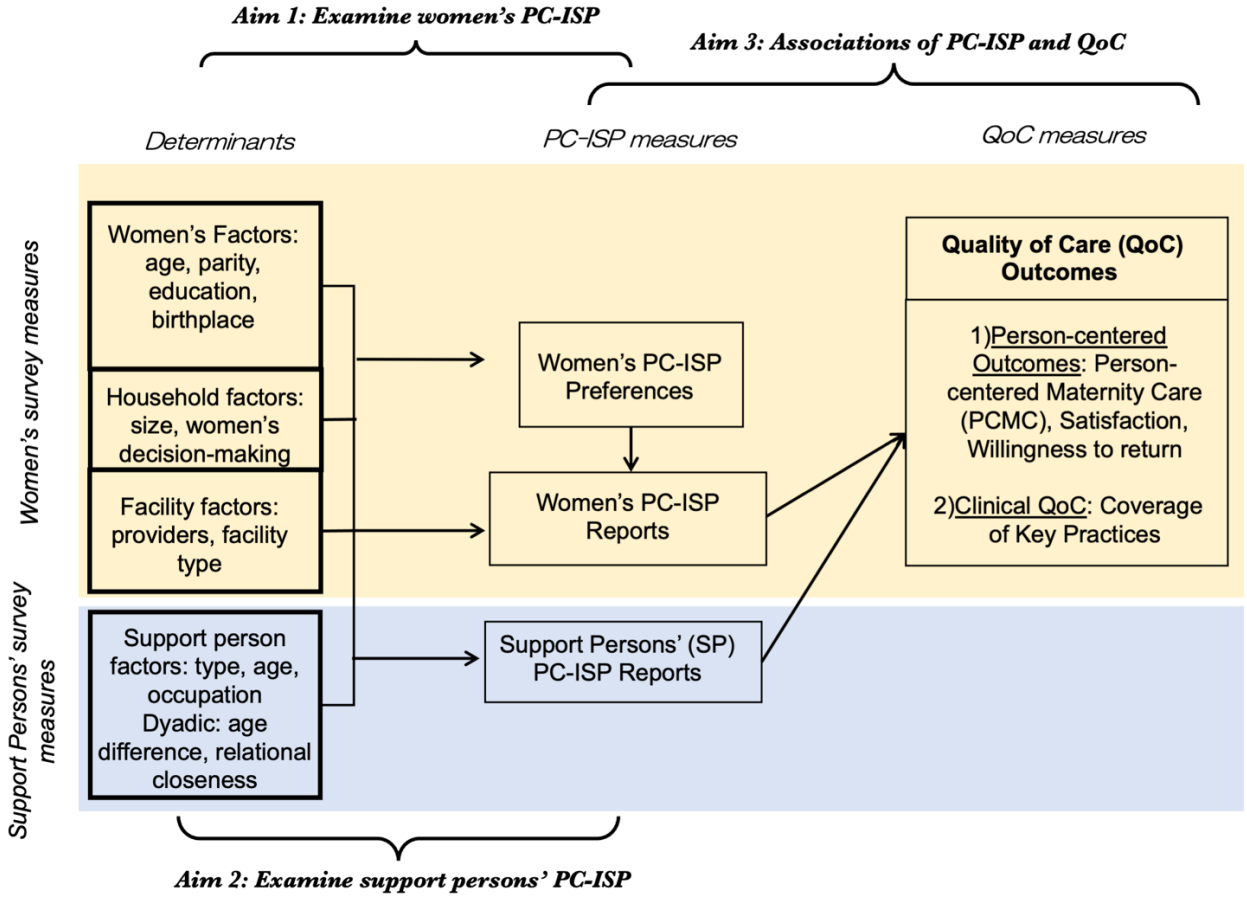
Sub-Aim 2b: Explore the associations between women's, support persons', dyadic, household, and facility-level factors and types of SPs, number of SPs, and their timing of support. This exploration sought to highlight potential factors that shape the characteristics of women's SPs and support by examining bivariate associations. Little research has explored factors associated with having different types of SPs (e.g., male partners, mothers, mothers-in-law, sisters, other family, friends, etc.), number of SPs, and timing of support (e.g., accompanying to the hospital, labor and/or delivery, post-partum). I hypothesized that i) the type of SPs (reported by women and SPs), ii) number of SPs (reported by women) and iii) and the timing of support (reported by women and SPs) differed by women's, SPs', dyadic, household, and facility factors.

Aim 3: Estimate how women's and support persons' reports of PC-ISP are associated with women's reports of quality of care (QoC) outcomes specified by the WHO QoC framework: a) person-centered outcomes and b) clinical care outcomes. For **Aim 3a**, I examined how PC-ISP is associated with women's experience of care, measured by the Person-centered maternity care (PCMC) scale (30-item). I conceptualize a bi-directional relationship between PC-ISP and PCMC and that they mutually reinforce one another. Thus, I hypothesized that both women's and SPs' PC-ISP are positively associated with PCMC. PCMC and PC-ISP are also posited to improve the provision of clinical care, which, in turn, improves other person-centered outcomes including *satisfaction with care* and *willingness to return* to the facility. **Aim 3b** examines associations between PC-ISP and a clinical QoC outcome, *coverage of key*

practices. I hypothesized that both women's and SPs' PC-ISP experiences are positively associated with both person-centered and clinical QoC outcomes, net of individual, household, and facility factors.

Sub-Aim 3c: Examine the degree that facility factors related to capacity moderates associations between PC-ISP and QoC outcomes. Providers commonly cite staff shortages, lack of material resources, and crowding as reasons why they cannot integrate SPs or provide supportive care. However, evidence suggests that in settings where quality is poor and SPs are not allowed, SPs may have a greater influence on maternity care and health outcomes. Therefore, I hypothesized that facility capacity factors (i.e., staff capacity, patient volume, and crowding) moderates associations between PC-ISP and QoC outcomes, such that at understaffed, crowded facilities with high-patient volumes, PC-ISP is more strongly associated with higher QoC compared to well-staffed, uncrowded facilities with low-patient volumes.

Figure 1.1. Analytical Model and Proposed Study Aims



Overview of the dissertation

In Chapter 2, I present a review of the literature situating this study on integrating SPs at the intersection of person-centered care and social support literatures. I then ground this study in the WHO QoC framework for maternal and newborn health and describe the person-centered approach. I also highlight provider and facility barriers to SPs, showing that these factors must be addressed to integrate SPs across the health care system. Finally, I propose the Person-Centered Integration of Support Persons (PC-ISP) into maternity care concept and sub-domains, describing how it fills gaps in literature and measurement.

In Chapter 3, I present the conceptual framework for this study. I conceptualize PC-ISP as a component of an integrated framework comprising the WHO QoC framework, Person-centered Maternity Care (PCMC), and the socioecological model. PC-ISP is conceptualized as a complement to PCMC as both are constructs that mututally reinforce each other. PC-ISP and PCMC interact with the provision of care (i.e., technical delivery of care) within the WHO QoC framework and are embedded within interconnected levels of the social and physical context (SP relationship/households, facilities, broader socioeconomic context).

In Chapter 4, I describe the methods used in this study. I describe the social and health care setting of Nairobi and Kiambu counties in Kenya where this study takes place. I also provide information about my data source for this dissertation research, the Strengthening Person-centered, Accessibility, Respectful Care, and Quality (SPARQ) study. I present the PC-ISP questions administered to women and SPs and describe the combined PC-ISP scores, including their construction and measures of reliability. I also preesent information about other multi-level factors examined and QoC variables in line with the WHO QoC framework. I also describe the analytical methods used for each of the aims including sensitivity analyses and methods to address confounding and clustering by facility.

In Chapter 5, I present the study corresponding to Aim 1. The objective in this chapter was to examine women's a) preferences for integrating SPs and b) experiences of whether SPs were integrated into their care using PC-ISP measures reported by women. Results of this study indicate that women desired specific ways of integrating SPs aside from birth companionship but that these preferences varied by women's, SPs', and household characteristics. Findings also highlight how women and SPs were treated differently due to differences in social status, SP types, and facility characteristics.

Chapter 6 presents the study corresponding to Aim 2. The objective of this chapter was to examine how SPs perceive being integrated into care using PC-ISP measures. Results of this study highlight poor communication between providers and SPs and SPs' subsequent lack of information about care. Findings also highlight facility crowding as an important factor influencing SP integration.

In Chapter 7, I present the study that addresses Aim 3. The primary objective of this study was to estimate associations between PC-ISP experiences and QoC indicators specified by the WHO QoC framework. Using both women and SP-reported PC-ISP measures, I found evidence that PC-ISP was associated with women's greater satisfaction with care and coverage of key practices, but mixed evidence that PC-ISP is associated with higher person-centered maternity care and willingness to return to the facility. The secondary objective was to examine how facility factors related to capacity modify PC-ISP and QoC associations. Using data reported by facilities about their capacity for patient volume, crowding, and staffing, I found evidence of a statistical interaction between PC-ISP and facility measures of patient volume and crowding.

Chapter 8 discusses the findings from studies presented in chapters 5 through 7, including themes and contradictions found across studies, such as the tension highlighted between women's autonomy and experiences of integrating SPs. I also discuss limitations emphasizing the constraints of PC-ISP measures and the study design on causal inference, strengths of the PC-ISP concept relative to gaps in literature, and methodological considerations for this study. Finally, I conclude with directions for future research and implications for policy and practice, providing recommendations for efforts to integrate SPs in Nairobi and Kiambu counties and beyond.

Chapter 2. Literature Review

Introduction

This research aims to understand how integrating support persons into maternity care influences quality of care (QoC) in Kenya. In this dissertation, I define a support person (SP) as a lay person (i.e., those who are not medical professionals employed by the facility) who accompanies or remains with a birthing woman (henceforth referred to as "women") in or near the maternity ward during labor, delivery or postpartum to provide social support (Maimbolwa et al., 2001; Simmonds et al., 2012). Integrating SPs involves creating a welcoming environment for SPs, facilitating opportunities for women to consult with SPs for decision-making, and educating and informing SPs about the processes of care (Alio et al., 2013; Bäckström & Hertfelt Wahn, 2011; Bohren, Berger, et al., 2019; Brüggemann et al., 2007; Mgawadere et al., 2019; Tokhi et al., 2018). The extent to which providers integrate SPs during intrapartum care determines the degree to which SPs can adequately support women. For example, when SPs are informed about women's condition and procedures, they can better practically assist women and providers, monitor women's conditions and advocate on their behalf, as well as arrange postpartum caregiving. Integrating SPs is also important for longer-term health including decreased postpartum depression, decreased low Apgar scores (the status of a newborn's overall condition), and decreased prolonged newborn hospital stays (Bohren et al., 2017; Kabakian-Khasholian et al., 2018).

In this study, I propose the *Person-Centered Integration of Support Persons (PC-ISP) into maternity care* and define it as the extent to which SPs are integrated into care that is respectful and responsive to women's needs and preferences, ensuring that women's needs and preferences guide clinical decisions (Institute of Medicine (US), 2001). I conceptualize PC-ISP

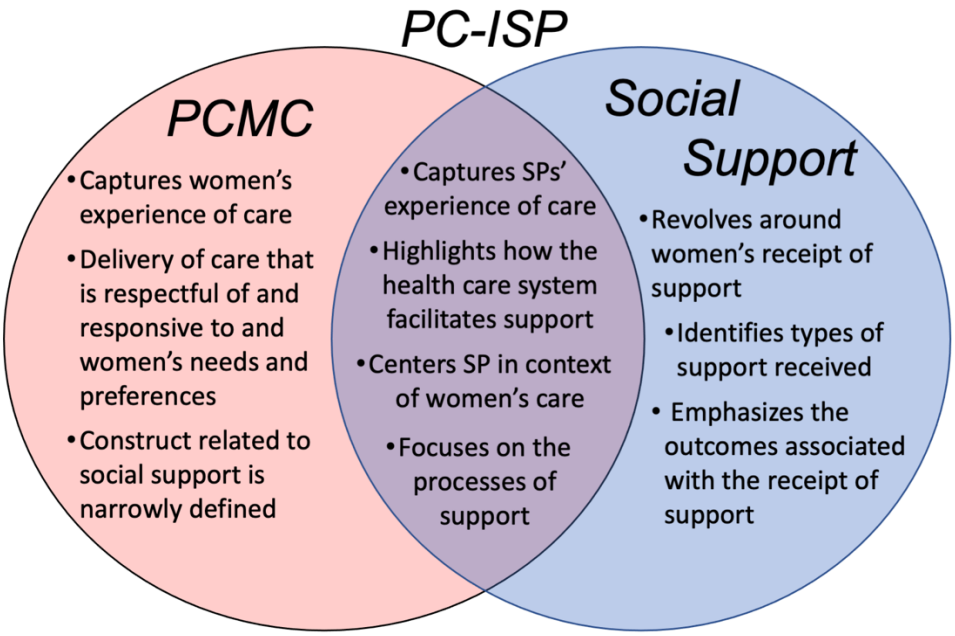
as addressing gaps at the intersection of the Person-Centered Maternity Care (PCMC) and social support literatures (Figure 2.1).

First, PCMC refers to the delivery of care that is respectful of and responsive to women's needs and preferences, ensuring that it guides all clinical decisions (Sudhinaraset et al., 2017). PCMC addresses some aspects of how maternity care can facilitate social support, such as whether women were allowed companions or could receive food and supplies; however, it does not highlight the process or extent to which SPs are integrated into care. In addition, PCMC focuses primarily on women's experiences of care. Although it acknowledges that women are embedded in families and social networks and that SPs, families and social networks are also beneficiaries of the health system, PCMC does not incorporate SPs' experiences of care. PC-ISP captures the SPs' experiences of care and centers SPs in the context of women's care.

Second, social support during childbirth broadly refers to women's receipt of support to facilitate her transition from pregnancy to motherhood (Leahy-Warren, 2018). Support literature has focused on the types of support women receive (e.g., companionship, emotional support, informational support, etc.) but PC-ISP is focused on the *processes* of support, highlighting the SP and their experiences, and acknowledging that they shape the support received by women. Social support literature has also shown multiple positive outcomes associated with the receipt of increased social support such as less reported mistreatment of women (defined as physical or verbal abuse, discrimination, non-consented procedures and non-supportive care), shorter labors, decreased need for pain medication, and fewer cesarean deliveries, among others (Abuya et al., 2015; Bohren et al., 2017; Chalmers & Wolman, 1993; Hodnett et al., 2012). This research on PC-ISP bridges the PCMC and social support literatures by calling attention to how the health

care system integrates SPs into care–a process of support—and investigates its associations with person-centered and clinical QoC outcomes.

Figure 2.1. Person-Centered Integration of Support Persons (PC-ISP), the intersection between Person-Centered Maternity Care (PCMC) and social support



The following literature review comprises four sections. In the first section, I ground the present study in the World Health Organization (WHO) Quality of Care Framework for Maternal and Newborn Health. I also use PCMC to guide this inquiry within women's and SPs' experience of care. In the second section, I present literature on social support as an essential component of quality care. I discuss extant literature on the positive benefits of social support and women's preferences for support. Here, I also reconceptualize the role of the SP, assuming a broader definition than what has been used in most literature and note that an understanding of how SPs influence multiple aspects of the delivery of care (e.g., beyond mistreatment) represents a major gap in literature. In section 3, I present literature about how the health system presents barriers for women to access SPs and highlight that integration of SPs has been proposed to

address these barriers. Lastly, in section 4, I propose a definition for the *Person-Centered Integration of Support Persons (PC-ISP)* into maternity care. I also describe themes in literature, propose sub-domains of PC-ISP, and discuss the limitations of existing concepts and measures.

1. Improving the quality of care in maternity care: the provision and experience of care

Particularly in low-income countries and low-resource settings, facility-based maternity care is characterized by hierarchies of power and rigid institutional rules (Sadler et al., 2016; Sochas, 2019). Women are vulnerable to mistreatment in maternity care, which includes physical or verbal abuse, discrimination, non-consented procedures, and non-supportive care (Bohren et al., 2015). Because of this, women often lack control over what happens and cannot influence the care they receive throughout their childbirth experience (McMahon et al., 2014). Women are often scolded, shamed, and sometimes physically punished when they try to gain the attention of providers, request pain relief, or "break the rules," such as making noise or crying during labor (Jewkes et al., 1998; Sen et al., 2018; Sochas, 2019). Research on mistreatment during maternity care in Kenya has found that only 57-60% of women have reported that doctors, nurses, and other staff always treated them with respect and that 11-18% reported verbal abuse at least once during their stay at the facility (P. Afulani et al., 2019).

Improving both clinical care and women's experience of care are critical to making progress in health outcomes and achieving equity (Independent Expert Review Group (iERG), 2013; Tunçalp et al., 2015). Recently, women's experience of care has gained attention as an important component of quality, especially as emerging evidence indicates that women's experiences of care (e.g., communication with providers, degree of involvement in clinical decision-making, etc.) also influence maternal and newborn health outcomes including maternal

and newborn complications, depression, etc. (Diamond-Smith, Sudhinaraset, & Montagu, 2016; Gitobu et al., 2018; Souza et al., 2013; Sudhinaraset et al., 2020, 2021). Evidence has indicated that solely increasing facility-based care or coverage of essential biomedical interventions, such as providing magnesium sulfate for prevention and treatment of eclampsia, is insufficient to reduce maternal mortality (WHO, 2007).

To this end, the WHO outlined an agenda to make high-quality reproductive, maternal, and newborn health care available, accessible, and acceptable for all who need it (WHO, 2015). The WHO Quality of Care Framework for Maternal and Newborn Health defines quality of care (QoC) as comprising inter-linked dimensions of the provision and experience of care. The provision of care refers to the clinical and technical delivery of care, such as the implementation of evidence-based practices for routine care and management of complications. The experience of care refers to how women were treated by providers and their perceptions of service, including whether communication was effective, whether they were treated respectfully and with dignity, and whether they received adequate emotional support (Tunçalp et al., 2015). The framework proposes that concurrent progress in both the provision and experience of care will improve clinical as well as person-centered QoC outcomes, specifically, coverage of key practices, person-centered maternity care, satisfaction with care, and willingness to return to the facility for care. However, more evidence is needed to develop new interventions to improve the quality of maternal health care and reduce disparities in care delivery.

A person-centered approach to enhance the experience of care

Given widespread mistreatment during maternity care across contexts, global calls for action have advocated for person-centered care to be established as the standard of care, arguing

that dignified care is a basic human right (Betron et al., 2018; Bohren, Mehrtash, et al., 2019; Miller & Lalonde, 2015; Shakibazadeh et al., 2018). Person-centered maternity care (PCMC) refers to health care that is respectful of and responsive to individual women and their families' preferences, needs and values, and engages them in clinical decision-making processes (Sudhinaraset et al., 2017; WHO, 2007). PCMC covers several sub-domains of care including dignity and respect, communication and autonomy, and supportive care. Often, existing models of medical care in lower-income countries center around the institution and providers (Bruggemann et al., 2014). The person-centered model shifts the focus towards women at the center of their own care. Practically, this gives women a voice in their health care, ensuring that they understand procedures and medications, are involved in decisions, provide consent, and that providers are attentive and respectful when they need help. Person-centered care is considered essential for improving QoC; engaging women and communities in health care is proposed as a primary pathway to increase patient safety, improve treatment, and improve interactions with providers (WHO, 2007).

A person-centered approach also acknowledges social and cultural determinants of health which drive health inequities (Sudhinaraset et al., 2017). Social and cultural determinants include how health systems are organized, norms about gender and violence, women's role and status in society, and stigma and discrimination that may be related to education, social status, ethnicity, or social groupings. Health system factors such as lack of leadership, poor facility standards, and provider demoralization and shortages often fuel discriminatory or preferential care for certain groups (Bowser & Hill, 2010; Kruk & Freedman, 2008). Social and gender norms contribute to inequalities in obstetric care when power differentials between providers and patients are

normative and women are placed in subordinate positions (Jewkes & Penn-Kekana, 2015; WHO, 2016c).

Historically, most studies conducted on intrapartum care have not included woman-reported outcomes or investigated women's experiences of care (Bohren, Berger, et al., 2019), although they have become more commonly examined in recent literature. To fully address person-centered care, examining women's experiences from their own perspectives is critical, such as how they evaluate the quality of service received or perceive treatment from providers. Women's perceptions of QoC are also crucial because they influence how women interact with providers, seek future care, and shape broader community attitudes towards health services and systems (Sudhinaraset et al., 2017; WHO, 2017b).

Admittedly, reliance on women's reports has notable limitations, especially because perceptions of care are shaped by expectations. When poor QoC is normalized and expected, women tend to underreport mistreatment when compared to providers' or observers' reports (Bohren, Mehrtash, et al., 2019; Sudhinaraset et al., 2019). This is particularly pronounced for women of lower social position, who are more likely to expect poorer care (P. Afulani, Kirumbi, et al., 2017; Bohren et al., 2016; Warren et al., 2017). Regardless, these limitations do not invalidate women's perceptions, but suggest that women's reports should be complemented with other data, such as providers' reports, SPs' reports, or direct observations.

These limitations also indicate that better measures are needed. Use of broad measures of perceived quality or satisfaction have produced contradictory results precisely because they are subject to expectations. Measures like the PCMC scale that measure women's direct experiences (e.g., whether women were called by their name, whether providers explained procedures, etc.) have been shown to be more robust to examine the effect of social position on experiences of

care (P. Afulani, Diamond-Smith, et al., 2017). For example, in rural western Kenya, wealthier, employed, literate, and married women report higher PCMC than unemployed illiterate and unmarried women (P. Afulani, Sayi, et al., 2018). In addition, those who deliver in health centres and private facilities report higher PCMC than in public hospitals. In peri-urban Nairobi, literate women who were attended by a nurse, midwife, or clinical officer were more likely to report higher PCMC compared to illiterate women or those attended by an unskilled attendant or anxiliary nurse/midwife (Oluoch-Aridi, Afulani, Makanga, et al., 2021).

Although PCMC acknowledges that care should be respectful and responsive to women *and* their families' preferences, needs, and values (P. Afulani, Diamond-Smith, et al., 2017), the roles of families and social networks have been largely overlooked in PCMC. Importantly, a person-centered approach recognizes that SPs, families, and communities are also participants and beneficiaries of health systems (WHO, 2016b). The experiences and perspectives of SPs, as caregivers, are under-studied and under-represented. SPs' perspectives influence women's expectations of care, decisions to seek care, and experiences of care (Moyer et al., 2014; Sudhinaraset et al., 2017). Arguably, SPs' perspectives are particularly important because they are among women's closest relationships, are closely involved with women's care, and directly interact with the clinical care setting. Their perceptions of QoC can also influence women's (and communities') future decisions to seek care at facilities (Moyer et al., 2014; WHO, 2017b). Yet, only a small number of qualitative studies have explored the experiences and perspectives of SPs (M. K. Longworth et al., 2015), and they have rarely been surveyed as a group. The few studies that have surveyed SPs have usually focused on specific types of SPs, such as male partners and have investigated their perceptions about the birth experience and attitudes towards involvement in their partners' health care (Adeyemi et al., 2018; Labrague et al., 2013). While these studies

also examined SPs' perceptions of the facility environment and interactions with providers, they only investigated how these factors influenced SPs' involvement, not women's experiences of care. A gap in the literature includes quantitative assessments of how SPs' experiences of care subsequently influence women's experiences of care and future care-seeking behavior. Incorporating the perspectives of SPs, together with women's, are crucial to shaping person-centered health policy and services.

2. Social support: an essential domain of quality care

Within the WHO framework, access to women's preferred social and emotional support is an essential component of broader QoC and specifically women's experiences of care (Tunçalp et al., 2015). In this dissertation, I assume a broad definition of 'social support' in the context of perinatal health. I define social support as the receipt of support to facilitate a woman's transition from pregnancy to subsequent motherhood (Leahy-Warren et al., 2018). This encompasses certain functions (e.g., instrumental, informational, emotional support), but can also have structural characteristics (i.e., women's membership in social networks).

Social support has been shown to be one of the most important factors that improves women's perceptions of their childbirth experience (Hodnett, 2002). Social support during the perinatal period has also been associated with multiple positive maternal health and behavioral outcomes. Studies have found that social support during labor and delivery is associated with shorter durations of labor, less need for pain medication, fewer delivery complications, decreased rate of cesarean deliveries, and increased exclusive breastfeeding postpartum (Bohren, Berger, et al., 2019; Essex & Pickett, 2008; Federenko & Wadhwa, 2004; Gaudino et al., 1999; Hodnett et al., 2012; Kennell et al., 1991; Langer et al., 1998; Madi et al., 1999; Sapkota et al., 2013; Sosa,

1986; Zhang et al., 1996). Social support also contributes to better neonatal health including lower likelihood of adverse birth outcomes, better Apgar scores, and decreased prolonged neonatal intensive care (Bohren et al., 2017; Kabakian-Khasholian et al., 2018). Social support during childbirth also has implications for mental health, as it has been shown to decrease stress and is associated with less postpartum depression (Gjerdingen et al., 1991; Hetherington et al., 2015). Increasing social support during the critical birth period, a modifiable factor, has the potential to measurably improve maternal and neonatal health.

Although many studies have examined the positive effects of social support during maternity care, there are notable limitations. Most studies evaluating the effects of support on clinical outcomes were conducted in high and middle-income countries, where women largely have access to companionship and other forms of support. Especially because access to SPs remains a challenge in many low-resource settings (Ibitoye & Phetlhu, 2018; Maimbolwa et al., 2001), it is still largely unknown whether social support has similar effects in contexts where providers and facilities do not facilitate social support.

Reconceptualizing the support person: beyond birth companions and considering women's preferences

The definition of "support person" has been inconsistent in the literature, frequently varying by the activities/functions performed and the timing of support during the birthing process (i.e., before labor and delivery, during labor and delivery, and post-partum). I define a support person (SP) as a lay person (i.e., those who are not medical professionals employed by the facility) who accompanies or remains with a woman, in or near the maternity ward during labor, delivery or postpartum to provide social support (including doulas, Accredited Social

Health Advocates (ASHAs), etc.). Existing international guidelines assert that women have the right to an SP (or SPs) to support, encourage, or assist them throughout labor and delivery (Tunçalp et al., 2015; WHO, 2018). Several studies have used the term 'support persons' to reflect local customs of support during childbirth, which may or may not include labor and delivery companionship. For example, Maimbolwa et al. (2001) defined 'social support woman' in Zambia as a female person who accompanies a woman to the maternity unit and remains near the unit until the birth of the baby. Simmonds et al. (2012) described the role of SPs in indigenous Western Australian culture as 'escorts' who provide company and share knowledge about birth with women, but do not stay with women during labor and delivery. Because women may want support in a variety of ways that vary by cultural preferences and personal circumstances, I assume a broad definition of SPs.

The literature on social support during childbirth has been dominated by birth companionship, which is defined as the *continuous presence* of an SP through labor and delivery (Bohren et al., 2017; Kabakian-Khasholian & Portela, 2017; Lunda et al., 2018). As a result, the concept of the SP has been conflated with birth companionship (WHO, 2013). I argue that the focus on companionship is too narrow and does not accurately reflect women's needs and preferences for support. Despite evidence that many women globally do not desire birth companionship, the prevailing emphasis on birth companionship is driven by preferences and practice in Western, high-income countries (Bohren, Berger, et al., 2019; Bohren et al., 2017; Sudhinaraset et al., 2017). Studies have shown that many women do not want an SP present during labor or delivery because of concerns for modesty, or fear of abuse or interference (P. Afulani, Kusi, et al., 2018; Alexander et al., 2014; Dim et al., 2011; Ganle et al., 2016; Kwambai et al., 2013; Maimbolwa et al., 2001). For example, in Kenya, one study found that 18.4% and

63.4% of women surveyed did not want a companion during labor and delivery, respectively, further challenging assumptions that women desire continuous support throughout labor and delivery (P. Afulani, Kusi, et al., 2018). Studies in other contexts in sub-Saharan Africa have reported that 17-42% of women interviewed did not desire labor and delivery companion support (Alexander et al., 2014; Dim et al., 2011; Maimbolwa et al., 2001). The discrepancy between women's reported preferences for support and the dominance of companionship in literature underscores the need to re-assess the role of the SP and the array of supportive functions they perform.

Thus, I define SPs more broadly, as they may assume a variety of supportive roles (e.g., physical, emotional, or informational support, advocacy) whether they are present with women during labor and delivery or not. Types of SPs can include male partners, mothers, mothers-in-law, sisters, other family members, friends or neighbors, depending on women's cultural and personal preferences (P. Afulani, Kusi, et al., 2018; WHO, 2017b). SPs may provide for women's physical needs such as bringing women to facilities or providing them with food or supplies, their emotional needs by encouragement or reassurance, and their informational needs by sharing knowledge about the birth experience or facilitating communication with providers (Simmonds et al., 2012; Sudhinaraset et al., 2017; WHO, 2013). Women may also include SPs as a strategy to garner needed medical attention, prevent or address mistreatment, and serve as a necessary communication link with providers (Ampim et al., 2021; McMahon et al., 2014).

However, there is little understanding of how different types of SPs may provide different kinds of support throughout the processes of childbirth. In addition, existing studies have primarily investigated the influence of labor and delivery companionship, neglecting other important periods of intrapartum care (e.g., accompaniment to the facility, post-partum) and

narrowly focused on mistreatment and disrespectful care as outcomes. There is a large gap in the literature examining who SPs are (including how many), at what periods they provided support to women, and associations with other measures of women's experience of care. This dissertation examines the types of SPs, number of SPs, and the timing of support and how these are associated with women's, SPs', dyadic, household, and facility-level factors. This highlights the factors at multiple levels that shape structures of social support for women and provides insight into how the health system can better accommodate the diversity of women's social support systems. This research also examines associations between the type of SP, number of SPs, the timing of support during the birthing process (e.g., accompaniment to the facility, labor and delivery, postpartum) and women's experiences of care, as measured by the person-centered maternity care (PCMC).

Literature suggests that SPs can dramatically alter the delivery of maternity care. For example, research has suggested that SPs' interpersonal interactions with providers during care may actually underlie the positive associations between social support and positive health outcomes. Keirse (1989) questioned the mechanisms of associations between social support and decreased pain medication, fewer delivery complications and cesarean deliveries: "However, since the interventions in labour are much more related to caregiver differences than to differences between labouring women—as variation in practices demonstrate—a more important mechanism for any influence of the partner's presence on the outcome of labour is likely to be a change in the behaviour of the physician." Some qualitative studies have shown that SPs can identify gaps in clinical care and summon providers for needed exams and procedures (Alexander et al., 2014; Banda et al., 2010). Others have also argued that inclusion of SPs during

childbirth affects the social dynamic of care and theorize that providers interact and relate to women differently when SPs are present (Kozhimannil et al., 2016).

Recent studies have investigated how SPs can affect health care providers' interactions with women in intrapartum care. One Kenyan study found that women who had no family or friends present during care were twice as likely to report that a health provider's interactions or facial expressions made them feel uncomfortable (Abuya et al., 2015). Another study in India found that women who reported less support at childbirth (e.g., fewer number of supportive actions, such as bringing water/food, talking to providers, providing information, etc.) were more likely to report mistreatment (Diamond-Smith, Sudhinaraset, Melo, et al., 2016). Notably, reported lack of support in discussions with providers was most strongly associated with a higher mistreatment score, doubling the odds of mistreatment. This suggests that SPs play an important role in facilitating or mediating women's interactions with providers. Most recently, a multi-country study on mistreatment during childbirth found that the lack of an SP was associated with both greater physical abuse from providers and reports that health workers and staff did not listen to or respond to women's concerns (Balde et al., 2020). Nonetheless, investigations of how inclusion of SPs and their interactions with providers influence other indicators of QoC beyond mistreatment remains a noteworthy gap in literature. This study investigated how SPs interact with providers in the context of providing support to women and how these may be associated with both clinical and person-centered QoC outcomes.

Within the WHO QoC framework, women's preferences are emphasized, specifying that support must be "of [a woman's] choice." Preferences for SPs can vary substantially by culture, setting, and individual circumstances (Kozhimannil et al., 2016). In general, studies have shown that women prefer someone with whom they were familiar and comfortable, but SP

characteristics and types of support provided can influence women's perceptions about the childbirth experience (Lunda et al., 2018).

It must also be acknowledged that not all support is positive for all women and as such, women's preferences to *not* include SPs should be respected. Support may be considered oppressive when it decreases women's control over decision-making processes or results in mistreatment or distress (Betron et al., 2018; Wittmann-Price, 2004). Some women may also consider certain individuals to be overbearing (i.e., coaching in ways that women consider unhelpful) and want to limit some individuals' involvement, or want to exclude individuals because they fear that they will gossip about their information (such as HIV status) or experiences (Odent, 1984; Wanyenze et al., 2022). One study also found that having too many SPs may be undesirable: 90% of women who had multiple family members present (up to 6) wished to have fewer people present (Keirse et al., 1989). Women's preferences and perceptions must be elicited to ensure that efforts to increase support for women do not undermine women's autonomy (Betron et al., 2018).

The few studies that have explored women's preferences for support during childbirth have revealed considerable heterogeneity in preferences within and across settings, yet these studies are still primarily limited to birth companionship. As described earlier, women in sub-Saharan African studies have reported varying preferences for labor and delivery companionship. In addition, most studies have focused on male partners as SPs, but in practice, SPs are often other family or social network members. In contexts like Kenya, the birth process is often viewed as a women's affair and women are frequently preferred as SPs (Alexander et al., 2014; Al-Mandeel et al., 2013; Banda et al., 2010). For instance, Afulani (2018) found that among a sample of postpartum women in Western Kenya, less than a third (29.3%) of women were

accompanied by male partners to the facility, and the majority were accompanied by mothers, mothers-in-law, sisters, and friends/neighbors. Evidence also suggests that women's preferences for support are changing over time, especially as gender and social norms shift (Moyer et al., 2014). More educated and younger women tend to favor involving their male partners in care, despiite traditional practices and cultural taboos (Ampim et al., 2020). Although women's preferences are varied and dynamic, the literature lacks assessments of how women want to receive support from their SPs beyond wanting companions during labor and delivery. This dissertation research elicited women's preferences for SPs supportive roles in a variety of ways, such as decision-making, interacting with providers, etc., and how these are associated with women's and support persons' characteristics, as well as household and facility factors.

3. Barriers to support persons in maternity care: providers and institutions

Health care system in Kenya

The health sector in Kenya comprises over 12,000 health facilities, of which approximately half (47%) are public institutions (Kenya Ministry of Health, 2022). The private sector includes private for-profit, non-governmental organizations, and faith-based organizations. Facilities are classified by six levels: 1) community, 2) dispensaries, which provide preventive health services and conduct normal deliveries staffed by nurses 3) health centres, which generally provide much of the outpatient health services, staffed mostly by midwives, nurses or clinical officers, 4) district hospitals, which provide clinical services and are the first level of referral hospitals 5) provincial general hospitals, which are the next level of referral that can provide specialized care, and 6) national referral hospitals, which act as teaching and referral

hospitals and provide complex health care staffed by highly skilled personnel (Kenya Ministry of Health, 2011).

There have been continued efforts to improve maternal health at the national and subnational levels, aimed primarily at improving coverage for maternal health services (Kenya Ministry of Devolution and Planning, 2017; UN joint programme on reproductive maternal newborn child and adolescent health 2016-2020, 2017). For instance, all public health facilities across the country abolished delivery fees to improve access to facility-based care (Kenya, 2013) and initiatives have targeted increasing health care capacity (e.g., staff and equipment), strengthening systems, and increasing demand for health services in high maternal mortality areas (Ministry of Health, 2016; UN joint programme on reproductive maternal newborn child and adolescent health 2016-2020, 2017). Although free maternal health care resulted in a significant increase in utilization of facility services, maternal and neonatal mortality failed to decrease as expected, primarily because care continued to be poor quality (Gitobu et al., 2018). In addition, uptake of maternal health services in public health facilities was lower than expected despite fee elimination and increased health care capacity largely because women and communities held negative perceptions of quality of service (Owiti et al., 2018; UN joint programme on reproductive maternal newborn child and adolescent health 2016-2020, 2017).

Evidence indicates significant disparities in access to quality care such that poorer, younger, less educated, and ethnic minority women have poorer access to quality care (Fotso et al., 2008; Sharma et al., 2017; Wairoto et al., 2020; Wirth et al., 2008). In addition, there are notable differences in QoC and patient perceptions of quality for private versus public hospitals in Kenya, which has implications for who can afford and access better QoC. Private facilities

perform better in basic maternal and newborn care and have fewer patient complaints of quality compared to public facilities (Diamond-Smith, Sudhinaraset, & Montagu, 2016).

Concurrent with the national government's policy of free maternity services in 2013, the government decentralized health service provision to county governments, save for the five national referral hospitals (Calhoun et al., 2018). Decentralization increased resources and decision-making within local governance systems to identify local solutions to public health problems. Most dispensaries established maternity delivery units which allowed women to access delivery services at the primary care level while complicated deliveries could still be referred to higher level facilities for specialized care (Mochache et al., 2018).

Despite these changes in policy and governance, deliveries increased in hospitals, but not at health centres/dispensaries (Owuor & Amolo, 2019). In urban areas, women tended to choose higher level facilities, although these policies shifted deliveries from private to public facilities (Calhoun et al., 2018; Escamilla et al., 2018). Unfortunately, the increase in deliveries at facilities was not matched by increased health facility capacity resulting in compromised quality of care, which was further exacerbated by delays in the federal government reimbursing funds for services (Tama et al., 2018). Local supervision of facilities also led to notable differences in care by county of residence. For example, women in Kiambu county were more likely to perceive that maternity care was high quality compared to other counties, including Nairobi (Oyugi et al., 2018). Surprisingly, Nairobi also had the highest neonatal mortality rate (39 deaths per 1000 live births)—death in the first month of life—compared to other regions (the neonatal mortality rate nationally is 22 deaths/1000 live births and in the Central region, where Kiambu county is located, is 24 deaths/1000 live births) (National Bureau of Statistics Nairobi, 2015). Evidence indicates that Nairobi health facilities have low quality of newborn care and are ill-

equipped to care for the urban, predominantly poor population; over 50% of Nairobi's sick newborns may not access a facility with adequate resources to provide essential care (Murphy et al., 2018).

Quality of care also differs across sectors (i.e., public vs. private) and facility types. Use of Active Management of Third Stage of Labor to prevent mortality and morbidity, as per WHO and Ministry of Health guidelines, is greatest in government hospitals compared to private health facilities and greater in higher level facilities (i.e., county & national-level) than lower district hospitals (Felarmine et al., 2016). Hospitals also provide better emergency and routine maternal and newborn care than health centres (Diamond-Smith, Sudhinaraset, & Montagu, 2016), which may be due to funding mechanisms and constraints: health centres and dispensaries are reimbursed at half the amount compared to hospitals for each delivery (Owuor & Amolo, 2019). Despite disparities in clinical care, women's perceptions of care are often higher in private vs. public hospitals and in lower-level vs. higher level facilities (Diamond-Smith, Sudhinaraset, & Montagu, 2016; Oluoch-Aridi, Afulani, Guzman, et al., 2021).

Health care system barriers to support during childbirth: providers and facilities

Despite evidence of positive outcomes associated with including SPs in maternity care, literature has shown that a large proportion of women globally lack access to SPs during childbirth (Kabakian-Khasholian & Portela, 2017). In Kenya, little research has investigated women's access to social and emotional support during childbirth, but some studies indicate that Kenyan women's access to companion support, in particular, is low (P. Afulani et al., 2019). Studies across settings have shown that only 6-42% and 4-16% of women report being allowed

labor and delivery companionship, respectively (P. Afulani, Kusi, et al., 2018; Sudhinaraset et al., 2019).

Both facilities and providers have been implicated as critical factors that determine women's access to their SPs (Kabakian-Khasholian & Portela, 2017; Sudhinaraset et al., 2019). Qualitative evidence about companion support indicates that there continue to be substantial barriers to implementing labor/delivery companionship and integrating SPs into women's care, especially in low and middle-income countries (Bohren, Berger, et al., 2019). Studies in Africa have highlighted policies explicitly barring labor and delivery companions or inconsistent practices of allowing companions regardless of policies (Alexander et al., 2014; Sudhinaraset et al., 2019). Integrating women's preferences into care and facilitating support must occur at multiple levels, from individual nurses to organizations and systems (Burman et al., 2013).

Health care providers are key to delivering high quality health care and shaping the experience of care. Providers' attitudes and behaviors are among the most powerful influences of women's satisfaction with childbirth, surpassing the influences of pain, pain relief, and intrapartum medical interventions (Hodnett, 2002). In addition to providing effective and clinically-sound health care, there is an increasing emphasis on the need for practitioners to be responsive to the needs, preferences and values of people accessing health services (WHO, 2007). This has often been met with resistance from providers, especially as providers may feel that the person-centered elements of care are extraneous, and that they are already overtaxed in low-resource settings (Rominski et al., 2017; WHO, 2016c). However, given that providers have more agency within the provider-patient relationship (Sudhinaraset et al., 2019), it is important to provide evidence of how their normalized practices can have an impact on QoC.

Yet, while I highlight provider practices, I also acknowledge that health care providers are embedded in institutions, health care systems, and social systems. Despite wanting to provide the best care, providers are often constrained and frustrated by institutional policies, lack of resources, and social hierarchies (Sen et al., 2018; Solnes Miltenburg et al., 2018; WHO, 2016c). Frequently, providers are subject to discrimination and mistreatment in the health care system themselves (WHO, 2016c). Also, providers may fear being blamed for negative outcomes and deliver care that they perceive to be technically sound but may mistreat women and SPs in the process (e.g., such as slapping or scolding women to motivate women to push) (Rominski et al., 2017). Rather than blame providers, I argue that providers are essential partners in improving QoC and that change must also occur at the institutional and societal levels.

Provider barriers to support persons

Although providers play a critical role in mobilizing support systems for new mothers (Gjerdingen et al., 1991), literature indicates that providers commonly exclude SPs in care (Bohren, Berger, et al., 2019). Qualitative studies have commonly reported that providers fail to engage or integrate SPs into the model of care, and in some cases, actively exclude SPs. Studies have reported that SPs felt "sidelined," "left out" or ignored by health care professionals (Bäckström & Hertfelt Wahn, 2011; Fenwick et al., 2012). At times, when providers exclude SPs, they create conflict between themselves and SPs (Bruggemann et al., 2014; Kabakian-Khasholian & Portela, 2017; Kaye et al., 2014).

These findings are corroborated by literature exploring providers' reluctance to involve SPs in care, often in spite of recognizing the positive emotional and psychosocial support benefits for women (Banda et al., 2010; Maimbolwa et al., 2001; Qian et al., 2001). Providers

have expressed beliefs that SPs get in the way of the obstetric team (Bruggemann et al., 2014; Qian et al., 2001); disturb midwives (Banda et al., 2010); or will interfere with care such as administering traditional medicine or inciting conflict (Maimbolwa et al., 2001; Qian et al., 2001). These views may also accompany providers' beliefs that they already provide complete care and adequate support, rendering SPs as unnecessary (Cogan & Spinnato, 2009; Horstman et al., 2017).

Evidence also indicates that providers differentially exclude SPs. Though facilities may have explicit policies about access to SPs or visitors during childbirth, they may be discriminatorily implemented by clinical staff. A mixed-methods study conducted in urban Kenya found that providers at the same facilities frequently reported differing practices: some asserted that women were not allowed any access to companions while some stated that a woman was allowed to bring any person of her choice, and yet still other providers granted access based on women's conditions or type of companion, such as allowing only husbands (Sudhinaraset et al., 2019). Another study in rural, western Kenya found that wealthier, employed, and literate women had nearly double the odds of being allowed continuous companion support compared to the poorest, unemployed, and illiterate women (P. Afulani, Kusi, et al., 2018). In contrast to the former study, this study found female relatives were more likely to be allowed as companions than male partners. While these examples illuminate disparities in access to SPs according to social position, they also highlight how localized social norms shape patterns of access.

Facility barriers to support persons

Facility policies and institutional capacity that form the systems, processes, and culture of maternity care are also major factors that shape access to SPs. Kabakian-Khasholian and

Portela's (2017) review of quantitative and qualitative literature concluded that access to SPs largely depended upon facilities' "*allocation of resources, organization of care, facility-related constraints and cultural inclinations."* Infrastructure limitations such as lack of physical space have been cited as a major barrier to SPs' presence in maternity wards. In their qualitative study on perceptions of QoC, Mgawadere et al (2019) recorded a health provider's sentiments about infrastructure as a necessary prerequisite to facilitating access to SPs, "*In most of our labour rooms, it is not possible to allow a companion to be with the woman…We need to work on our infrastructure before we start advocating for companionship during birth."* Providers also commonly cite a lack of appropriate resources as a major reason for their inability to provide more supportive care (P. Afulani, Kirumbi, et al., 2017). In Kenya, patient perceptions of quality (e.g., wait times, availability of medicines, staff treatment of patients, etc.) at private facilities is higher than in public facilities, suggesting that facilities with greater resources may have better trained or incentivized staff, higher quality standards and provide more patient-centered care (Diamond-Smith, Sudhinaraset, & Montagu, 2016). This likely also influences how SPs are treated.

Facility capacity also shapes access to SPs. While some have argued that within overcrowded, understaffed facilities, SPs may attend to women and fill in gaps in care (Chalmers & Wolman, 1993; Maimbolwa et al., 2001), but evidence shows that when patient volumes are high and staff are outnumbered, providers tend to exclude SPs. Overworked and busy staff perceive that they do not have the time to accommodate SPs, whom the obstetric team often considers to be an additional burden (Bruggemann et al., 2014; Kabakian-Khasholian et al., 2018). SPs and women can also perceive that crowded facility environments are not conducive to SPs' presence because of a lack of privacy (Adeyemi et al., 2018). These examples illustrate how

institutions and the way they structure systems of care and allocate resources influence women's access to SPs through multiple pathways.

Despite the large body of qualitative literature about provider and facility barriers to SPs in maternity care, there are several gaps in research. Little is known about disparities in practices regarding SPs aside from which women are allowed labor and delivery companions and what types of companions are allowed. More research is needed about whether there are disparities in women's access to SPs for other supportive functions, such as how providers facilitate support for decision-making or communicate with SPs, and the risk factors that are associated with these disparities.

Importantly, integration of SPs into care has been proposed as a way to address provider and facility barriers to SPs, facilitate support, and improve outcomes (Bohren, Berger, et al., 2019). However, a gap in literature is the extent to which integrating SPs influences the care women receive. Integration of SPs into care has been conceptualized as distinct from merely allowing SPs to be present with women as companions. Companions can still experience substantial barriers (e.g., negative provider attitudes, failure to provide information, inadequate space or privacy, etc.) that can hinder their efforts to provide support, even when allowed to be present with women (Bäckström & Hertfelt Wahn, 2011; Boyce et al., 2007; Kululanga et al., 2012; Steen et al., 2012). Rather, integration of SPs is conceptualized as an antecedent to both access and the provision of support, influencing whether SPs are allowed to be present and the quality of support that SPs provide (Bohren, Berger, et al., 2019). The studies that have found that receipt of social support was positively associated with improved health outcomes and lower mistreatment did not examine or indicate the degree to which SPs were integrated into processes

of maternity care. Thus, we still lack an understanding of how integration of SPs may influence the associations between social support and health outcomes and lower mistreatment. This dissertation research examines integration of SPs into care and estimates associations between integration of SPs and QoC outcomes, accounting for facility factors. Measurably assessing how providers and the facility environment influence SPs' roles which, in turn, contribute to QoC will have implications for institutional policies, health systems management, and clinical practice.

Gaps in the literature

This literature review highlights several notable gaps in the literature regarding the role of SPs. First, a gap in the literature is the assessment of an array of women's preferences for social support. Literature on women's support preferences continues to be dominated by studies on women's preferences for birth companionship. Because evidence indicates that many women do not desire companions during labor and delivery, research on women's needs and preferences for other forms of their SPs' involvement is needed. This research addresses this gap in Aim 1 by eliciting women's preferences for integrating SPs in a variety of ways (i.e., preferences for consulting SPs on decisions, SPs receiving information about their care and condition, etc.).

Second, despite the recognition that SPs are also beneficiaries of the health care system, there is a gap in investigating SPs' experience of care in relation to (or as a part of) women's experience of care. Studies have not examined how SPs' perspectives of providers or their experience with maternity care influence women's perspectives or experiences of maternity care. In addition, literature lacks examinations of SPs' experiences of care for a variety of SP types (e.g., mothers/mothers-in-law, sisters, other family, friends/neighbors). Most studies have focused on the experiences of male partners and overlook other types of SPs as participants in

health care. This study addresses these gaps by investigating both women's and SPs' experiences of PC-ISP in Aims 1 and 2, respectively, including a range of SP types (e.g, male partners, mothers/mothers-in-law, sisters, other family, friends/neighbors). This study also centers the SPs' experiences in the context of women's care by investigating how PC-ISP is associated with woman-reported PCMC and QoC measures in Aim 3.

Third, there are gaps in the determinants that shape structures of social support for women which are important for policy-making (e.g., those aiming to increase male partner involvement). For example, little is known about the multi-level factors that shape women's preferences for different types of SPs, including male partners. The few studies that have investigated factors associated with social support available to women have primarily examined women's individual characteristics. I address this gap in Sub-aim 2b by also examining SPs', dyadic, household, and facility factors associated with types of SPs (e.g., mothers/mothers-in-law, sisters, other family, friends/neighbors), number of SPs, and other timing of support (i.e., accompanying to hospital, post-partum). In addition, given evidence of provider and facility barriers to support, little is also known about whether disparities exist in women's access to SPs for different supportive functions (aside from labor and delivery companionship). Aims 1 and 2 investigate whether integration of SPs reveals possible social inequities in care and whether certain risk factors are associated with integration or exclusion of SPs.

Fourth, although integrating SPs into care has been proposed to address provider and facility barriers to SPs and facilitate support for women, the extent to which integration of SPs influences the care women receive remains an important gap in literature. While other studies have established that the presence of an SP is associated with lower reported mistreatment by women during maternity care, we still lack an understanding of how integration of SPs

influences other aspects of care care women receive, such as clinical QoC. Aim 3 examines the associations between integrating SPs into care and person-centered and clinical outcomes specified by the WHO QoC framework.

Fifth, there is the need to identify how the health care system—constituting providers and facilities—can facilitate support for women beyond companionship, given that many women do not want labor and/or delivery companionship. Most studies currently focus on how health care systems can implement labor and delivery companionship and facilitate support in the form of receiving food and supplies. This dissertation research addresses this gap in Aims 1 and 2 by investigating how the health care system, as measured by provider and facility factors (e.g., number of providers assisting delivery, crowding), integrates SPs into care in different ways (e.g., decision-making, communicating information, ability to ask questions of providers, etc.). In Aim 3, I also investigate how facility factors related to patient and staff capacity moderate how integrating SPs is associated with QoC.

Lastly, there is a gap in quantitative examinations of SPs' experiences in low-income, low-resource settings where access to SPs remains a challenge. The few studies that have surveyed SPs about their experiences were primarily conducted in high-income countries where women largely have access to companions and other forms of support. In addition, a meta-analysis of companion support across settings found evidence suggesting that companion support yielded greater positive effects on health outcomes (e.g., cesarean deliveries, etc.) in settings where companions were normally not allowed (Bohren et al., 2017). The experiences of SPs interacting with providers and facilities in these settings merit deeper investigation because they may be more important for women's care and well-being. Kenya is one of the few countries where the proportion of women who are allowed companion support has been measured;

estimates indicate that a large proportion of women are still denied SPs (P. Afulani, Kusi, et al., 2018; Sudhinaraset et al., 2019). This study addresses this gap by analyzing survey data of women and SPs in Kenya, a lower middle-income country (LMIC), where SPs still face barriers to providing support for women.

4. Proposal of the Person-Centered Integration of Support Persons (PC-ISP) into maternity care

Based on the noted gaps in the PCMC and social support literatures, there is a critical need to address how and to what extent SPs are integrated into care; and how integration is associated with women's experience of care. The integration of SPs into maternity care is crucial to addressing QoC from a person-centered approach. In their systematic review of qualitative literature, Bohren et al. (2019) found that integrating SPs increases women's ability to receive support during childbirth. Importantly, as discussed earlier, they conceptualized integrating SPs as distinct from having labor and delivery companions in care, since SPs can still face provider and institutional barriers to providing support to women, even when allowed to be present with women. They proposed that integrating SPs is an antecedent to women's access to SPs that will improve the quality of support. Their findings also suggest that integrating SPs improves intrapartum care and positive birth experiences, as well as post-partum health outcomes.

Thus, I propose the *Person-Centered Integration of Support Persons (PC-ISP) into maternity care* and define it as the extent to which SPs are integrated into care that is respectful and responsive to women's and needs and preferences, ensuring that women's needs and preferences guide clinical decisions (adapted from the definition of patient-centered care) (Institute of Medicine (US), 2001). Integrating SPs into maternity care services ensures that

allowing SPs is normalized in the ways that women want, providers and clinical staff facilitate SPs' presence and roles, and facility policies and structures accommodate SPs. Integrating SPs with the care team establishes that SPs are provided with sufficient information about women's condition and clinical processes, have clear roles and expectations, act as advocates, and help facilitate communication between women and providers. Conversely, when SPs are excluded, providers are resistant, space is inadequate or cannot ensure privacy, or when practices are differentially applied across women and SPs, women lose connection to those who can assist them and speak and act on their behalf.

PC-ISP themes and sub-constructs

The following section presents themes in literature regarding integrating SPs into care. Literature was organized into four PC-ISP themes: *Welcoming environment*, *Decision-making support*, *Communication and provision of information,* and *Ability to ask questions and express concerns*. I propose that these four themes represent important PC-ISP sub-constructs and merit further research.

A. Welcoming environment

Creating a warm and welcoming environment for women and families is a necessary feature of care, especially because their experiences in the care environment influence their perceptions of quality care. In turn, their perceived QoC contributes to theirs and others' future decisions to utilize health services (WHO 2017 IFC). Qualitatively, QoC is often conflated with feeling welcome in the maternity care setting which draws attention to the importance of positive interactions with providers. Studies have found that quality care is commonly defined as good

interpersonal relationships with providers, such as "being greeted" or having a "feeling of belonging" (Mgawadere et al., 2019). SPs report feeling welcome and being able to effectively provide support when health providers treat them favorably and acknowledge their presence as beneficial to women's well-being (Brüggemann et al., 2007). In contrast, when SPs feel excluded or forgotten by providers, they experience uncertainty about their supportive roles and express inability to support women through birth (Deave & Johnson, 2008; Steen et al., 2012).

B. Decision-making support

It is critical that women remain at the center of decision-making in maternity care to promote their autonomy and agency in care (Nieuwenhuijze et al., 2014). Ensuring agency in decision-making requires that women are adequately supported in the processes of making decisions (Elwyn et al., 2012). Women may need support as they deliberate and may want to consult with SPs as they consider information about clinical care and personal preferences (Rapley, 2008). Especially because family and network members influence women's decisions for maternal health care, such as where and how to seek care and what health behaviors to adopt (Dudgeon & Inhorn, 2004; Moyer et al., 2014; Mullany et al., 2005), women should also be given the opportunity to make clinical care decisions with their SPs. Studies have shown that women want to share decisions about the birth process with their close social relations, especially as they think through options and implications (Cook & Loomis, 2012; Lawton et al., 2016; Seidler et al., 2019; Vedam et al., 2019).

It is important to note that in many contexts, decisions about maternity care are still unilaterally made by providers (Kaye et al., 2014; Kululanga et al., 2012). In these settings, SPs may play a particularly important advocacy role by facilitating women's involvement in

decision-making processes (Dunne et al., 2014). Giving women opportunities to consult with SPs can increase avenues for women to be involved in their own health care, especially when women trust SPs to represent them and intervene on their behalf (Ampim et al., 2021; Kaye et al., 2014).

In addition, giving women the opportunity to make decisions with SPs has implications for the subsequent provision of social support. Inclusion in decision-making processes contributes to SPs' own positive experiences of maternity care (H. L. Longworth & Kingdon, 2011). And when desired by women, shared decision-making can further strengthen linkages among social networks that can result in greater social support among women, families, and communities (WHO, 2017b). For example, joint decision-making in maternal health care has been associated with greater subsequent involvement and supportive behaviors from SPs during childbirth (Mullany et al., 2005).

C. Communication and provision of information

When health care providers give information about maternity care processes, SPs are more confident in their ability to support women (Bäckström & Hertfelt Wahn, 2011; Deave & Johnson, 2008). Greater knowledge and awareness of pregnancy and birth increase SPs' involvement in birth and postnatal care (Alio et al., 2013; Mullany, 2006; Porrett et al., 2013). When SPs are aware and knowledgeable about women's conditions and the processes of care, they can help monitor women's conditions and summon providers for needed clinical care (Kaye et al., 2014). Conversely, unclear birth expectations and insufficient information about pregnancy and childbirth increase SPs' feelings of stress and frustration, reducing their ability to support women (Bäckström & Hertfelt Wahn, 2011; Boyce et al., 2007; Kululanga et al., 2012).

Furthermore, communicating information to SPs about women's condition and care can improve women's ability to engage in their own care, including clinical dimensions. Conveying information to SPs about women's condition and care may help ensure that clinical information is properly heard and understood (Ampim et al., 2021). This may be especially important in aiding women and their families in how they make decisions (H. L. Longworth & Kingdon, 2011) and ensuring adequate informed consent (Elwyn et al., 2012; Kululanga et al., 2012).

Some studies suggest that education and information need to be specifically tailored for SPs. Several studies found that SPs' participation in women's antenatal education alone was insufficient, and that more education and information was specifically needed during intrapartum care. SPs reported feeling unprepared and expressed needs for more information about the birth process, their specific roles during birth, parenting, baby care and relationships. (Deave & Johnson, 2008; Kaye et al., 2014; Kululanga et al., 2012). Providing educational materials about the importance and role of SPs within labor wards has been shown to be useful, facilitate support, and subsequently contribute to women's positive experiences of both support and care (Kabakian-Khasholian et al., 2018).

D. Ability to ask questions and express concerns to providers

The opportunity to interact with providers, ask providers questions during care, and having complications explained are key to SPs having sufficient knowledge and information (Bäckström & Hertfelt Wahn, 2011; Bondas-Salonen, 1998; Kululanga et al., 2012). These types of interactions with providers also bolster SPs' competence and confidence to support women (Alio et al., 2013; Widarsson et al., 2015). When SPs are unable to have their questions answered or obtain information about how women's conditions and medical care change throughout

childbirth, they are less involved and cannot effectively accommodate women's needs (Kaye et al., 2014).

The ability to ask questions and interact with providers about their concerns also provides avenues for SPs to speak up for women regarding the delivery of clinical care. In contexts where providers allow women minimal involvement in their own care, increasing SPs' engagement with providers allows additional pathways to improve QoC (Ampim et al., 2021). Studies have found that women consider SPs as their 'verbal link' to providers when they wanted to communicate concerns with busy staff but lacked the capacity to gain providers' attention because of pain or immobility (Bondas-Salonen, 1998; Kabakian-Khasholian et al., 2018; Kululanga et al., 2012). Evidence also shows that when SPs can interact with providers, they can point out gaps in clinical care and draw providers' attention to needed procedures and exams (Kaye et al., 2014). Moreover, when women are unable to advocate for their own care because they are incapacitated by complications or medical procedures, SPs' ability to advocate on their behalf may be especially crucial (Kaye et al., 2014).

Measuring Person-Centered Integration of Support Persons (PC-ISP) into maternity care

The majority of literature examining how providers integrate family members into maternity care comprises qualitative research (Bohren, Berger, et al., 2019). Few survey instruments have been developed to assess SPs' experiences of care or their interactions with the health care system. Because I have introduced PC-ISP as a novel construct, I reviewed literature for measures assessing how SPs were integrated into maternal health care or similar measures that assess and evaluate SPs' experience within the clinical care context. I also discuss their utility as well as limitations, specifically related to measuring PC-ISP.

Existing measures used to assess interactions between support persons and providers in care

The little extant research and measures related to providers' interactions with SPs in maternal health care have focused on male partner involvement. Several instruments have been designed to assess men's experiences in maternal health care. For example, the Kuopio Instrument for Fathers (KIF) primarily assesses men's perceptions of childbirth (Sapountzi-Krepia et al., 2009; Vehviläinen-Julkunen & Liukkonen, 1998), but includes five questions regarding their perceptions of providers such as *"The staff were very professional," "I trusted the staff," "The staff were busy," "I was grateful to the staff,"* and *"The staff were unfriendly."* Similarly, Porrett et al. (2013) used a 14-item questionnaire to evaluate men's attendance of antenatal classes and how it influenced their childbirth experiences. They assessed men's perceptions of the antenatal classes with two items (*"I found the educators in the antenatal classes were helpful and sympathetic"* and *"I felt well-informed"*) and included a general measure of self-efficacy (*"I felt I was able to help my partner"*). Another male involvement study conceptualized male partners' interactions with health providers as one facet of broader involvement in maternity care (Ampt et al., 2015). Of five involvement indicators used, one item regarding the provider-partner interaction was included: *"Discussion of partner's most recent pregnancy and birth with a health care provider."* They conceptualized this as an indicator of greater depth of involvement.

These instruments have several limitations in the context of this inquiry of PC-ISP. All of the measures regarding SPs' interactions with providers were developed specifically to examine male partner companionship and involvement (either descriptively or as an outcome), since in those contexts SPs were assumed to be male partners. In reference to PC-ISP, these instruments

were related to sub-constructs: *Welcoming environment* (i.e., feelings towards health providers/staff), *Communication and provision of information* (i.e., antenatal education), and *Ability to ask questions and express concern* (i.e., discussion of pregnancy and birth with provider). These measures did not, however, address *Communication and provision of information* during intrapartum care and did not include measures about facilitating *Decision-making support*. In addition, only one of the measures described a supportive role of the SP (i.e., discussion of birth with provider). And most notably, none of the measures addressed how providers integrated the SP into women's maternity care. Moreover, none of the studies that used these measures assessed how SPs' experiences or involvement influenced women's reported experiences or care. It is important to examine the SPs' experiences of care beyond whether they were present or not to better understand how these experiences influence the care that women receive.

Chapter 3. Conceptual Framework

My conceptual model (Figure 3.1) establishes PC-ISP within the WHO QoC framework (Tunçalp et al., 2015) and Person-Centered Maternity Care (PCMC) (Sudhinaraset et al., 2017). This model is also situated within the socioecological model to illustrate how forces at multiple, intersecting levels influence the delivery of care.

WHO quality of care framework for maternal and newborn health

The WHO QoC framework for maternal and newborn health conceptualizes QoC as a multi-dimensional process, recognizing that biomedical and social factors influence health outcomes (Tunçalp et al., 2015). This framework proposes that improving both the provision and experience of care will increase likelihood of QoC outcomes: person-centered outcomes (e.g., person-centered maternity care, satisfaction with care, willingness to return to the facility) and clinical care outcomes (e.g., increased coverage of key practices), and subsequent health outcomes. The provision of care refers to evidence-based practices for routine and emergency care and effective information and referral systems. For example, these include whether women had a vaginal examination at intake, had blood pressure checked, contractions timed, and fetal heartbeat assessed, among others (WHO, 2016d). The experience of care includes effective communication, dignity and respect, and the social and emotional support of her choice. These elements ensure that care acknowledges and respects women's needs and values. The WHO framework conceptualizes an interplay between the provision and experience of care such that both dimensions are critically needed. (Bohren et al., 2014; WHO, 2007). Care that is of high quality should be clinically sound, responsive, and respectful.

The experience of care: Person-Centered Maternity Care (PCMC)

Person-centered maternity care (PCMC) refers to maternity care that is dignified, equitable, and responsive to women's needs and preferences, ensuring that it guides all clinical decisions (Sudhinaraset et al., 2017). PCMC encompasses parts that are based in human rights and universal standards of practice as well as components that account for cultural differences which shape expectations of care. PCMC covers three sub-domains, including Dignity and Respect, Autonomy and Communication, and Supportive Care. PCMC's guiding framework, the Person-centered care framework for reproductive health equity, extends the WHO QoC framework to also account for social determinants of health that drive inequities, manifested by differential treatment based on social status, community influence, or gendered norms. Too often, maternity care is inequitable and discriminatory, and women are given worse care because of poverty or lack of education (Sadler et al., 2016; Sen et al., 2018).

The PCMC framework consequently proposes interactions between three contextual levels: 1) Societal and community determinants of health equity, 2) women's health-seeking behaviors, and 3) facility-level factors, including the provision of clinical care and person-centered dimensions of care. Societal and community determinants of health equity include broader social and gendered norms, recognizing that broader patterns of stigma, discrimination and mistreatment are reflected in women's experience of health care (Bingham et al., 2019; WHO, 2016c). These determinants contribute to women's expectations and decisions to seek care, such as when women avoid using maternity services because they fear abuse or mistreatment (Bradley et al., 2016a; Gage, 2007).

Person-Centered Integration of Support Persons (PC-ISP) into maternity care

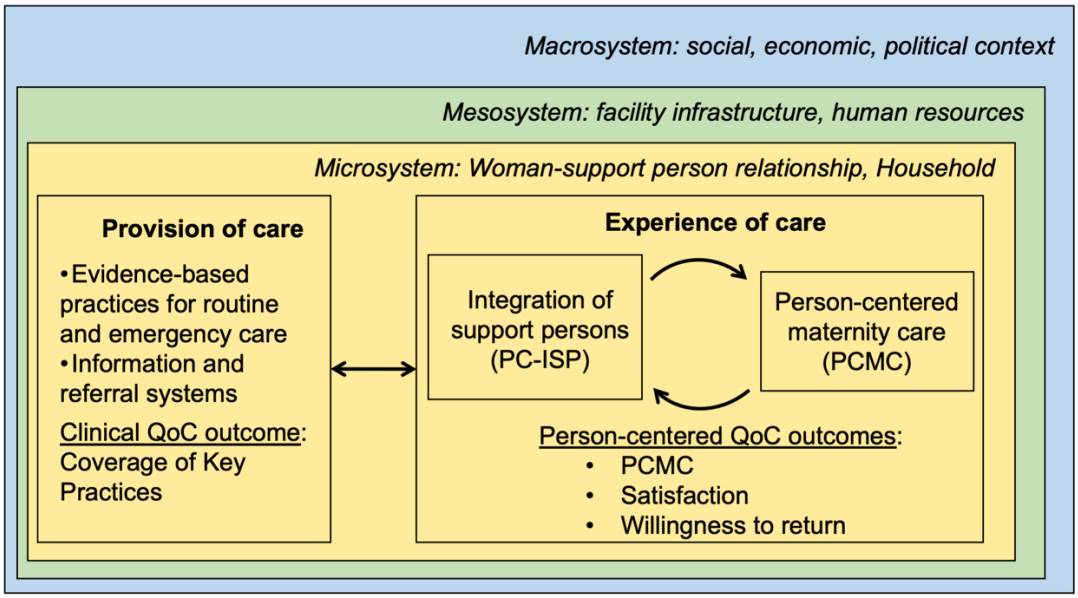
Access to women's emotional and social support of her choice is one essential component of QoC (Tunçalp et al., 2015). Literature indicates that the extent to which SPs are integrated into maternity care determines whether women can receive social support (Bohren, Berger, et al., 2019). PC-ISP refers to the extent to which SPs are integrated into care that is respectful and responsive to women's and SPs' needs and preferences, ensuring that women's needs and preferences guide clinical decisions. This encompasses several key provider practices during intrapartum care, including making family members feel welcome (Banda et al., 2010; Brüggemann et al., 2007; Mgawadere et al., 2019), allowing women to consult with SPs about decisions in care (Mullany et al., 2005; Tokhi et al., 2018), communicating information to SPs about health conditions and care (Bäckström & Hertfelt Wahn, 2011; Bondas-Salonen, 1998; Kululanga et al., 2012), and answering their questions and listening to their concerns (Alio et al., 2013; Deave & Johnson, 2008; Widarsson et al., 2015).

This model thus conceptualizes PC-ISP as a complement to PCMC, capturing the quality of engagement regarding social support within the model of care. This model proposes that PC-ISP and PCMC mutually reinforce one another. For example, PCMC likely increases PC-ISP, as providers who are respectful of women's preferences will likely respect women's desires to integrate SPs. On the other hand, PC-ISP increases SPs' abilities to act as advocates or facilitate communication between women and providers, etc. These experiences are posited to subsequently modify and improve women's interactions with providers, garner more respectful treatment, and therefore increase PCMC.

Likewise, building from the WHO QoC framework and the person-centered framework for reproductive health equity, this model also conceptualizes that PC-ISP interacts with the provision of care (i.e., clinical practices). PC-ISP provides avenues for women to improve the

delivery of care by calling upon SPs to gain the attention of providers and advocate for necessary and better clinical treatment.

Figure 3.1 Adapted WHO Quality of Care and PCMC Framework



Socioecological framework

Lastly, this conceptual framework employs a socioecological approach to orient QoC within broader systems at multiple levels. A systems-based socioecological approach has been widely used in public health research and conceptualizes the individual embedded within an interconnected ecology of social and physical contexts (Bronfenbrenner, 1986; Darling, 2007). The individual is thus influenced by and actively interacts with multiple levels of this ecology, which, in turn impact her health. Literature on disparities in perinatal care recommends a socioecological approach to examine inequities in QoC to outline modifiable factors at the societal, facility, relationship and individual levels (Bingham et al., 2019).

Within this model, the individual is situated within her most proximal setting, which is embedded in increasingly distal levels: microsystems, mesosystems, and finally, macrosystems. Microsystems include the closest level of relationships that involve frequent, regular interactions and activities, generally constituting family or kin. Family members are typically those closest to and most trusted by women, though not always, whom she wants to integrate into care. Mesosystems are the next layer of the social ecology which includes larger institutions, structures, and processes. Here, I conceptualize the facility and broader health system as a mesosystem, as the physical and social environment for intrapartum caregiving processes. The institutional policies, normalized practices, physical space, and allocation of human and material resources shape both provider practices and women's experience of care. Lastly, macrosystems represent overarching patterns and systems that organize more proximal systems in society. These include factors such as cultural norms, and economic and political systems which organize cultural norms and norms about gender, social stratification, and distribution of resources within the broader population.

Chapter 4. Methods

In this chapter I describe the methods I used for this study. I first present the setting of the study, providing background information about Nairobi and Kiambu counties in Kenya and the health care system. I then describe the Strengthening Person-centered, Accessibility, Respectful Care, and Quality (SPARQ) study, which is the overarching study that provided the data used in this research. I also present detail about the variables I examined, including PC-ISP measures that I developed, QoC indicators, and other factors examined. Finally, I describe the analytical approach for each of the three specific aims including model-building, methods to address clustering and confouding, and sensitivity analyses.

Setting

Nairobi is the capital and largest city in Kenya with a population of 4.4 million. Kiambu county, as part of the Nairobi metropolitan area, is the second most populous county in Kenya (2.4 million). The administration under the British laid down the political and socioeconomic structure for African residents' lives, including social institutions, governance, and housing (Ese & Ese, 2020). Following independence in 1963, racial segregation shifted into social segregation, which persists today (Charton-Bigot & Rodriguez-Torres, 2010): now over half (56%) of the urban population lives in informal slum settlements and is projected to continue to grow (UN Habitat, 2015).

The demographics of Nairobi and Kiambu counties reflect its history of social and income inequality. These urban counties are a destination for migration as people seek economic and educational opportunities. But resources are still inequitably distributed, shown by the large proportion of the population that still live in poor, informal communities. In these two counties,

women have the highest educational attainment in the country and deliver in facilities (vs at home) at proportions much higher than compared to the rest of Kenya (Nairobi: 89%, Kiambu: 93%, nationally: 61%) (National Bureau of Statistics Nairobi, 2015). Yet paradoxically, Nairobi's neonatal mortality rate (NMR) at 39 deaths per 1000 live births is higher than all other regions in Kenya (in the central region of Kiambu NMR is 24 deaths per live births; national NMR is 22 deaths per live births) (National Bureau of Statistics Nairobi, 2015). Literature has cited inequitable access to high quality services as factors underlying poor maternal and newborn health outcomes (Calhoun et al., 2018; Fotso et al., 2008).

Data

I used quantitative data from the Strengthening Person-centered, Accessibility, Respectful Care, and Quality (SPARQ) study. The SPARQ study is a longitudinal study that investigated PCMC and associations with maternal health and neonatal outcomes in central Kenya (Sudhinaraset et al., 2021). Data were collected between September 2019 and January 2020 from 6 facilities in Kiambu and Nairobi counties, which were selected as a mix of public and private facilities with high patient volumes (i.e., over 100 deliveries per month). Patient volumes of selected facilities ranged from 100-900 deliveries per month.

Women's survey:

Women between the ages of 15-49 who had recently delivered in study hospitals were interviewed at the facilities for baseline and were contacted for two follow-up surveys at 2-4 weeks and 10 weeks post-partum. Criteria for inclusion in this study for women were a) between 15-49 years of age, b) spoke English or Kiswahili, c) had given birth vaginally and d) owned a

mobile phone and felt comfortable being contacted by the study team. Women were recruited from post-partum wards by female research assistants in collaboration with facility staff. Facility staff approached women who met eligibility criteria and asked if they would be interested in the study. Women were then referred to research assistants and led to a private setting. Research assistants described the study, assessed eligibility, obtained informed consent, and interviewed women. Baseline interviews lasted approximately 1 hour. Women were contacted via phone by research assistants for two follow-up surveys (2-4 weeks and 10 weeks). Follow-up surveys lasted approximately 15-20 minutes. A total of 1,197 women provided baseline data, 1,138 of whom reported that they had at least one SP (i.e., someone either accompany them to the facility, stay with them during labor/delivery, or visit post-partum). Among those women, 965 participants also completed a follow-up survey at 2-4 weeks or 10 weeks post-partum.

Support persons' survey:

In addition, the data set also includes interview data of accompanying SPs, who were also surveyed at the facility at baseline.

Criteria for inclusion for SPs included: a) anyone who accompanied the woman to the hospital, stayed and assisted the woman during labor and/or delivery or visited during the post-partum period, b) at least 18 years of age, and c) spoke English or Kiswahili. Recruitment of SPs was conducted in collaboration with women who participated in the baseline survey. Following completion of their interviews, women identified an SP as a potential participant. Eligible SPs were referred to research assistants in a private setting. Research assistants then described the study, assessed eligibility, obtained informed consent, and interviewed SPs. Surveys lasted

approximately 20 minutes. A total of 606 SPs completed interviews. Only 9 respondents refused the SP survey. The remaining women without accompanying SP surveys did not have an SP who met eligibility criteria.

Ethical approval

The study procedures were approved by the Institutional Review Boards at the University of California, San Francisco (protocol number 19-27783) and the Kenya Medical Research Institute (Protocol KEMRI Non-SSC 666). Informed consent was obtained from all participants prior to participation.

PC-ISP themes and survey questions

I define PC-ISP as the extent to which SPs are integrated into care that is respectful and responsive to women's needs and preferences, ensuring that women's needs and preferences guide clinical decisions. I also broadly define a support person (SP) as a lay person (i.e., those who are not medical professionals employed by the facility) who accompanies or remains with a woman, in or near the maternity ward during labor, delivery, or postpartum to provide emotional, physical, and social support (Maimbolwa et al., 2001; Simmonds et al., 2012). Doulas, Accredited Social Health Advocates (ASHAs), or community health workers who provide support but are not employed by the health facility may also be included within the definition of SPs.

In addition, I grounded the concept of PC-ISP in person-centered care. The person-centered model asserts that women should be at the center of their own care (Sudhinaraset et al., 2017). This is important because existing models of medical care in low-resource settings often

center around the institution and providers (Bruggemann et al., 2014). Practically, this gives women a voice in their health care and acknowledges their desires and needs for support. Within the person-centered approach, evaluating women's experiences of care from their own perspectives is critical. Thus, PC-ISP indicators are reported by women, measuring how they perceived that SPs were integrated into their care.

Because existing measures of social support on care are not detailed enough to capture nuances in women's preferences for support and access to SPs, I focused measurement on integrating SPs into care. I conducted a literature review of women's and SPs' experiences of social support in maternity care and identified themes regarding how SPs are excluded from maternity care practices, such as making them feel unwelcome or failure to communicate with them (Kululanga et al., 2012; Mgawadere et al., 2019). I used these themes to define specific areas that SPs can be integrated into care which were then developed into four corresponding sub-constructs of PC-ISP: *Welcoming environment, Decision-making support, Communication and provision of information*, and *Ability to ask questions and express concern*s.

A *welcoming environment* highlights the importance of positive interpersonal relationships between providers and women's preferred SPs (Brüggemann et al., 2007; Mgawadere et al., 2019; WHO, 2017b). Adequate *decision-making support* promotes women's autonomy and agency in their own care by providing the opportunity to consult with SPs about clinical decisions (Cook & Loomis, 2012; Elwyn et al., 2012; Nieuwenhuijze et al., 2014). *Communication and provision of information* facilitates SPs' involvement in care and clarifies their roles (Alio et al., 2013; Kabakian-Khasholian et al., 2018; Kaye et al., 2014; Porrett et al., 2013). The *ability to ask questions and express concerns* acknowledges the importance of providing opportunities for SPs to engage with providers during care, especially as an avenue to

advocate on behalf of women (Ampim et al., 2021; Bondas-Salonen, 1998; Kaye et al., 2014; Kululanga et al., 2012).

PC-ISP survey questions

The four themes discussed above were used to develop PC-ISP survey questions included in the women's and SPs' surveys. These survey questions were designed to measure the extent to which care integrates SPs that is respectful and responsive to women's needs and preferences. Table 4.1 presents PC-ISP indicators administered to both women and SPs. Five survey questions were administered to women about their PC-ISP experiences. Women were also surveyed regarding their preferences for PC-ISP corresponding to three sub-constructs (*Decision-making support*, *Communication and provision of information*, and *Ability to ask questions and express concerns*). Possible response options for women's survey questions used a 3-point Likert-type scale: Agree, Somewhat agree, and Disagree.

SPs were asked 5 PC-ISP questions, corresponding to three PC-ISP sub-constructs (*Decision-making support*, *Communication and provision of information*, and *Ability to ask questions and express concerns*). Response options for SPs' questions were binary (yes vs. no). Two questions (i.e., *Decision-making support* and *Ability to ask questions and express concerns*) were only asked of the subsample of SPs who reported being present with the woman during labor or delivery (n=134). Although these questions should have been asked of all SPs, they were only asked of a subset of SPs, thus presenting a limitation of the data (this is addressed further in Aim 2 analyses in Chapter 6).

Table 4.1: PC-ISP variables and survey questions

Women's survey questions (n=1,138)

Subconstruct	Women's PC-ISP experiences	Women's PC-ISP preferences
Welcoming environment	My family member(s) felt welcome by the facility at my delivery	---
Decision-making support	I was given the opportunity by my health provider to consult my family about my health care decisions	I wanted to consult my family about decisions about my care for delivery
Communication and provision of information	I was asked by my health provider if my family should be told about my condition/care	I wanted my family to know about my condition/care I wanted my family to understand my condition/care
Ability to ask questions and express concerns	My family was welcome to ask my health care provider questions My health care provider listened to my family members' concerns	I would have liked my family members to make sure my provider respects my values and choices
Support persons' survey questions (n=606)		
Decision-making support	Did you help the mother with any decisions during the labor and/or delivery? *	
Communication and provision of information	Were you provided resources or information from the mother's health provider on how to help care for the mother? Were you provided resources or information from the mother's health provider on how to help care for the newborn?	
Ability to ask questions and express concerns	Were you or do you think you would have been welcome to ask the health care providers questions about the mother and baby's care? Did you ever help speak up to the health facility staff on behalf of the mother? *	

Notes:
* Question was asked of a subset of SPs who reported being present with the woman during her labor and/or delivery (n=134).

To measure the reliability of PC-ISP indicators, Cronbach's alpha was calculated. For the 5 PC-ISP reports in the women's survey, indicators displayed poor reliability (α=0.592), likely because of the small number of items and low average inter-item covariance (0.017). This is not surprising, given that PC-ISP items cover a range of PCMC domains and themes. One item in particular, *welcoming environment*, showed low item-rest correlation (0.1820). Removing *welcoming environment* resulted in a slight improvement in reliability and, for the remaining 4-items, the alpha coefficient was 0.616, which is still considered 'undesirable,' yet not unacceptable (DeVellis, 2017). The 5 PC-ISP items in the SPs' survey also demonstrated undesirable reliability (α=0.618). However, some have suggested that low reliability may not be

a major impediment to a measure's use, especially if it has meaningful content coverage and a degree of unidimensionality (Schmitt, 1996). I argue that although these PC-ISP measures span several domains contributing to low alpha statistics, these measures are still useful because the items are theoretically grounded and that its examination may be constructive for further scale development. Nevertheless, the low reliability could potentially lead to underestimation of associations between PC-ISP and predictors or outcomes.

For analyses, I investigated women-reported PC-ISP experiences, using the 5 items as separate indicators as well as a combined 4-item measure, (summative score of *Decision-making support*, *Communication and provision of information*, *Ability to ask questions and express concerns*, range 0-4). Woman-reported PC-ISP variables will be recoded as dichotomous with 1 indicating "Agree" or "Somewhat agree" and 0 for "Disagree" responses. Recoding allowed for easier identification of trends and patterns (De Vaus, 1995). While collapsing a Likert-type scale results in some loss of information, the data loss in this case is considered minimal because of small frequencies in the "Somewhat agree" responses. In this case, for each item, a very small proportion reported "Somewhat agree," ranging from only 1.5-3.9% of the sample. On theoretical grounds, "Agree" and "Somewhat agree" were combined as both response options have positive valence. I conservatively recoded "Don't know" responses as "Agree/Somewhat Agree" and excluded missing responses (2 indicators were missing 19 responses: *Ability to ask questions and express concerns*).

For women's PC-ISP preferences, I also used the 4 items as separate indicators as well as a combined 4-item measure (range 0-4). Similar to the PC-ISP reports, the separate indicator variables were recoded as dichotomous (collapsing "agree" and "somewhat agree" response options).

For SP-reported PC-ISP, I used the 5-items as separate variables. Because 2 questions (*Decision-making support* and *Ability to ask questions and express concerns*) were only administered to the subsample of SPs who reported being present with the woman during labor and delivery (n=134), it was not possible to use a combined score due to inconsistent sample sizes.

Quality of Care (QoC) variables

Person-centered outcomes (Aim 3a): The *Person-Centered Maternity Care (PCMC)* scale is a measure of the experience of care, which has demonstrated high reliability and validity in rural and urban Kenyan populations (P. Afulani, Diamond-Smith, et al., 2017). The PCMC scale was developed as an instrument to assess the extent to which maternity care is respectful and responsive to individual women's preferences, needs, and values. The 30-item PCMC scale was administered in the women's survey and is comprised of three subdomains: *dignity and respect* (6 items)*, communication and autonomy* (9 items), and *supportive care* (15 items). Response options for each item were a 4-point Likert-type scale and total combined PCMC score can range from 0 to 90, which I standardized to a 100-point scale.

Women's reported *Satisfaction with care* is a multidimensional construct that encompasses perceptions of the quality and goodness of care (Srivastava et al., 2015). In addition, satisfaction is posited to impact future care-seeking behaviors and broader community perceptions of quality (Aziz Ali et al., 2018). The *Satisfaction with care* variable is a combination of three questions regarding satisfaction with different aspects of care and services received: during labor and delivery, after delivery, and for the newborn received after delivery. Possible responses corresponded to a 4-point Likert-type scale (Very satisfied; satisfied,

dissatisfied, very dissatisfied). Together, these three variables demonstrate respectable reliability (α=0.78). The combined *Satisfaction with care* variable sums the three items and ranges from 0-9.

Willingness to return refers to women's stated intentions to return to the facility for future deliveries (Paudel et al., 2015). Intention to use maternal health services is important to assess as progress is still needed to reach universal maternal health care coverage in Kenya (UN joint programme on reproductive maternal newborn child and adolescent health 2016-2020, 2017). This outcome was assessed at women's follow-up interviews (at 2-4 and/or 10 weeks after delivery) by the question "Would you go back to the same provider/facility next time you are delivering a baby? (yes/no)". This outcome variable coded women who reported that they would go back to the same provider/facility at either follow-up interview as 1='willing to return' vs. 0='not willing to return.' Notably, this is the only variable used from follow-up surveys in this study.

Clinical QoC (Aim 3b): I assessed *coverage of key practices*. Women reported on 28 key practices from WHO's standards of maternal and newborn care (Montagu et al., 2020; WHO, 2016d). *Coverage of key practices* is a variable summing the total number of standard procedures or exams received reported by women. These practices include *maternal key practices* (17 questions): pre-delivery practices such as whether a health provider asked how a woman was feeling, had headaches, had bleeding, if her water had broken, if she was examined, had blood pressure and pulse checked, had contractions timed, if the fetal heartbeat was assessed, if she was given a vaginal and post-delivery practices such as blood pressure and pulse checks, whether she was asked if she was in pain, abdominal, perineum, and bleeding examinations, and whether staff

were always accessible. *Newborn key practices* (11 questions) included whether the infant was examined following birth, put immediately on the mother's chest after delivery, wiped dry, was not bathed in the first 6 hours, had temperature assessed, had the cord was examined, and whether a health provider counseled on newborn danger signs, checked if breastfeeding was going well, observed breastfeeding, helped show how to breastfeed, and whether breastfeeding was initiated in the first hour after birth. The *coverage of key practices* variable sums the reported number of these practices for each woman (range 0-28) and comprises two subdomains: *maternal key practices* (range 0-17) and *newborn key practices* (range 0-11*). Coverage of key practices* demonstrated very good reliability (α=0.82), while subdomains *maternal key practices* demonstrated respectable reliability (α=0.79) and *newborn key practices* had undesirable reliability (α=0.63) (DeVellis, 2017).

Other variables

This section presents other variables examined at the women's, SP's, dyadic, household, and facility levels, based on levels of the socioecological model. These variables were examined as predictors in Aims 1 and 2 and included as covariates in Aim 3. Table 4.2 presents independent, dependent, and control variables investigated mapped onto each of the 3 specific aims.

Women's variables: Investigation of individual-level determinants can reveal disparities in care, specifically whether certain groups of women are more likely to have negative experiences of PC-ISP (Aim 1). Individual-level factors include age (continuous), marital status (married or partnered vs. not), parity (continuous), educational attainment (primary or less;

vocational/secondary; college/university), current employment status (employed vs. not), birthplace (born in Nairobi or Kiambu counties vs. not), and health insurance status (covered under health scheme/insurance vs. not). Health status and health conditions could also influence how providers address preferences and whether they integrate SPs. I examined health factors including self-reported health status (ordinal: excellent/very good, good, fair, poor/very poor) and self-report of problems during pregnancy (yes vs. no), and delivery complications (yes vs. no).

Support Person Variables: Recognizing that the social position of SPs may influence interactions with health care providers, I also examined SPs' and dyad-level factors. Women reported on whether an SP (or SPs) were present during different periods of maternity care (e.g., accompanied to the facility, labor and/or delivery, post-partum) and their relation to the SPs. I examined the types of SPs (i.e., male partner; mother/mother-in-law; other family member; friend/neighbor/other), the total number of SPs (continuous), and timing of support (accompanied to the facility, labor and/or delivery, post-partum). In addition, I also examined SP-reported characteristics including age (continuous) and occupation (casual labor, salaried worker, self-employed in petty trade, self-employed small-scale industry, unemployed/homemaker). I also investigated dyadic variables that describe the woman-SP relationship: SPs' relational connectedness to the woman (range 1-7, higher values corresponding with greater connectedness), age difference between the SP and the woman (continuous), how long the SP has known the mother, and whether SPs accompanied the woman to antenatal care (yes vs. no), an indicator of past involvement in maternal health care.

Household factors: Household factors include household composition, such as size, and number of adults and children. Because a woman's position within the household influences her expectations and preferences for care, I also included an indicator of women's empowerment: household decision-making power. The women's survey includes four questions from the Demographic and Health Surveys regarding women's decision-making power in the household woman's health care, major household purchases, daily household purchases, and visits to family or relatives (Kishor & Lekha, 2008). I constructed a variable from these measures, '*empowered in household decisions,*' a dichotomous variable which coded women who reported being involved (i.e., reporting that decisions were made by the "woman only" or "jointly") in all four household decision questions as 'empowered' vs. women who reported not being involved (i.e., reporting that decisions were made by "partner only" or "someone else") in at least one household decision question, coded 'not empowered' (Upadhyay & Karasek, 2012).

Facility-level factors: Facility factors include the type of facility (government hospital; government health centre or dispensary; private facility) and type of provider who assisted with delivery (doctor, clinical officer, nurse, midwife, other, unattended). The physical infrastructure of the facility, such as whether there is adequate space or privacy or is properly equipped, can influence the degree to which providers integrate SPs (Kabakian-Khasholian & Portela, 2017; Mgawadere et al., 2019). The facility environment can also influence SPs' perceptions of the QoC received, especially if SPs perceive facilities are crowded, dirty, or ill-equipped (McMahon et al., 2014). I examined SPs' *perceptions of crowding in the health facility environment* (crowded vs. not crowded).

Table 4.2. Variable List by Aims

Aim 1: Examine women's PC-ISP	
Aim 1: Determinants of women's a) preferences and b) reports of PC-ISP	
Dependent variables	*Aim 1a:* Women's PC-ISP preferences (4 individual variables, combined 4-item measure) *Aim 1b:* Women's PC-ISP experiences (5 individual variables, combined 4-item measure) **See Table 4.1 for specific measures
Independent variables	*Woman:* Age, marital status, parity, educational attainment, employment status, birthplace, health insurance coverage, health status, pregnancy problems, delivery complications *SP:* Type, total number of SPs, timing of support *Household*: household size, women's empowerment scale *Facility:* Type of facility, type of provider at delivery
Aim 2: Examine support persons' PC-ISP	
Aim 2: Determinants of SPs' PC-ISP experiences	
Dependent variables	SP-reported PC-ISP experiences (5 individual variables) **See Table 4.1 for specific measures
Independent variables	Women's, SPs', household, and facility factors described above in Aim 1 will be included. Additional factors included in the SPs' survey include*:* *SP:* age, occupation *Dyadic:* relational connectedness, age difference of dyad, how long the SP has known the mother, and whether the SP accompanied the woman to antenatal care *Facility:* SPs' perceptions of crowding in the facility environment
Sub-Aim 2b: Explore types of SPs, number of SPs, and timing of support	
Dependent variables	Types of SPs, number of SPs, timing of support
Independent variables	Women's, SPs', dyadic, household, and facility factors are the same as described in Aim 2.
Aim 3: Estimate associations between PC-ISP and QoC	
Aim 3a: Associations of PC-ISP and woman-reported person-centered outcomes	
Dependent variable	*Person-centered QoC outcomes*: PCMC (full 30-item scale and 3 subdomains: Dignity & Respect, Communication & Autonomy, Supportive Care), Satisfaction with care, Willingness to return **See p.60-61 for specific measures
Independent variables	Women-reported PC-ISP experiences (5 individual variables, combined 4-item measure) SP-reported PC-ISP experiences (5 individual variables)
Covariates	Women's, SPs', dyadic, household, and facility factors described in Aims 1 and 2 above.
Aim 3b: Associations of PC-ISP and woman-reported clinical quality outcome	
Dependent variables	*Clinical QoC outcome:* Coverage of key practices and subdomains (maternal key practices, newborn key practices)

	**See p.61 for specific measure
Independent variables	Women-reported PC-ISP experiences (5 individual variables, combined 4-item measure) SP-reported PC-ISP experiences (5 individual variables) **see Table 4.1 for specific measures
Covariates	Women's, SPs', dyadic, household, and facility factors identified from Aims 1 and 2 above.
Sub-Aim 3c: Facility capacity as a moderator of associations between PC-ISP and QoC	
Dependent variables	PCMC, satisfaction, willingness to return, and coverage of key practices
Independent variables	Women-reported PC-ISP experiences (combined 4-item measure)
Moderating variables	Patient:staff ratio (staffing), total number of beds at the facility (patient volume), patient:bed ratio (crowding)

Analyses

Aim 1 Analysis

The objective of Aim 1 was to examine the women's, support persons', household, and facility-level determinants of <u>women's</u> a) PC-ISP preferences and b) PC-ISP experiences.

Analyses for both Aim 1a (PC-ISP preferences) and Aim 1b (PC-ISP experiences) followed the same analytical process. I first examineed bivariate associations between dependent variables and all factors at the women's, SPs', household, and facility levels, using chi-square tests and t-tests. Second, I will assess: 1) determinants associated with individual PC-ISP indicators using multivariable binomial logistic regression 2) I assessed determinants associated with the combined PC-ISP score, using multiple linear regression. Both sets of analyses followed a sequential, blocked model building approach, beginning with a model including a block of woman's individual factors, then adding increasingly distal levels for each subsequent model (i.e., adding SPs' factors, then household, etc.). Within each block of variables at a given level, I included theoretically relevant variables as well as all variables that showed statistically significant (two-sided alpha=0.05) bivariate associations. I used cluster-robust standard errors to

account for clustering by facility. I also examined the intra-class correlation across facilities and examined multi-level models to understand whether variation in PC-ISP could be explained by individual facilities' random effects.

Sensitivity analyses assessed the extent to which PC-ISP occurs within and across facilities, as well as possible differences in associations with risk factors by facility. I also assessed confounding that may be due to women's selection of facilities: because women were not randomized to facilities, I also examined differences by women's stated reasons for choosing a particular facility (e.g., referral, close to home, facility was of high quality, etc.).

Aim 2 Analysis

The objective of Aim 2 was to examine the women's, support persons', dyadic, household, and facility-level determinants of <u>support persons</u>' PC-ISP experiences.

I investigated determinants of SPs' reports of PC-ISP as separate indicators, corresponding to different levels of the socioecological model. Analyses for Aim 2 followed the same analytical process as described in Aim 1 above, including examination of bivariate associations, the blocked modeling approach, cluster-robust standard errors, and sensitivity analyses. The SPs' surveys included additional data on SP characteristics, dyadic and facility factors such as SPs' age, occupation (SP-level), relational connectedness, age difference (dyad-level), and perceptions of the facility environment (facility-level).

The objective of Sub-Aim 2b was to explore factors associated with types of support persons, number of support persons, and timing of support.

In this exploratory aim (results are in Appendix A), I descriptively analyzed factors associated with dependent variables: i) the types of SPs (reported by women and SPs), ii) number of SPs (reported by women), iii) the timing of support (reported by women and SPs). I examined differences in frequencies and distributions of factors at each level (i.e., women's, SPs', dyadic, household, and facility factors) by i) categories of SP types, ii) total reported number of SPs at the facility, and iii) the timing of support using crosstabs, histograms, and scatterplots, etc. I used bivariate statistics, such as t-tests, chi-square tests, and correlation coefficients, to test for statistically significant differences (two-sided alpha=0.05).

Preliminary analyses also demonstrate that women's and SPs' reports of timing of support are often contradictory. For example, 89% of SPs who reported being present with the woman during labor and delivery were contradicted by women's reports of having no SP present during labor and delivery. To address this, I examined factors associated with both women's and SPs' reports of timing of support and compared differences. I also examined whether any factors are associated with concordant vs. discordant reports between women and SPs, to assess possible bias introduced from these contradictory reports.

Aim 3 Analysis

Aim 3 addresses how PC-ISP is associated with QoC across several dimensions. **The objectives for this aim were to estimate associations between women and support person-reported PC-ISP and QoC outcomes specified by the WHO QoC framework, specifically, a) person-centered QoC: *Person-centered maternity care* (PCMC), *satisfaction* and *willingness to return* to the facility; and b) clinical QoC: *coverage of key practices*.**

I estimated associations between both women and SP-reported PC-ISP experiences. Analyses for women's PC-ISP used both separate indicators and the PC-ISP combined scores as primary independent variables. Analyses for SP-reported PC-ISP used separate PC-ISP indicators only. I examined bivariate associations between covariates and QoC variables. I also used linear regression to estimate associations between PC-ISP and *PCMC* (total score and sub-domains), *coverage of key practices* (total key practices and subdomains) and *Satisfaction with care*. Associations between PC-ISP and *Willingness to return* were estimated using logistic regression.

The modeling approach for regression analyses followed a similar blocked approach as described in Aim 1. Using the regression framework, I first used a model examining only bivariate associations between PC-ISP and QoC as the primary association of interest. I then added covariates in blocks corresponding to increasingly distal levels of the socioecological model to examine how factors at each level impacts the variance of the association of interest. To account for clustering by facility, I estimated robust standard errors in statistical models. Sensitivity analyses also examined associations using other forms of regression analyses, such as examining other functional forms including Poisson, negative binomial, and log-transformed outcomes and models for different constructions of variables (e.g., examining satisfaction as a binary or ordinal variable based on distribution and using binomial or ordinal logistic regression, respectively). I also conducted stratified analyses by facility, to examine any heterogeneity within the sample or facility-specific effects. I followed the same process described in Aim 1 for sensitivity analyses and examination of confounding.

The objective of Sub-Aim 3c was to examine facility capacity as a moderator of associations between PC-ISP and QoC.

I used regression models from Aim 3 to assess statistical interactions between the women-reported PC-ISP score and separate facility capacity measures. I examined *patient:staff ratio* as a measure of staff capacity, *total beds in the facility* as a measure of patient volume, and patient:bed ratio as a measure of crowding. Facility capacity measures were mean-centered. Sensitivity analyses included fitting multi-level models, including a cross-level direct effect of facility capacity.

Chapter 5. Who wants and has access to support during childbirth?: Understanding women's preferences and experiences of Person-Centered Integration of Support Persons (PC-ISP): Aim 1

Abstract

Integrating support persons (SPs) into maternity care, such as making them feel welcome or providing them with information, is posited to increase support for women and improve health outcomes. Little quantitative research has examined what support women want and how the healthcare system currently facilitates women's support of choice. I propose the *Person-Centered Integration of Support Persons (PC-ISP)* concept into the literature and suggest indicators for research and practice. Based on literature, I specify four PC-ISP domains: *Welcoming environment, Decision-making support, Communication and provision of information*, and *Ability to ask questions and express concern*s and developed indicators measuring women's preferences and experiences of PC-ISP. I used data from the Strengthening, Person-Centered, Accessibility, Respectful Care, and Quality (SPARQ) study. Measures were administered to women (n=1,138) in postpartum surveys at six facilities in Nairobi and Kiambu counties in Kenya from September 2019 to January 2020. I used multiple linear and logistic regression to estimate how factors at multiple levels were associated with women's PC-ISP preferences and experiences. I found a large unmet need for access to SPs during childbirth: between 73.6-93.6% of women reported that they preferred integrating SPs for PC-ISP indicators, while only 45.3-82.0% of women reported that SPs were integrated into their care across indicators. SPs were integrated differently due to differences in women's social status, SP types, and facility characteristics. More specific, support role-based efforts are needed to facilitate women's needs for support in maternity care.

Introduction

Access to support persons (SPs) has implications for quality of maternal care and health outcomes. Lack of social support in maternity care is associated with higher mistreatment during maternity care (Abuya et al., 2015; Diamond-Smith, Sudhinaraset, Melo, et al., 2016), lower person-centered maternity care (Kiti et al., 2022), higher likelihood of adverse birth outcomes, and worse postpartum mental health (Bohren et al., 2017; Hodnett et al., 2012; Sapkota et al., 2013). Yet, the majority of pregnant and birthing women globally lack access to the social support they want and need during facility-based childbirth (Kabakian-Khasholian & Portela, 2017). In Kenya, studies across settings indicate that women's access to SPs is low; only 6-42% and 4-16% of women report being allowed labor or delivery companions, respectively (P. Afulani, Kusi, et al., 2018; Sudhinaraset et al., 2019). Moreover, even when SPs are allowed to stay with women during maternity care, provider and facility barriers (e.g., negative provider attitudes, exclusive policies, lack of resources) inhibit SPs abilities to effectively provide support (Bruggemann et al., 2014; Kabakian-Khasholian & Portela, 2017). Integrating SPs into maternity care, such as making them feel welcome or providing them with information, has been posited to increase support for women in facility-based childbirth and improve health outcomes (Bohren, Berger, et al., 2019).

Gaps in literature regarding social support during childbirth

To effectively design interventions to increase support for women during childbirth, we must address critical gaps in understanding what support women want and how the health care system currently facilitates women's support of choice. For example, literature has been dominated by research on labor and delivery companionship and male partner involvement, but

studies have shown that up to 60% of women may not want companions and many do not want their male partners as support persons, preferring other types of SPs, such as mothers, or sisters, etc. (P. Afulani, Kusi, et al., 2018; Alexander et al., 2014). Women's access to SPs needs to be reconceptualized to adequately capture the social support they need and provide insight into how the health care system can facilitate women's needs for support. A more granular assessment of women's preferences for social support—including a range of supportive functions and a broad array of types of SPs—is needed to design systems that ensure women have the support they want and need.

In addition, how the health care system currently interacts with and facilitates supportive function for women beyond labor and delivery companionship needs to be examined. The few studies that have surveyed women about how the maternity care system facilitated social support focused only on labor and delivery companionship or the ability to receive food or supplies from SPs (Abuya et al., 2015; Sudhinaraset et al., 2017). Furthermore, most studies exploring how the health care system facilitates SPs' presence and roles are qualitative studies (Bohren, Berger, et al., 2019). However, at a population-level, we lack quantitative data about how and to what extent the healthcare system integrates SPs in practice.

Lastly, a better understanding of the multi-level determinants that shape women's preferences and access to SPs is needed. Little research has explored the factors that contribute to women's preferences for support including types of SPs and the kind of support they want. Evidence also indicates that women in Kenya may have differing access to SPs based on their social status, health condition, or SPs' characteristics (P. Afulani, Kusi, et al., 2018; Sudhinaraset et al., 2019). In addition, qualitative studies have emphasized how provider practices, facility policies, infrastructure and level of resources influence women's preferences for support as well

as how SPs are excluded or integrated into the model of care (Adeyemi et al., 2018; Banda et al., 2010; Kabakian-Khasholian & Portela, 2017; Kaye et al., 2014; Maimbolwa et al., 2001). The level of person-centered care also varies by the type of facility (e.g., public/private, hospitals, dispensaries, health centres) (Diamond-Smith, Sudhinaraset, & Montagu, 2016; Oluoch-Aridi, Afulani, Guzman, et al., 2021) which influences whether SPs are allowed during care. Efforts to facilitate support for women must be made at multiple levels, from individual providers to organizations and systems (Burman et al., 2013). Knowledge of the multi-level factors that may facilitate engagement of SPs in maternity care is needed to effectively target interventions.

Person-centered Integration of Support Persons (PC-ISP)

This study aims to address these gaps through the proposal of the *Person-Centered Integration of Support Persons (PC-ISP)* concept into the literature and suggest indicators for use in research and practice.

Present study

Using the PC-ISP concept, the main objectives of this study were to quantitatively examine women's 1) preferences for integrating SPs and 2) experiences of whether SPs were integrated into their care. I applied a socioecological approach (Bronfenbrenner, 1986), recognizing that women's maternity care is nested within multiple levels of a social ecology (e.g., their relationships with their SPs, households, facilities), to understand how women's experiences of PC-ISP are influenced by factors at proximal and distal levels. I also investigated how factors at multiple levels (women, SP, household, and facility) were associated with both women's PC-ISP preferences and experiences. I hypothesized that women who are younger,

more educated, born in Nairobi/Kiambu counties (individual level), have an SP present during labor and/or delivery (SP-level), have higher empowerment scores (household), and deliver at private facilities (vs. public) (facility level) are more likely to prefer PC-ISP. I also expected that women of lower social status would be subject to worse treatment from providers and experience less integration of SPs into care. I hypothesized that women who are younger, less educated, not born in Nairobi/Kiambu counties (individual-level), who have an SP who is of lower social position (e.g., non-male partners vs. male partners) (SP-level), have less household decision-making power (i.e., household-level), deliver at public facilities (vs. private), and whose deliveries are assisted by doctors (vs. midwives, nurses, etc.) (facility-level) are less likely to report experiences of PC-ISP. Understanding determinants at multiple levels can provide insight about patterns and trends in women's preferences and the extent to which SPs are integrated into maternity care in practice.

Methods

Data

This study used women's survey data from the Strengthening Person-centered, Accessibility, Respectful Care, and Quality (SPARQ) study. Data were collected between September 2019 and January 2020 from women delivering at six facilities in Kiambu and Nairobi counties, which were selected as a mix of public and private facilities with high patient volumes (i.e., over 100 deliveries per month). Patient volumes of selected facilities ranged from 100-900 deliveries per month. Women between the ages of 15-49 who had recently delivered in these hospitals were interviewed at the facilities.

Inclusion criteria for women were a) between 15-49 years of age, b) spoke English or Kiswahili, c) vaginal birth and d) owned a mobile phone and felt comfortable being contacted by the study team. Women were recruited from postpartum wards by female research assistants in collaboration with facility staff. Facility staff approached women who met eligibility criteria and asked if they would be interested in the study. Women were then referred to research assistants and led to a private setting. Research assistants described the study, assessed eligibility, obtained informed consent, and interviewed women. Interviews lasted approximately 1 hour. A total of 1,197 women provided baseline data and the analytic sample for this survey included 1,138 women who reported that they had someone either accompany them to the facility or stay with them during labor, delivery, or postpartum.

Measures

PC-ISP variables

The four themes in literature regarding integrating SPs into maternity care discussed previously were used to develop PC-ISP questions in the women's survey. These survey questions were designed to measure the extent to which care integrates SPs (in this context, family members) that is respectful and responsive to women's needs and preferences. Table 5.1 presents PC-ISP indicators that were developed for women's surveys. Women were surveyed regarding their preferences for PC-ISP using four questions corresponding to three sub-constructs. Women also responded to five questions reporting on how their SPs were integrated into their care corresponding to four sub-constructs. Possible response options for all PC-ISP survey questions used a 3-point Likert-type scale: agree, somewhat agree, and disagree.

Two summative score measures were constructed for PC-ISP preferences and experiences, respectively. The PC-ISP preference score (range 0-4) showed questionable reliability (α=0.651) and PC-ISP experiences (range 0-4) showed poor reliability (α=0.592) (DeVellis, 2017), indicating there was a fair amount of multidimensionality among the few measures. One PC-ISP experience in particular, *felt welcome*, showed low item-rest correlation (0.1820). Because of this, I omitted *felt welcome* from the summative PC-ISP experience variable (range 0-4), resulting in a slight improvement in reliability (α=0.616). I also examined a PC-ISP experience score that combined all 5-items to understand whether there were differences in including or excluding the indicator, *felt welcome*. In addition, PC-ISP preference measures displayed small to moderate correlations (r=0.20-0.64) while PC-ISP experience measures showed no to moderate correlations (r=0.04-0.61).

For analyses, I conservatively recoded PC-ISP variables with "Don't know" responses as "agree" (n=9 for felt welcome, n=30 for *welcome to ask questions* and *listened to concerns*) and excluded those who responded "N/A" for questions (n=19 for *welcome to ask questions* and *listened to concerns*). Since there were few "somewhat agree" responses for each of the variables (ranging from 1.5-3.9%), each measure was recoded as a dichotomous variable (agree/somewhat agree vs. disagree).

Table 5.1. Women-reported PC-ISP measures

Women's PC-ISP measures				
Subconstruct	**Women's preferences for PC-ISP**		**Women's experiences of PC-ISP**	
	Variable Name	**Question**	**Variable Name**	**Question**
Welcoming environment		---	*Felt welcome*	My family member(s) felt welcome by the facility at my delivery
Decision-making support	*Consult decisions*	I wanted to consult my family about	*Opportunity to consult*	I was given the opportunity by my health provider to

		decisions about my care for delivery		consult my family about my health care decisions
Communiation and provision of information	*Know condition/care*	I wanted my family to know about my condition/care	*Told condition/care*	I was asked by my health provider if my family should be told about my condition/care
	Understand condition/care	I wanted my family to understand my condition/care		
Ability to ask questions and express concerns	*Respects choices*	I would have liked my family members to make sure my provider respects my values and choices	*Welcome to ask questions*	My family was welcome to ask my health care provider questions
			Listened to concerns	My health care provider listened to my family members' concerns

Women's, SP, household, and facility variables

Women's individual-level factors included age (continuous), marital status (married or partnered vs. not), parity (continuous), educational attainment (primary or less; vocational/secondary; college/university), current employment status (employed vs. not), birthplace (born in Nairobi or Kiambu counties vs. not), and health insurance status (covered under health scheme/insurance vs. not). Given that health status and health conditions could also influence how providers acknowledge women's preferences and whether they integrate SPs, I also examined self-reported health status (excellent/very good, good, fair, poor/very poor) and women's reports of delivery complications, based on their self-report of delivery problems such as prolonged labor or hemorrhage (yes vs. no).

Support Person variables included the total number of SPs reported (continuous) and the types of SPs by their relation to the woman including eight types: male partner, mother, mother-in-law, sister, brother, father (of the woman), other family member, and friend/neighbor/other. Binary indicator variables were constructed for each of the eight SP types indicating whether the woman reported having the type of SP (e.g., male partner SP vs. no male partner SP, mother SP vs. no mother SP, etc.). Women also reported on the timing of support, that is, whether an SP (or

SPs) was present with them during different periods of maternity care (e.g., accompanied to the facility, labor and/or delivery, postpartum).

Because a woman's position within the household influences her expectations and preferences for care, I also examined household factors including household size (continuous) and women's empowerment indicators. Surveys asked women who were married or partnered four questions regarding decision-making power for various household decisions, including woman's health care, major household purchases, daily household purchases, and visits to family or relatives (Kishor & Lekha, 2008). I constructed a composite variable using these measures, *Empowered in household decisions,* indicating whether a woman reported involvement in all four types of household decisions (i.e., "woman only" or "jointly") versus lack of involvement (i.e., "partner only" or "someone else") in at least one type of household decision (Upadhyay & Karasek, 2012). Women who were not married or partnered were coded as being involved in all four types of decisions. Facility factors included the type of facility (government hospital; government health centre or dispensary; private facility), total number of providers who assisted the delivery (continuous), and type of provider who assisted with delivery (doctor or clinical officer, nurse or midwife, other, none).

Analysis

Analyses for women's reported PC-ISP preferences and experiences followed the same analytical process. I examined bivariate associations between dependent variables (i.e., PC-ISP variables) and all factors at the women's, SPs', household, and facility levels, using chi-square tests and t-tests. I also assessed: 1) factors associated with individual PC-ISP indicators using

multivariable binomial logistic regression and 2) factors associated with the combined PC-ISP scores, using multiple linear regression.

Both sets of analyses followed a sequential, blocked model building approach, beginning with a model including a block of woman's individual factors, then adding increasingly distal levels for each subsequent model (i.e., adding SPs' factors, then household, etc.) according to the socioecological model (Bingham et al., 2019). Within each block of variables at a given level, I included theoretically relevant variables (e.g., age, parity) as well as all variables that showed statistically significant (two-sided alpha=0.05) bivariate associations. Final models included age, parity, education, marital status, birthplace, health insurance coverage, and health status (woman-level), number of SPs, types of SPs, timing of support (SP-level), women's empowerment in the household (household-level), type of facility, and number of providers at delivery (facility-level). Equations for the full models for both 1) binomial logistic regression for individual PC-ISP indicators (Eq. 5.1) and 2) linear regression for the combined PC-ISP scores (Eq. 5.2) are detailed as follows:

Equation 5.1, Binomial Logistic (full model):

$$logit(p) = \alpha + X\beta_{Woman} + X\gamma_{SP} + X\delta_{HH} + X\zeta_{Facility} + \epsilon$$

Where p is the probability of reporting a given PC-ISP item.
β_{Woman} is the vector of parameters for women's individual factors
γ_{SP} is the vector of parameters for SPs' individual factors
δ_{HH} is the vector of parameters for household factors
$\zeta_{Facility}$ is the vector of parameters for facility factors, and,
ϵ is the vector of error terms

Equation 5.2, Linear regression (full model):

$$Y = \alpha + X\beta_{Woman} + X\gamma_{SP} + X\delta_{HH} + X\zeta_{Facility} + \epsilon$$

Y is the *combined PC-ISP score*
$\beta_{Woman,}$ γ_{SP}, δ_{HH} , $\zeta_{Facility}$ and ϵ are as defined in Eq. 6.1 above.

For OLS models of PC-ISP preference and PC-ISP experience scores, I inspected the normality of residuals visually using kernel density estimates, and quantile-quantile (Q-Q) plots

and tested normality using Shapiro-Wilk tests and found notable non-normality (Appendix 5A). I inspected heteroskedasticity by examining the plot of residuals vs. predicted values and the Breusch-Pagan test. I used link tests and Ramsey regression specification error tests (RESET) to examine model specification error. For PC-ISP preference scores, I found evidence of specification error but no omitted variables. For individual PC-ISP preference indicators, I found no evidence of specification error. I did not find any evidence of multicollinearity between factors (VIF=~1.41). For logistic regression models, I used link tests and Hosmer-Lemeshow goodness-of-fit tests and found no evidence of specification error or poor fit. I also examined potential outliers using standardized Pearson residuals, deviance residuals, and Pregibon leverage. I performed sensitivity analyses excluding potentially influential observations but found that estimates and confidence intervals of associations were minimally affected.

To account for clustering by facility, I used two methods: First, I constructed single-level regression models with cluster-robust standard errors. Third, I used multi-level models including using fixed effects and random effects by facility. Because intraclass correlations were low (all were less than 0.035) (Appendix 5B), I only present results from OLS models. I was also concerned with confounding that may be due to women's selection of facilities and thus controlled for 1) whether women were referred to a particular facility and 2) whether women reported selecting the facility because of quality of care (e.g., cleanliness, higher quality, more privacy, trusted providers, etc.). To assess the extent to which PC-ISP occurs within and across facilities, I also examined facilities separately to explore possible differences in associations between PC-ISP and risk factors by facility.

Sensitivity analyses also examined different constructions of the PC-ISP experience score to understand whether results were robust. In addition to the 4-item combined score, I examined:

a) 5-item summative measure that includes *SP felt welcome*, c) High vs. low PC-ISP scores, dichotomizing the 5-item score as reporting SP integration on 4 or more items (high) vs. 3 or less items (low). Results examining factors associated with the 5-item score were highly consistent with results of the 4-item score presented here. Results of these sensitivity analyses are included in Appendix B.

Results

The analytic sample includes the 1,138 women who had an SP accompany them to the facility or stay at the facility during labor, delivery, or postpartum. Table 5.2 presents descriptive characteristics of the sample of women. On average, women were 25.4 years of age (SD 5.0) and the majority of women were multiparous (61.8%), married or partnered (83.0%), Christian (98.1%), not employed (60.4%), born outside of Nairobi or Kiambu counties (79.0%), and were covered by some form of health insurance (85.1%). There was a larger proportion of women who attained primary or less education (44.3%) compared to Vocational/Secondary (39.9%) or College/University education (15.8%). Most women rated their health as excellent/very good (35.0%) or good (40.1%) and reported no complications during delivery (93.4%). Women reported an average of 1.5 (SD 0.7) SPs which included their male partners (60.0%), sisters (16.7%), mothers (8.5%), other family members (21.2%), and friends/neighbors/others (34.7%), etc. Almost all women reported that they were accompanied to the facility (94.6%), while only a fraction reported that an SP (or SPs) stayed with them during labor and/or delivery (7.4%), or during the postpartum period (43.7%). Women who reported not having an SP stay with them during labor and delivery were also asked if they wanted an SP during labor and delivery. Of those 1,054 women, 317 (27.9% of the full sampled) women reported wanting an SP during

labor and/or delivery. Most women were empowered in household decision-making (54.5%). Most women surveyed delivered at a government hospital (73.3%) and reported an average of 1.1 (SD 0.4) providers assisting delivery. Most (64.4%) women selected their facility because of quality and 15.8% were referred to their facility.

Table 5.2. Descriptive characteristics of the sample of women

Variable	N or mean	% or (SD)
Total participants	1,138	
Age		
Mean age	25.4	(5.0)
Parity		
Mean parity	2.0	(1.0)
Primiparous	435	38.2%
Multiparous	703	61.8%
Currently married or partnered		
No	194	17.1%
Yes	944	83.0%
Educational attainment		
Primary or less	504	44.3%
Vocational/Secondary	454	39.9%
College/University	180	15.8%
Religion		
Christian	1116	98.1%
Muslim/other	22	1.9%
Currently employed		
No	687	60.4%
Yes	451	39.6%
Birthplace		
Born in Nairobi or Kiambu counties	239	21.0%
Born elsewhere	899	79.0%
Self-rated health status		
Excellent or very good	398	35.0%
Good	456	40.1%
Fair	181	15.9%
Poor or very poor	103	9.1%
Complications during delivery		
No	1063	93.4%
Yes	75	6.6%
Health insurance/scheme coverage		
Not covered	169	14.9%
Covered	969	85.1%
Support person type*		
Male Partner	683	60.0%
Mother	97	8.5%
Mother-in-law	37	3.3%
Sister	190	16.7%

Variable	N or mean	% or (SD)
Father	10	0.9%
Brother	18	1.6%
Other family member	241	21.2%
Friend/neighbor/other	395	34.7%
Total number of SPs		
Mean (min 1- max 6)	1.5	(0.7)
Timing of support*		
Accompanied to facility	1,076	94.6%
Labor and/or Delivery	84	7.4%
Postpartum	497	43.7%
Household size		
Mean	4.2	(1.4)
Empowered in household decisions		
Not involved in all decisions	518	45.5%
Involved in all decisions	620	54.5%
Facility type		
Gov't hospital	834	73.3%
Gov't Health Centre/Dispensary	137	12.0%
Private facility	167	14.7%
Providers assisting delivery*		
Mean total number of delivery assistants	1.1	(0.4)
Doctor/Clinical Officer	627	55.1%
Nurse/Midwife	594	52.2%
Other delivery assistant	78	6.9%
No delivery assistant	12	1.1%
Selected facility because of quality	733	64.4%
Referred to facility	180	15.8%

* Percentages do not sum to 100% because women could mark multiple response options (i.e., report multiple SPs, timings of support, and delivery assistants).

PC-ISP preferences and experiences

Table 5.3 presents frequencies of PC-ISP indicators. Most women preferred PC-ISP. The average PC-ISP preference score was 3.5 (SD 0.9) out of a maximum score of 4. For individual measures, most women reported that they preferred (agree/somewhat agree) integrating SPs (ranging from 73.6-93.6% for different indicators). The highest proportion of women (93.6%) reported that they wanted their SPs to *understand their condition/care* and the fewest women (73.6%) reported that they wanted to *consult decisions* with their SPs.

For PC-ISP experiences, the average PC-ISP experience score was 2.6 (SD 1.2) out of a maximum of 4 on the composite score. Most women reported positive experiences of PC-ISP (agree/somewhat agree): 78.7% reported that *family felt welcome*, 58.9% reported being given

the *opportunity to consult* family on decisions, 80.7% reported that family *felt welcome to ask questions*, and 81.9% reported that providers *listened to their family's concerns*. However, only 45.3% reported being asked by providers if their family should be *told about their condition and/or care*.

Table 5.3. Frequencies of PC-ISP preferences and experiences

Women's PC-ISP Preferences	**N or mean**	**% or (SD)**
Summative PC-ISP preference score (range 0-4)	3.47	(0.91)
Consult decisions		
I wanted to consult my family about decisions about my care for delivery		
Agree/Somewhat agree	837	73.6%
Disagree	301	26.4%
Know condition/care		
I wanted my family to know about my condition/care		
Agree/Somewhat agree	1,013	89.0%
Disagree	125	11.0%
Understand condition/care		
I wanted my family to understand about my condition/care		
Agree/Somewhat agree	1,065	93.6%
Disagree	73	6.4%
Respects choices		
I would have liked my family members to make sure my provider respects my values and choices		
Agree/Somewhat agree	1,033	90.8%
Disagree	105	9.2%
Women's PC-ISP Reports	**N or mean**	**% or (SD)**
Summative PC-ISP score (range 0-4)	2.64	(1.23)
Felt welcome		
My family member(s) felt welcome by the facility at my delivery		
Agree/Somewhat Agree	896	78.7%
Disagree	242	21.3%
Opportunity to consult		
I was given the opportunity by my health provider to consult my family about my health care decisions		
Agree/Somewhat agree	670	58.9%
Disagree	468	41.1%
Told condition/care		
I was asked by my health provider if my family should be told about my condition/care		
Agree/Somewhat agree	516	45.3%
Disagree	622	54.7%
Welcome to ask questions[1]		
My family was welcome to ask my health care provider questions		
Agree/Somewhat agree	903	80.7%
Disagree	216	19.3%
Listened to concerns[1]		

My health care provider listened to my family members' concerns		
Agree/Somewhat agree	917	82.0%
Disagree	202	18.1%

[1] N=1,119. N/A responses (N=19) were excluded from analyses.

Aim 1a: Examine the individual, support persons', household, and facility-level determinants of women's preferences for PC-ISP

Factors associated with women's PC-ISP preferences

Multivariate results showed that factors at multiple levels were associated with PC-ISP preferences. For the composite PC-ISP preference measure (Table 5.4), being married or partnered, employed, having a mother SP, having postpartum support, and being empowered in household decisions were associated with an increase in the number PC-ISP preferences. For example, having a mother SP was associated with an 8.3% increase in PC-ISP preferences (p=0.027) compared to not having a mother SP. In contrast, increases in age and having a greater number of SPs were negatively associated with the number of PC-ISP preferences.

Table 5.4. Factors associated with the summative PC-ISP preferences variable using OLS

	Combined preferences variable		
	B	**p-value**	**95%CI**
Age	-0.04*	0.01	(-0.06, -0.01)
Parity	0.056	0.176	(-0.04, 0.15)
Marital status (Ref. Not married/partnered)			
Married or partnered	0.21*	0.04	(0.01, 0.42)
Education (ref. Primary or less)			
Vocational/Secondary	-0.06	0.24	(-0.17, 0.05)
College/University	-0.06	0.66	(-0.40, 0.27)
Employed (ref. no)			
Yes	0.12*	0.04	(0.01, 0.23)
Birthplace (ref. born elsewhere)			
Born in Nairobi or Kiambu Counties	0.05	0.53	(-0.14, 0.24)
Self-rated health	-0.03	0.30	(-0.09, 0.03)
Covered under health scheme or health insurance (ref. No)			
Yes	0.04	0.69	(-0.21, 0.29)
Total SPs	-0.18*	0.01	(-0.29, -0.06)
Male partner SP (Ref. No)			
Yes	0.21	0.08	(-0.03, 0.44)
Mother SP (Ref. No)			
Yes	0.33*	0.03	(0.06, 0.61)
Mother-in-law SP (Ref. No)			
Yes	0.25	0.24	(-0.23, 0.73)

	Combined preferences variable		
	B	**p-value**	**95%CI**
Father SP (Ref. No)			
Yes	0.16	0.38	(-0.26, 0.58)
Sister SP (Ref. No)			
Yes	0.22	0.12	(-0.08, 0.52)
Brother SP (Ref. No)			
Yes	0.10	0.56	(-0.32, 0.52)
Other family members SP (Ref. No)			
Yes	0.21	0.05	(-0.01, 0.43)
Accompanied to facility (Ref. No SP accompanied)			
SP Accompanied	0.23	0.10	(-0.07, 0.53)
Labor & Delivery (Ref. No SP during L&D)			
Had SP during Labor & Delivery	0.08	0.37	(-0.13, 0.30)
Postpartum (Ref. No SP postpartum)			
Had SP during Postpartum	0.12**	0.007	(0.05, 0.19)
Household decision-making (Ref. Does not have say in all decisions)			
Empowered in HH decisions	0.13*	0.02	(0.04, 0.23)
Facility type (Ref. Gov't hospital)			
Gov't HC/Disp	0.01	0.79	(-0.11, 0.14)
Private facility	-0.11	0.07	(-0.22, 0.01)
Total providers assisting delivery	-0.11	0.20	(-0.30, 0.08)
Selected facility based on quality	0.05	0.59	(-0.16, 0.25)
Referred to facility	0.14	0.08	(-0.02, 0.30)
Constant	3.88	0.000	(3.24, 4.51)

Notes: *p<0.05, **p<0.01, ***p<0.001
The Friend/Neighbor/Other SP indicator was omitted from models because of collinearity.

Results for the combined PC-ISP preference score were generally consistent with results for individual variables (Table 5.5) except for associations with SP types and facility types. For example, several other SPS types—male partner, sister, other family members—were also associated with wanting to *consult decisions* with SPs. Other family member SPs were also associated with wanting SPs to *know* and *understand women's condition/care*. In addition, individual PC-ISP indicators were inconsistently associated with facility types. Women in health centres/dispensaries were more likely to want to *consult decisions* with SPs, but less likely to want SPs to ensure that providers *respected their choices* compared to government hospitals. Women at private facilities were less likely to want SPs to *know their condition/care* or SPs to ensure that providers *respected their choices.*

For individual preference indicators and the combined PC-ISP preferences variable, separate examination of facilities did not reveal notable differences by facilities. I did not find significant facility random effects, indicating that there were no systematic differences by facility.

Table 5.5. Multivariate logistic models for individual women's PC-ISP preference indicators (n=1,138)

	Consult decisions (n=1,138)		Know condition/care (n=1,138)		Understand condition/care (n=1,138)		Respect choices (n=1,138)	
	aOR	95%CI	aOR	95%CI	aOR	95%CI	aOR	95%CI
Age	0.93*	(0.88, 0.98)	0.91***	(0.88, 0.94)	0.90***	(0.88, 0.92)	0.93***	(0.91, 0.96)
Parity	1.09	(0.91, 1.29)	1.26*	(1.04, 1.53)	1.34*	(1.01, 1.78)	0.95	(0.75, 1.20)
Marital status (Ref. Not married/partnered)								
Married or partnered	1.21	(0.82, 1.78)	2.27**	(1.24, 4.16)	3.73*	(1.12, 12.41)	1.50	(0.69, 3.24)
Education (ref. Primary or less)								
Vocational/Secondary	0.71**	(0.58, 0.88)	0.94	(0.63, 1.39)	1.14	(0.80, 1.63)	0.97	(0.71, 1.32)
College/University	0.681	(0.37, 1.25)	1.03	(0.54, 1.95)	0.82	(0.33, 2.06)	1.08	(0.54, 2.17)
Employed (ref. no)								
Yes	1.27	(0.86, 1.86)	1.29	(1.00, 1.66)	1.54	(0.89, 2.65)	1.32	(0.82, 2.13)
Birthplace (ref. born elsewhere)								
Born in Nairobi or Kiambu Counties	0.79	(0.60, 1.06)	1.31	(0.62, 2.76)	1.54	(0.55, 4.26)	1.96**	(1.17, 3.27)
Self-rated health	0.95	(0.80, 1.13)	0.94	(0.79, 1.13)	0.98	(0.84, 1.15)	0.89	(0.78, 1.02)
Covered under health scheme or health insurance (ref. No)								
Yes	1.14	(0.89, 1.46)	1.00	(0.46, 2.20)	0.87	(0.29, 2.60)	1.32	(0.61, 2.85)
Total number of SPs	0.67*	(0.48, 0.94)	0.65**	(0.51, 0.84)	0.53**	(0.36, 0.76)	0.80	(0.57, 1.13)
Male partner SP (Ref. No)								
Yes	1.98***	(1.50, 2.60)	1.32	(0.72, 2.44)	1.11	(0.61, 2.02)	1.45	(0.94, 2.23)
Mother SP (Ref. No)								
Yes	3.50**	(1.58, 7.74)	2.22	(0.67, 7.36)	8.97***	(2.65, 30.34)	0.89	(0.38, 2.09)
Mother-in-law SP (Ref. No)								
Yes	1.58	(0.46, 5.37)	2.35	(0.37, 14.83)	3.20	(0.23, 44.28)	1.68	(0.63, 4.49)
Father SP (Ref. No)								
Yes	1.52	(0.61, 3.79)	0.42*	(0.18, 0.95)	—		—	
Sister SP (Ref. No)								
Yes	1.760*	(1.08, 2.86)	1.41	(0.56, 3.55)	1.81	(0.62, 5.25)	1.65	(0.82, 3.29)
Brother SP (Ref. No)								
Yes	0.82	(0.40, 1.64)	2.83	(0.24, 33.11)	1.75	(0.11, 27.41)	1.62	(0.16, 16.15
Other family members SP (Ref. No)								
Yes	1.54*	(1.01, 2.34)	1.90*	(1.02, 3.52)	2.63**	(1.40, 4.95)	1.20	(0.83, 1.74)
Accompanied to facility (Ref. No SP accompanied)								
SP Accompanied	1.44*	(1.00, 2.05)	2.46**	(1.40, 4.34)	2.23	(0.79, 6.29)	1.06	(0.84, 1.33)
Labor & Delivery Support (Ref. No SP during L&D)								

	Consult decisions (n=1,138)		Know condition/care (n=1,138)		Understand condition/care (n=1,138)		Respect choices (n=1,138)	
	aOR	95%CI	aOR	95%CI	aOR	95%CI	aOR	95%CI
Had SP during Labor and/or Delivery	1.26	(0.96, 1.66)	1.20	(0.43, 3.37)	1.47	(0.41, 5.18)	1.09	(0.70, 1.69)
Postpartum (Ref. No SP postpartum)								
Had SP during Postpartum	1.26	(0.94, 1.69)	1.77**	(1.28, 2.46)	1.77	(0.93, 3.36)	0.92	(0.64, 1.32)
Household decision-making (Ref. Does not have say in all decisions)								
Empowered in HH decisions	1.29**	(1.11, 1.49)	1.78**	(1.27, 2.50)	1.85**	(1.17, 2.93)	1.00	(0.65, 1.56)
Facility type (Ref. Gov't hospital)								
Gov't HC/Disp	1.25**	(1.10, 1.43)	1.19	(0.87, 1.62)	0.85	(0.45, 1.60)	0.66**	(0.50, 0.88)
Private facility	0.89	(0.79, 1.01)	0.76*	(0.60, 0.97)	1.09	(0.57, 2.10)	0.51**	(0.34, 0.76)
Total providers assisting delivery	0.84	(0.60, 1.17)	0.78	(0.56, 1.09)	0.84	(0.50, 1.40)	0.65	(0.39, 1.10)
Selected facility based on [illegible]	1.22	(0.90, 1.65)	0.71	(0.42, 1.20)	1.17	(0.68, 2.01)	1.32	(0.67, 2.63)
Referred to facility	1.62***	(1.26, 2.09)	1.09	(0.85, 1.40)	1.58	(0.84, 2.97)	1.26	(0.55, 2.86)
Constant	7.75	(1.67, 35.86)	15.96	(2.74, 93.11)	17.12	(8.19, 35.81)	56.71	(18.05, 178.10)

Notes: *p<0.05, **p<0.01, ***p<0.001
The Friend/Neighbor/Other SP indicator was omitted from models because of collinearity.

Aim 1b: Examine the individual, support persons', household, and facility-level determinants of women's experiences of PC-ISP

Factors associated with women's PC-ISP experiences

For the combined PC-ISP experiences score (Table 5.6), only one factor—having a male partner—was associated with an increase in total PC-ISP experiences. Women who reported having a male partner SP, were more likely to report 0.13 (93%CI: 0.02, 0.23) additional PC-ISP experiences compared to women without a male partner SP.

Table 5.6. Factors associated with total woman-reported PC-ISP experiences using OLS (n=1,138)

	Combined		
	B	**p-value**	**95% CI**
Age	-0.001	0.90	(-0.02, 0.02)
Parity	0.03	0.45	(-0.07, 0.13)
Marital status (Ref. Not married/partnered)			
Married or partnered	-0.02	0.88	(-0.27, 0.24)
Education (ref. Primary or less)			
Vocational/Secondary	-0.01	0.94	(-0.17, 0.16)
College/University	-0.08	0.34	(-0.28, 0.12)
Employed (ref. no)			
Yes	0.07	0.47	(-0.17, 0.32)

	Combined		
	B	**p-value**	**95% CI**
Birthplace (ref. born elsewhere)			
Born in Nairobi or Kiambu Counties	-0.08	0.52	(-0.37, 0.21)
Self-rated health	-0.05	0.45	(-0.19, 0.10)
Covered under health scheme or health insurance (ref. No)			
Yes	0.06	0.40	(-0.10, 0.22)
Total SPs	-0.09	0.40	(-0.34, 0.16)
Male partner SP (Ref. No)			
Yes	0.11*	0.04	(0.01, 0.22)
Mother SP (Ref. No)			
Yes	0.13	0.27	(-0.14, 0.41)
Mother-in-law SP (Ref. No)			
Yes	-0.01	0.96	(-0.41, 0.40)
Father SP (Ref. No)			
Yes	0.14	0.75	(-0.93, 1.20)
Sister SP (Ref. No)			
Yes	0.02	0.88	(-0.29, 0.33)
Brother SP (Ref. No)			
Yes	0.13	0.56	(-0.39, 0.65)
Other family members SP (Ref. No)			
Yes	0.14	0.07	(-0.01, 0.30)
Timing of support: Accompanied to facility (Ref. No one accompanied)			
Accompanied	-0.04	0.84	(-0.48, 0.41)
Timing of support: Labor & Delivery (Ref. No one during L&D)			
Labor & Delivery	0.03	0.63	(-0.13, 0.20)
Timing of support: Postpartum (Ref. No one postpartum)			
Postpartum	-0.04	0.56	(-0.21, 0.13)
Household decision-making (Ref. Does not have say in all decisions)			
Empowered in HH decisions	0.06	0.64	(-0.23, 0.34)
Facility type (Ref. Gov't hospital)			
Gov't HC/Disp	0.16	0.20	(-0.12, 0.45)
Private facility	-0.01	0.97	(-0.31, 0.30)
Total providers assisting delivery	0.30	0.06	(-0.01, 0.60)
Selected facility based on quality	0.15	0.14	(-0.07, 0.38)
Referred to facility	0.19	0.21	(-0.15, 0.54)
Constant	2.21	0.01	(1.01, 3.41)
Log likelihood -1833.76	AIC = 3677.52	BIC = 3702.71	

Notes: *p<0.05, **p<0.01, ***p<0.001
The Friend/Neighbor/Other SP indicator was omitted from models because of collinearity.

Sensitivity analyses using a random intercept for facilities are presented in Table 5.7. Although the likelihood ratio test indicated that the random-intercept model was a better fit than ordinary least squares regression (p=0.006), AIC and BIC (penalized measures of fit), indicated that the OLS model was a better fit. Thus, results from the random-intercept model should be interpreted conservatively. The random intercept model sheds light on how facility factors may

influence PC-ISP experiences: increases in the number of providers assisting delivery and being referred to a facility were associated with increases in the number of PC-ISP experiences.

Table 5.7. Factors associated with women's combined PC-ISP experience score, random intercept model (n=1,138)

	Combined		
	B	**p-value**	**95% CI**
Age	-0.003	0.76	(-0.02, 0.02)
Parity	0.02	0.75	(-0.09, 0.13)
Marital status (Ref. Not married/partnered)			
Married or partnered	-0.02	0.86	(-0.28, 0.24)
Education (ref. Primary or less)			
Vocational/Secondary	-0.02	0.78	(-0.18, 0.14)
College/University	-0.11	0.35	(-0.34, 0.12)
Employed (ref. no)			
Yes	0.08	0.33	(-0.08, 0.23)
Birthplace (ref. born elsewhere)			
Born in Nairobi or Kiambu Counties	-0.10	0.31	(-0.29, 0.09)
Self-rated health	-0.05	0.24	(-0.12, 0.03)
Covered under health scheme or health insurance (ref. No)			
Yes	0.087	0.41	(-0.11, 0.29)
Total SPs	-0.10	0.27	(-0.27, 0.07)
Male partner SP (Ref. No)			
Yes	0.11	0.28	(-0.09, 0.32)
Mother SP (Ref. No)			
Yes	0.12	0.44	(-0.19, 0.43)
Mother-in-law SP (Ref. No)			
Yes	-0.03	0.89	(-0.46, 0.40)
Father SP (Ref. No)			
Yes	0.12	0.77	(-0.66, 0.89)
Sister SP (Ref. No)			
Yes	0.03	0.82	(-0.20, 0.26)
Brother SP (Ref. No)			
Yes	0.18	0.55	(-0.41, 0.77)
Other family members SP (Ref. No)			
Yes	0.15	0.16	(-0.06, 0.37)
Timing of support: Accompanied to facility (Ref. No one accompanied)			
Accompanied	-0.01	0.94	(-0.33, 0.31)
Timing of support: Labor & Delivery (Ref. No one during L&D)			
Labor & Delivery	0.01	0.92	(-0.26, 0.29)
Timing of support: Postpartum (Ref. No one postpartum)			
Postpartum	-0.05	0.50	(-0.21, 0.10)
Household decision-making (Ref. Does not have say in all decisions)			
Empowered in HH decisions	0.06	0.46	(-0.10, 0.22)
Facility type (Ref. Gov't hospital)			
Gov't HC/Disp	0.16	0.38	(-0.20, 0.53)
Private facility	0.01	0.95	(-0.30, 0.32)
Total providers assisting delivery	0.29**	0.00	(0.11, 0.47)
Selected facility based on quality	0.14	0.10	(-0.03, 0.30)
Referred to facility	0.30*	0.01	(0.07, 0.52)

		Combined		
		B	**p-value**	**95% CI**
Constant		2.30***	0.00	(1.67, 3.01)
Random effects at the facility-level			SE	
	σ_u^2	0.015	0.013	(0.00, 0.08)
	$\hat{\sigma}_\varepsilon^2$	1.453	0.061	(1.34, 1.58)
Log likelihood = -1830.62	AIC= 3719.23	BIC=3865.31		

Notes: *p<0.05, **p<0.01, ***p<0.001
The Friend/Neighbor/Other SP indicator was omitted from models because of collinearity.

Analyses of individual PC-ISP experience measures showed that associations varied by factors at different levels (Table 5.8). Employed women were more likely to report having the *opportunity to consult* SPs and providers asking if SPs should *be told about their condition/care*. Having a greater number of SPs was negatively associated with SPs feeling *welcome to ask questions* and *providers listening to SPs' concerns*. Women who reported having a male partner SP were more likely to report SPs *felt welcome*, while those who had their father or brother as SPs were less likely. Having an SP present during labor/delivery or postpartum was positively associated SPs *feeling welcome* and being *welcome to ask questions*. Women with a greater number of providers assisting delivery were more likely to report having the *opportunity to consult* SPs on decisions and SPs feeling *welcome to ask questions*. Facility types, however, were inconsistently associated with PC-ISP experiences. Compared to government hospitals, women at government health centres/dispensaries were more likely to report an *opportunity to consult* SPs on decisions and that providers asked if SPs should be *told about their condition/care*, but less likely to report SPs *felt welcome*. The opposite pattern was observed at private facilities: women at private facilities were more likely to report SPs *felt welcome* but were less likely to be asked if SPs should be *told about their condition/care* compared to government hospitals.

Table 5.8. Multivariable logistic models for women's separate PC-ISP experience indicators

	Felt welcome **(n=1,138)**		***Opportunity to consult*** **(n=1,138)**		***Told condition/care*** **(n=1,138)**		***Welcome to ask questions*** **(n=1,119)**		***Listened to concerns*** **(n=1,119)**	
	aOR	**95% CI**	**aOR**	**95% CI**	**aOR**	**95% CI**	**aOR**	**95% CI**	**aOR**	**95% CI**
Age	0.97**	(0.96, 0.99)	0.99	(0.95,1.03)	1.00	0.97, 1.03)	1.00	(0.98, 1.02)	1.01	(0.97,

	Felt welcome (n=1,138)		*Opportunity to consult* (n=1,138)		*Told condition/care* (n=1,138)		*Welcome to ask questions* (n=1,119)		*Listened to concerns* (n=1,119)	
	aOR	**95% CI**	**aOR**	**95% CI**	**aOR**	**95% CI**	**aOR**	**95% CI**	**aOR**	**95% CI**
Parity	1.00	(0.83.1.20)	1.13*	(1.03, 1.24)	1.01	(0.89, 1.15)	0.99	(0.83, 1.18)	1.09	(0.90, 1.32)
Marital status (Ref. Not married/partnered)										
Married/partnered	0.69	(0.45, 1.07)	1.04	(0.65, 1.66)	0.89	(0.70, 1.12)	0.94	(0.73, 1.19)	0.87*	(0.78, 0.98)
Education (ref. Primary or less)										
Vocation/Secondary	0.91	(0.78. 1.06)	0.91	(0.70, 1.19)	1.07	(0.73, 1.56)	0.92	(0.71, 1.20)	1.17**	(1.07, 1.28)
College/University	0.91	(0.51, 1.64)	0.71	(0.49, 1.02)	0.82	(0.48, 1.39)	1.04	(0.60, 1.81)	1.50***	(1.20, 1.86)
Employed (ref. no)										
Yes	1.05	(0.71, 1.54)	1.26**	(1.07, 1.49)	1.29**	(1.07, 1.55)	0.90	(0.53, 1.52)	0.78	(0.50, 1.22)
Birthplace (ref. born elsewhere)										
Born in Nairobi or Kiambu Counties	1.28*	(1.03. 1.60)	1.05	(0.82, 1.36)	0.92	(0.57, 1.47)	0.92	(0.62, 1.37)	0.75	(0.43, 1.32)
Self-rated health	0.93	(0.83, 1.05)	0.94	(0.82, 1.09)	0.89**	(0.83, 0.96)	1.02	(0.85, 1.22)	0.99	(0.78, 1.25)
Covered under health insurance (ref. No)										
Yes	0.70*	(0.50, 0.98)	1.23	(0.94, 1.61)	1.19	(0.92, 1.53)	0.988	(0.85, 1.13)	1.00	(0.78, 1.27)
Total SPs	0.99	(0.69, 1.42)	0.94	(0.67, 1.31)	1.00	(0.71, 1.42)	0.71*	(0.53, 0.96)	0.77*	(0.62, 0.97)
Male partner SP (Ref. [illegible])										
Yes	1.64***	(1.42, 1.89)	1.10	(0.89, 1.37)	1.10	(0.92, 1.33)	1.15	(0.85, 1.56)	1.47*	(1.07, 2.02)
Mother SP (Ref. No)										
Yes	1.39	(0.84, 2.29)	1.49***	(1.23, 1.80)	1.19	(0.78, 1.80)	0.92	(0.53, 1.59)	0.92	(0.39, 2.15)
Mother-in-law SP ([illegible])										
Yes	1.24	(0.57, 2.72)	1.23	(0.71, 2.13)	0.86	(0.40, 1.85)	0.76	(0.56, 1.03)	1.13	(0.60, 2.14)
Father SP (Ref. No)										
Yes	0.17***	(0.09, 0.33)	1.28	(0.20, 8.28)	0.33	(0.10, 1.07)	2.98	(0.56, 15.85)	3.16	(0.74, 13.5)
Sister SP (Ref. No)										
Yes	0.99	(0.61, 1.62)	1.17	(0.85, 1.60)	1.00	(0.76, 1.31)	0.82	(0.48, 1.38)	1.07	(0.73, 1.58)
Brother SP (Ref. No)										
Yes	0.47*	(0.24, 0.91)	0.77	(0.58, 1.03)	0.94	(0.40, 2.23)	1.48	(0.36, 6.15)	2.94	(0.70, 12.3)
Other family members SP (Ref. No)										
Yes	0.95	(0.54, 1.67)	1.17	(1.00, 1.36)	1.22	(0.84, 1.78)	1.21	(0.98, 1.51)	1.38	(0.91, 2.08)
Accompanied to facility (Ref. No SP										
SP Accompanied	0.85	(0.54, 1.67)	0.99	(0.73, 1.36)	0.73	(0.37, 1.47)	1.08	(0.72, 1.62)	0.87	(0.54, 1.38)
Labor & Delivery (Ref. No SP during L&D)										
Had SP during Labor & Delivery	2.34*	(1.16, 4.71)	1.25	(0.89, 1.75)	1.00	(0.73, 1.36)	1.31	(0.67, 2.56)	0.80	(0.46, 1.38)
Postpartum (Ref. No										
Had SP Postpartum	1.94**	(1.29, 2.92)	0.81	(0.56, 1.18)	0.74***	(0.67, 0.81)	1.34*	(1.04, 1.73)	1.14	(0.73, 1.77)
Household decision-making (Ref. Does not have say in all decisions)										
Empowered in HH decisions	0.89	(0.64, 1.24)	1.08	(0.82, 1.41)	1.28	(0.88, 1.84)	0.90	(0.69, 1.73)	0.97	(0.65, 1.45)
Facility type (Ref. Gov't hospital)										
Gov't HC/Disp	0.72***	(0.63, 0.82)	1.43***	(1.27, 1.60)	1.30**	(1.08, 1.57)	1.09	(0.69, 1.73)	1.17	(0.70, 1.96)
Private facility	1.64***	(1.31, 2.04)	1.04	(0.87, 1.47)	0.76*	(0.61, 0.95)	1.08	(0.46, 2.57)	1.18	(0.67, 2.10)

	Felt welcome (n=1,138)		*Opportunity to consult* (n=1,138)		*Told condition/care* (n=1,138)		*Welcome to ask questions* (n=1,119)		*Listened to concerns* (n=1,119)	
	aOR	**95% CI**	**aOR**	**95% CI**	**aOR**	**95% CI**	**aOR**	**95% CI**	**aOR**	**95% CI**
Total providers assisting delivery	0.85	(0.51, 1.40)	1.54*	(1.10, 2.15)	1.10	(0.79, 1.54)	1.84*	(1.07, 3.17)	1.64	(0.87, 3.09)
Selected facility based on quality	0.87	(0.54, 1.38)	1.18	(0.95, 1.47)	1.05	(0.73, 1.52)	1.21*	(1.02, 1.45)	1.34*	(1.04, 1.73)
Referred to facility	0.92	(0.59, 1.43)	1.43**	(1.10, 1.85)	1.31	(0.89, 1.92)	1.06	(0.77, 1.47)	1.14	(0.72, 1.79)
Constant	14.02	(9.78, 20.1)	0.70	(0.30, 1.67)	0.90	(0.22, 3.74)	2.78	(1.39, 5.57)	1.98	(0.84, 4.65)

Notes: *p<0.05, **p<0.01, ***p<0.001

Discussion

There is a lack of understanding of how to engage SPs into maternity care. This study introduces the novel construct of PC-ISP with related measures developed for it and sheds light on women's preferences and experiences for integrating SPs. Using survey data from postpartum women at facilities in Kenya, findings provide insight about women's needs for support and how their social support was facilitated (or not) by the healthcare system. These findings also show the utility of PC-ISP indicators for examining both women's preferences and experiences of integrating SPs into their care. I found that women desired specific types of support aside from birth companionship, but that these preferences varied by women's, SPs', and household characteristics. Results also indicate that women and SPs were treated differently due to differences in social status, SP types, and facility characteristics.

Results were partially consistent with my hypotheses. As expected, I found that women who were younger, more empowered were more likely to prefer integrating SPs. However, some hypothesized relationships, such as women's education, birthplace in Nairobi/Kiambu counties, having SPs present during labor/delivery, were not associated with PC-ISP preferences. I also expected that women at private facilities would desire SP integration, but instead found that women at private facilities were less likely to prefer integrating SPs than those at public hospitals. Similarly for women's PC-ISP experiences the finding that women with male partner

SPs were more likely to report PC-ISP experiences was consistent with my hypotheses. Other results were partially consistent since I found that older age, higher education, and being born in Nairobi/Kiambu counties were associated with some but not all PC-ISP experiences. Some of this may may be because some PC-ISP experiences were salient for women with specific characteristics; for example, women's greater educational attainment may make it easier for them and their SPs to express concerns to providers and have them addressed. Other literature has found that providers are favorable towards and more willing to engage with women who are informed (P. A. Afulani et al., 2020). This may also be because variables may lack specificity in capturing social status: for example, although women's birthplace in Nairobi/Kiambu counties measures their history of migration, this indicator masks differences in migration (i.e., migration from rural areas, urban areas, internationally) and reasons for migration (e.g., poverty, conflict, education) that are relevant for women's social position. I also found that facility factors went against my hypotheses: although provider type was not associated with PC-ISP experiences, the number of providers assisting delivery was, and associations with facility types varied widely across indicators.

Importantly, I found that there is a sizeable unmet need for social support during childbirth. First, more than one-in-four women wanted an SP during labor and/or delivery but did not have one. Second, although a large majority of women wanted their SPs integrated into their maternity care (73.6-93.6% across different PC-ISP preference indicators), fewer women reported that their SPs were actually integrated in practice (45.3-82.0% across different PC-ISP experience indicators). I argue that more specific, support role-based efforts are needed to facilitate women's needs and preferences for support in maternity care.

Women's preferences for PC-ISP

Regarding specific PC-ISP preferences, over 90% of women wanted their SPs to understand their condition/care and have their SPs make sure their providers respected their values and choices while slightly less wanted their SPs to know about their condition/care or consult SPs on decisions, suggesting that desires to remain at the center of their own maternity care are among women's highest priorities. Especially because there is little patient participation in health care, in general (WHO, 2007), these findings highlight the need to increase women's involvement in their maternity care. Women deserve a voice in their own health care, ensuring they are properly informed, involved in decisions, and attended to with respect when they need help.

Multivariate results indicated that younger women were more likely to prefer PC-ISP, including for all PC-ISP preference indicators separately and the total number of preferences. Similarly, another study in Kenya found that younger women were more likely to desire labor support (P. Afulani, Kusi, et al., 2018). Recent literature has also documented trends of younger women wanting support persons during childbirth. A study in Ghana reported that younger women were more likely to expect their partners to be more involved in their health care, stemming from a shift away from traditional gender norms (Ampim et al., 2020). Another study found that aboriginal Australian cultural preferences around birth have changed, finding that although older women traditionally gave birth themselves, younger women were more content to have an attendant support them during delivery (Simmonds et al., 2012). Our findings are consistent with these studies and extends the literature to show that beyond labor and delivery companionship, younger women are also more likely to want their SPs integrated into their care in specific ways. In addition, given literature that norms regarding support during childbirth are

changing for younger women, these results suggest that women's preferences for integrating SPs into care are growing over time.

Findings also suggest that women look to specific types of SPs for certain types of support. For example, having an SP who was mother (vs. no mother SP) was the only SP type that was associated with greater PC-ISP preferences indicating that women potentially look to their mothers for multiple supportive functions. In contrast, women may rely on other individuals for specific types of support; having an SP who was a male partner (vs. not) or sister (vs. not) were only associated with an increased likelihood of wanting to consult SPs for decisions. Interestingly, having other family members (e.g., aunts, cousins) as SPs was positively associated with a preference to consult on decisions, know condition/care, and understand condition/care. Given that literature and policy has predominantly focused on male partner involvement (Galle et al., 2021; UN Population Division, 1994), these findings challenge assumptions that male partners are women's primary SPs of choice. Many studies have found preferences for mothers, female relatives, etc., often stemming from cultural preferences (Alexander et al., 2014; Simmonds et al., 2012; Wanyenze et al., 2022; Yuenyong et al., 2008) . Yet, providers frequently give preferential treatment to male partners and policies have stressed the inclusion of male partners, including in Kenya (Aborigo et al., 2018; Ampim et al., 2021; Sudhinaraset et al., 2019). Rather, maternity care systems must broaden efforts to facilitate SPs beyond involving male partners and expand policy recommendations to include an array of SP types into care processes.

Interestingly, increases in the number of SPs was negatively associated with several PC-ISP preferences and the total number of PC-ISP preferences. One potential reason for this is that women may desire a degree of privacy if multiple SPs are involved. Women may consider

certain individuals to be overbearing (e.g., coaching in ways women find unhelpful) and want to limit some individuals' involvement (Odent, 1984). Another study also found that having too many SPs was undesirable; 90% of women who had multiple family members (up to 6) present at childbirth wished to have fewer people present (Keirse et al., 1989). Ensuring women have the SPs of their choice also includes the ability to limit SPs to only those they want.

Notably, women's empowerment in household decision-making was associated with preferences for consulting decisions with SPs, and SPs knowing and understanding women's conditions and care. This may suggest that when women feel that they have a say among their household members, they are also more likely to want to integrate them into their care. On the other hand, this may also indicate that women who lack decision-making power at home may want to protect their autonomy in health care and thus prefer not to integrate SPs into their care. This underscores the need to assess women's preferences for support to ensure women's involvement and autonomy are given primacy (Nieuwenhuijze et al., 2014). Furthermore, given that women's decision-making power in their own health care is increasing in sub-Saharan Africa (Andriano et al., 2021), our findings linking women's empowerment and PC-ISP preferences suggest that, over time, women may increasingly prefer to integrate SPs.

Women's experiences of PC-ISP

The data suggests that women's preferences were not met. This underscores how the healthcare system is ill-equipped to facilitate social support. Maternity care providers lack a clear agenda for engaging SPs directly or productively (Ampim et al., 2021). Even when policies are in place, providers often have widely differing practices about including or engaging SPs, such

as only allowing certain types of SPs or only providing information about women's conditions if women experienced problems (Ampim et al., 2021; Sudhinaraset et al., 2019).

For the PC-ISP indicator, *told condition/care*, most women reported that they were not asked if their SP should be told about their condition/care. Asking women about whether their information should be shared prioritizes their decision-making about their own privacy and how they want their SPs to be involved. If desired, sharing information with SPs can substantially alter women's experience of care: providing information about women's conditions and care processes facilitates SPs' ability to tailor their support and advocate for women (Kululanga et al., 2012; H. L. Longworth & Kingdon, 2011). Future research should examine providers' communication with SPs and its impact on SPs provision of support and care delivery.

Findings also suggest more attention is needed on the equitable, inclusive treatment of SPs, since women may look to a variety of SP types for their support needs. However, few studies have investigated strategies to address discriminatory or differential treatment of SPs in maternity care. Intervention studies that aim to increase access to SPs have even reported instances of differential treatment (Kabakian-Khasholian et al., 2018). Future research and interventions should also assess whether SPs are treated differently in practice and how this may affect women's receipt of support and outcomes.

Excluding SPs during intrapartum and postpartum periods may be particularly detrimental given that these are critical periods for women's health (Lunda et al., 2018; Zhang et al., 1996). Other studies have found that allowing women to have their SPs present with them throughout maternity care contributes to their network members' sense of inclusion and belonging in care (Mgawadere et al., 2019). Helping families and social network members feel welcome in facilities influences positive perceptions of facility-based care in the broader

community which contributes to women's and community members' future decisions to utilize health services and contributes to maternal and neonatal health (WHO, 2017b). These findings reaffirm other literature that emphasizes the importance of allowing their SPs of choice during the key periods of labor/delivery and postpartum (Bohren et al., 2017; Hodnett et al., 2012; WHO, 2016a).

This study corroborates existing literature that highlights the critical role of facility factors in influencing women's access to SPs. Notably, number of providers assisting delivery predicted women's experiences of SP integration. This is likely because adequate staffing contributes to providers' capacity to engage with SPs and facilitate support. This supports other studies that have attributed exclusion of SPs to understaffed wards and overworked providers (P. Afulani, Kusi, et al., 2018; Bruggemann et al., 2014; Mullany, 2006). Kabakian-Khasholian and Portela's (2017) review concluded that women's access to SPs largely depended upon facilities' "*allocation of resources, organization of care, facility-related constraints and cultural inclinations."* Overworked and busy staff perceive that they do not have the time to accommodate SPs, whom the obstetric team often considers to be an additional burden (Bruggemann et al., 2014; Kabakian-Khasholian et al., 2018). Kenyan providers have commonly cited institutional factors as a major reason for their inability to provide more supportive care, including lacking the appropriate resources to provide services (P. Afulani, Kirumbi, et al., 2017). Given that I did not find evidence that the type of provider was associated with PC-ISP as hypothesized, these findings about facility factors suggest that organizational factors have more of an influence on PC-ISP experiences than individual provider characteristics.

Moreover, these institutional factors also highlight how health care providers are embedded in institutions, health care systems, and social systems. Despite wanting to provide the

best care, providers are often constrained and frustrated by institutional policies, lack of resources, and social hierarchies (Sen et al., 2018; Solnes Miltenburg et al., 2018; WHO, 2016c). Maternity care practices tend to be similar within facilities while there is considerable variation in maternity care practice by county and facility, especially given Kenya's decentralized health care system (facilities are governed by counties) (Oyugi et al., 2018). Athough health policies and standards are established at the national level, implementation is left to counties. Greater coordination to address staff capacity and establish standard practices regarding SPs across the health system is needed.

Limitations

This study makes an important contribution to the literature on how SPs fit into a person-centered maternity care approach but there are notable limitations. The first relates to the PC-ISP survey measures. Although PC-ISP measures were developed from themes in extant literature, they were not validated within the sample, nor did they undergo psychometric or formal scale development. Additionally, given low reliability, the combined PC-ISP score may not accurately or validly measure PC-ISP as a broader concept. However, past studies have been primarily qualitative or only used single measures that do not adequately capture the PC-ISP construct.

Furthermore, although women were surveyed about their PC-ISP preferences, I was unable to assess how preferences aligned with or influenced reports of PC-ISP experiences because: 1) preference and report measures did not align well and 2) they were administered within the same interview and thus PC-ISP preferences may be biased by PC-ISP experiences. However, because acknowledging and respecting women's preferences is important for person-

centered care, knowledge of women's preferences for integrating SPs in maternity care is an important area of needed research.

Findings regarding some types of SPs (i.e., mother, mother-in-law, father, brother of the woman) should be interpreted conservatively, given the small numbers of women who reported these types of SPs and large standard errors in some models. Nonetheless, I included separate dummy variables for each of these types and did not combine them into a composite variable because literature has highlighted differences in how these SP types relate to women and within the maternity care setting. For example, mother-in-laws may act as gatekeepers for women's health care decision-making and women may feel more embarrassed in front of or be scolded by mother-in-laws compared to mothers and that (P. Afulani, Kusi, et al., 2018; Gupta et al., 2015).

Finally, there are limitations with regards to generalizability given the sample included only women who delivered at six facilities in urban areas in Nairobi and Kiambu counties. Since this study included only facilities with high-patient volumes, the results are biased towards those who attended high-level facilities and do not represent the preferences and experiences of those at lower-level facilities. More research is needed across a greater number of facilities to better examine women's access to SPs and how facility factors influence PC-ISP. Nevertheless, this study generates insights about gaps in maternity care practice and how health systems may better integrate SPs under broader efforts to improve person-centered care.

Future research

To address limitations in measuring SP integration, future research should include formal development and validation of a PC-ISP scale. More research is also needed to assess the extent

that women's PC-ISP preferences, which influence women's expectations of care, affect their experiences of care and QoC outcomes.

Future research should also further examine how additional facility factors, such as the financial resources or physical infrastructure (which influences privacy or crowded wards), are associated with women's access to SPs, potentially using facility data from DHIS2. This information is critical for developing comprehensive, multi-level interventions to increase support for women (Burman et al., 2013).

Future research may also examine the influence of other facility or broader social contextual factors using data from other sources. For example, I will use District Health Information System version 2 (DHIS2) to examine other facility-level factors such as deliveries attended by skilled personnel and antenatal care use and use Demographic and Health Survey (DHS) data to examine social norms (e.g., prevalence of intimate partner violence, attitudes towards wife-beating) in facility catchment areas. This may help us understand how local social norms such as care-seeking behaviors and gender norms influence experiences of integrating SPs. For example, measures of abuse in the the community may contribute stricter social hierarchies in obstetric practice and influence how SPs are integrated.

Study Implications

Because SPs play critical functions and are important to women, efforts to improve person-centered care should also include integrating SPs in the ways women want. By introducing and measuring the concept of PC-ISP, we found that most women wanted to integrate their SPs into maternity care and these preferences will likely continue to grow over time. Thus, integrating SPs, when desired, can bolster women's autonomy and involvement in their own care. Further,

maternity care practice needs appropriate instruments to better assess women's preferences for support. The PC-ISP indicators developed in this study could be used in both research and practice to examine women's preferences for integrating SPs more closely. The health care system should also establish processes to incorporate women's preferences to guide care delivery. At a minimum, the care team should acknowledge and engage with women's SP of choice. In addition, policies and training for providers are needed to ensure equitable treatment of women and different types of SPs given women rely on different types of family or community members for different forms of support. Lastly, efforts to integrate SPs into maternity care need to address facility factors including staff capacity, cultures of care, and patterns of provider behavior. For example, community health workers could potentially fill in gaps in staff shortages for non-technical care and better engage with training and integrating SPs during childbirth. Providers may also receive training about the benefits of integrating SPs for women's care, such as monitoring women's conditions or ensuring that information given to women is properly heard and understood. Lastly, although Kenya's health care system is decentralized, establishing and enforcing standard practices regarding SPs across the health system is needed. Ultimately, integrating SPs into maternity care in the ways women want increases needed support for women, bolsters efforts to advance person-centered care, and has the potential to improve health outcomes.

Chapter 6. Centering support persons' experiences of maternity care: results from support persons' surveys: Aim 2

Abstract

Support persons are commonly excluded in facility-based maternity care in Kenya which has implications for women's experience of childbirth and women's and newborns' health outcomes, including duration of labor, adverse birth outcomes, and postpartum mental health, among others. Integrating support persons in maternity care has been proposed as one strategy to improve health equity and improve health outcomes; however, there is a critical lack of data that centers on support persons' voices, including their perceptions in engagement in care. The primary objective of this study was to investigate how support persons perceive being integrated into care using the concept and measures of Person-centered Integration of Support Persons (PC-ISP). This study used data from the Strengthening Person-centered, Accessibility, Respectful care, and Quality (SPARQ) study from six facilities in Nairobi and Kiambu counties. Support persons (n=606) of women who recently delivered were surveyed at facilities. I used multiple linear and logistic regression to estimate associations between factors at multiple levels and support persons' PC-ISP experiences. Findings highlighted poor communication between providers and support persons and support persons' lack of information about care; only 20% of SPs reported receiving information about the woman and even fewer (17%) reported receiving information about the newborn. Support persons were less likely to report being given information about women and newborns if women reported problems during delivery. This lack of information merits attention because women who have poorer health likely need more support from their support persons and support persons cannot adequately support women when they are uninformed of women's conditions and not educated about how to properly support women.

Support persons were also twice as likely to be integrated into care if they reported that facilities were not crowded. Health care systems need to develop processes to inform support persons about women's condition and care, especially at crowded facilities.

Introduction

The presence of a support person is among the most important factors that improve women's perceptions of their childbirth experience (Hodnett, 2002). I define a support person (SP) as a lay person who accompanies a woman to the facility or stays in or near the maternity ward during labor, delivery, or postpartum (Maimbolwa et al., 2001; Simmonds et al., 2012). Yet in many contexts, including Kenya (P. Afulani, Kusi, et al., 2018; Sudhinaraset et al., 2019), SPs are pushed aside or actively excluded in maternity care, which has implications for the support women receive and subsequent health outcomes, such as longer duration of labor and greater need for cesarean deliveries (Bohren et al., 2019). Engaging both women and communities has been put forth as the primary strategy to improve safety, treatment, and interactions in healthcare (WHO, 2007), but little research has focused on understanding the healthcare experiences of SPs, who directly interact with the healthcare system as they support women in childbirth. Integration of SPs into care has been promoted to improve health outcomes and health equity (Bohren et al., 2019), and thus, SPs' perceived engagement in maternity care is needed to inform programs and practices to better integrate SPs. Exploring SPs' experiences can illuminate how the healthcare system treats SPs, how SPs' perceived experiences may differ by SPs' characteristics, and identify modifiable factors to help the healthcare system better integrate SPs.

Support Persons are critical for women's care

Women depend on their families and social networks for crucial instrumental, informational, and emotional support during childbirth (WHO, 2013). SPs influence women's experience of care, their relationships with providers, and decisions to seek care (Alexander et al., 2014; Kozhimannil et al., 2016). Particularly in contexts where provider mistreatment is common, the absence of an SP increases women's risk of experiencing mistreatment (Abuya et al., 2015; Balde et al., 2020). SPs can be vital advocates for women by improving women's interactions with providers, facilitating communication, and calling for medical help (Ampim et al., 2021; McMahon et al., 2014).

The overlooked role of Support Persons in research

Although SPs are among women's closest relationships and provide care and support to women within the healthcare system, little is known about who SPs are, such as their characteristics, their relationships to women, and how they support women. Despite evidence that SPs span an array of types (e.g., male partners, mothers, sisters, friends) (P. Afulani, Kusi, et al., 2018; Simmonds et al., 2012), literature has primarily focused on the involvement and attitudes of male partners in maternal healthcare (Adeyemi et al., 2018; Labrague et al., 2013). We also do not understand the experiences of SPs, whether they differ by social status, nor how they are shaped by the healthcare environment. This information is important because they are participants in maternity care system and critical for women's support—in the institutional setting, during pregnancy, and postpartum (WHO, 2016b).

SPs face provider and institutional barriers to supporting women in maternity care, which have also been documented in Kenya (P. Afulani, Kusi, et al., 2018; Kabakian-Khasholian & Portela, 2017; Sudhinaraset et al., 2019). Yet, aside from birth companionship, we lack

information about the extent to which SPs are excluded or, conversely, integrated into maternity care. This is largely because SPs, as a group, are seldom the subject of research and have rarely been examined in population studies. The few extant studies that have surveyed SPs have focused on male partners' involvement and were based in contexts where SPs were welcome and expected to provide companion support (Ampt et al., 2015; He et al., 2015; Porrett et al., 2013). Yet, there is evidence that women have an array of companions outside of their male partners. Existing studies included few measures assessing SPs' interactions with providers or the institution and did not explore the extent that SPs were integrated into maternity care, such as how they were educated about maternity care, provided information throughout care, or had opportunity to interact with providers.

Furthermore, quantitative investigations are particularly needed to identify and assess disparities in maternity care. Evidence suggests that treatment of SPs in Kenyan facilities can vary substantially by providers, women's characteristics, and SPs' characteristics (Sudhinaraset et al., 2019). One rural Kenyan study showed that access to birth companion support is greater for women of higher economic and educational status (P. Afulani, Kusi, et al., 2018). This study also found that female relatives were more likely than male partners to be allowed as companions. Another study in urban Nairobi and Kiambu counties found that provider practices varied: some providers granted access to all companions while others gave preferential treatment based on the SPs' relation to the woman, allowing only male partners (Sudhinaraset et al., 2019). A more detailed, quantitative investigation of SPs experiences can reveal broader patterns of differential treatment of SPs.

Lastly, although studies have described how institutional factors contribute to providers' treatment of SPs, quantitative assessments of how facility factors influence SPs' experiences of

care represent a gap in literature. The facility and broader health care system—through policies, organization, level of resources, and the built environment—determines and normalizes treatment of SPs. Qualitatively, many studies have shown that crowded maternity wards in Nairobi are not conducive to having SPs present; for example, when space is so limited that women need to share beds, there is neither space nor privacy to accommodate SPs (Oluoch-Aridi, Afulani, Guzman, et al., 2021; Sudhinaraset et al., 2019). A systems-approach is needed to understand how facility factors contribute to disparities for SPs and how they are linked with factors at multiple levels (e.g., SP, woman, facility, etc.). Investigating the multi-level factors will reveal the modifiable factors to better integrate SPs in maternity care.

Present study

This study investigated how SPs perceive being integrated into care using the concept of Person-centered Integration of Support Persons (PC-ISP). Specifically, I investigated SPs' reports of PC-ISP in three domains: 1) *Communication and provision of information*, 2) *Ability to ask questions and express concern*s, and 3) *Decision-making support*.

Using SP-reported PC-ISP measures, the main objective of this study was to examine how factors at the SP, woman, dyadic, household, and facility levels are associated with PC-ISP. I expected that SPs of lower social position who support women of lower social position will report less integration. I hypothesized that SPs who are younger, unemployed, not male partners (SP-level) who support women who are younger, less educated, non-locally born (woman-level), report lower relational connectedness (dyad-level), assist women with lower empowerment scores (household-level), deliver at public hospitals (facility-level) are less likely to report that they were integrated into care. Because the facility infrastructure is needed to accommodate SPs,

I also expected that SPs who report worse perceptions of the facility environment are less likely to report being integrated into care.

A secondary objective was to explore the bivariate associations between women's, SPs', dyadic, household, and facility-level factors and three support variables: types of SPs, number of SPs, and timing of SPs' support.

Methods

Data

This study used women's and SPs' survey data from the Strengthening Person-centered, Accessibility, Respectful Care, and Quality (SPARQ) study in Kenya. Data were collected between September 2019 and January 2020 from women delivering at six facilities in Nairobi and Kiambu counties. Women between the ages of 15-49 who had recently delivered in these hospitals were recruited at facilities. A total of 1,197 women provided data about their characteristics, SPs, households, and experiences of care.

Following interviews, women identified an SP for possible participation in the SPs' survey. Inclusion criteria for SPs were a) anyone who accompanied the woman to the hospital, stayed and assisted the woman during labor and/or delivery or visited during the postpartum period, b) at least 18 years of age, and c) spoke English of Kiswahili. Eligible and interested SPs were interviewed in a private setting for approximately 20 minutes. In total, 606 SPs completed surveys.

Measures

PC-ISP variables

PC-ISP survey measures were developed to assess SPs' experience of care according to the three themes discussed previously. Table 6.1 displays the PC-ISP indicators that were administered to SPs. Five PC-ISP questions corresponding to three sub-constructs were included in SPs' surveys. Response options for all SP-reported PC-ISP questions were binary: yes vs. no. Missing responses for PC-ISP indicators were excluded from analyses.

Two questions were only administered to the subsample of SPs who reported staying with the woman during labor and/or delivery (n=134): *help speak up during healthcare* and *help decide during healthcare*. Because these PC-ISP questions should have been asked of all SPs, this represents a notable limitation of the SPs' data. For this reason, I analyzed SPs' PC-ISP variables separately and did not create a summative score.

Table 6.1. PC-ISP indicators included in the SPs' survey

PC-ISP sub-construct	**Variable name**	**Question**
Communication and provision of information	*Provided information about woman*	Were you provided resources or information from the mother's health provider on how to help care for the mother?
	Provided information about newborn	Were you provided resources or information from the mother's health provider on how to help care for the newborn?
Ability to ask questions and express concerns	*Welcome to ask questions*	Were you or do you think you would have been welcome to ask the health care providers questions about the mother and baby's care?
	Help speak up during healthcare	Did you ever help speak up to the health facility staff on behalf of the mother?*
Decision-making support	*Help decide during healthcare*	Did you help the mother with any decisions during labor and/or delivery?*

* Question was only asked of a subset of SPs who reported staying with the woman during her labor and/or delivery (n=134).

Support persons', women's, dyadic, household, and facility variables

SPs reported on their relation to the woman within 8 specific categories (i.e., male partner, mother, mother-in-law, sister, brother, father, other family member, and friend/neighbor/other). For analyses, I constructed a variable that collapsed these 8 types into 4 categories (i.e., male partner, mother/mother-in-law, other family members, friend/neighbor/other) because of how the data were distributed and because literature has highlighted these particular types of relationships as important for women's maternal health care (Diamond-Smith, Sudhinaraset, Melo, et al., 2016; Ono et al., 2013). SP-reported variables also included the SPs' age (continuous), marital status (married/partnered vs. not), birthplace (born in Nairobi or Kiambu counties vs. not). Additional SP variables from the women's surveys included women's reports of all the SP types who provided support during three time periods (i.e., accompanying, staying during labor/delivery, or visiting postpartum). Using this data, I summed all SP types across times of support to obtain the total number of SPs assisting the woman at the facility.

Women's individual-level factors included age, marital status, parity, educational attainment, current employment status, birthplace, and health insurance coverage. Because literature has described instances where providers grant women access to SPs based on women's health conditions, I also examined women's reports of self-rated health status (range 1-4, included as a continuous variable with higher values representing worse health), pregnancy problems, and any problems during delivery.

Dyadic factors that describe the woman-SP relationship were reported by SPs and included how long the SP knew the mother and SP's relational connectedness to the woman (range 1-7, higher values corresponding with greater connectedness). Missing values for relational connectedness (n=5) were recoded as the mode value (7, the highest connectedness

rating). I also explored whether SPs accompanied the woman to antenatal care (yes vs. no), an indicator of past involvement in maternal health care. A total of 43 SPs reported that the woman did not attend antenatal care and were thus coded as 'did not accompany.' I also examined the age difference between the SP and the woman (continuous) by calculating the difference between the SP's and woman's reported ages.

Household factors likely influence what type of SPs are selected and how they support women. Household factors reported by women included household size and women's empowerment in household decision-making. The variable *Empowered in household decisions,* was a binary variable that indicated whether a woman reported involvement in four separate measures of involvement in household decisions (i.e., responding either "woman only" or "jointly"), which I refer to as *"Empowered,"* versus lack of involvement (i.e., "partner only" or "someone else") in at least one question, which I refer to as *"Not empowered"* (Upadhyay & Karasek, 2012). Women who were not married or partnered were not asked this question—they were coded as being involved in all four types of decisions (i.e., *"Empowered"*).

Facility factors that were reported by women included the type of facility, total number of providers who assisted the delivery, and types of providers who assisted with delivery (doctor or clinical officer, nurse or midwife, other, none). The physical infrastructure of the facility (e.g., crowding, whether the facility is properly equipped) can influence the degree to which providers integrate SPs (Kabakian-Khasholian & Portela, 2017; Mgawadere et al., 2019). Because of this, I also examined SPs' reported perceptions of the facility environment including whether the facility was crowded, safe, clean, and had water or electricity.

Analysis

For my primary objective, I investigated determinants of SPs' reports of PC-ISP as separate indicators, corresponding to different levels of the socioecological model (Bronfenbrenner, 1986). I applied a socioecological approach to this inquiry to examine how experiences of care are situated within broader systems at multiple levels. The socioecological model guided my measures and analyses, allowing me to examine how forces at multiple levels influence SPs' experiences of care.

I first examined the pairwise correlation matrix of SP-reported PC-ISP measures (see Appendix 6A), which ranged from no correlation to strong positive correlations (r=-0.006 to r=0.772). Notably, a strong correlation was only observed between the *provided information about woman* and *provided information about newborn*, two measures in the same sub-construct of provision of information and education.

I explored bivariate associations between PC-ISP indicators and all factors at the SPs', women's, dyadic, household, and facility factors using chi-square and t-tests. I constructed multivariate binomial logistic regression models using a blocked modeling approach, beginning with a model including a block of SPs' individual factors, women's factors, then adding increasingly distal levels for each subsequent model (i.e., adding other SPs' factors and household, the facility). Factors that I included in multivariate models were either theoretically important (e.g., age, parity, etc.), or were statistically significant ($\alpha = 0.05$) in bivariate analyses. Final models included SP variables: SPs' relation to the woman (recategorized into four types: male partner, mother/mother-in-law, other family, friend/neighbor/other), age, birthplace, employment status, SPs' connectedness rating, whether SP accompanied the woman to antenatal care, and whether the SP reported accompanying the woman to the facility or stayed with the woman during labor and/or delivery (I excluded postpartum because nearly all SPs were

recruited from postpartum wards); women's variables: age, parity, marital status, educational attainment, birthplace, self-rated health, and report of delivery problems; other SP and household variables: total number of SPs and household empowerment; and facility variables: facility type, number of providers assisting delivery, and SPs' perception of crowding at the facility; and two variables to control for selection: woman selected facility because of quality, and woman was referred to the facility.

I used the following equation for logistic regression for the separate PC-ISP indicators, describing the full model:

Equation 6.1, Binomial Logistic (full model):

$$logit(p) = \alpha + X\beta_{Woman} + X\gamma_{SP} + X\eta_{Dyadic} + X\delta_{HH} + X\zeta_{Facility} + \epsilon$$

Where p is the probability of SPs reporting a given PC-ISP item.
β_{Woman} is the vector of parameters for women's individual factors
γ_{SP} is the vector of parameters for SPs' individual factors
η_{Dyadic} is the vector of parameters for dyadic factors
δ_{HH} is the vector of parameters for household factors
$\zeta_{Facility}$ is the vector of parameters for facility factors, and,
ϵ is the vector of error terms

I checked models using Hosmer-Lemeshow goodness-of-fit tests which indicated that the full models for each of the PC-ISP indicators fit the data well (i.e., failed to reject the null hypothesis that the models poorly fit the data). To check for multicollinearity between predictors, I examined relationships between continuous predictors visually (Appendix 6C) and calculated the variance inflation factor of all factors included in full models (mean VIF=1.45) and found little evidence of correlation between predictors included in the full model. I checked for influential outliers by examining standardized Pearson residuals, deviance residuals, and Pregibon leverage (Appendix 6D). I ran models without potential outliers and generally found that no observations were particularly influential. For models examining *help decide* and *help*

speak up, I found that excluding observations with high leverage (*>3(k-1)/N*) resulted in several more factors being significant (for *help decide*: education, total SPs, total providers assisting delivery; for *help speak up*: accompanied to antenatal care, age, private facilities) (Velleman & Welsch, 1981). While this analysis was informative in showing that a handful of observations (n=7 in each case) influenced estimates to be more conservative, I included all observations in final models presented in this study.

I used several methods to address clustering by facility. First, I used cluster-robust standard errors in single-level regression models. Second, I included two variables to control for possible confounding by facility selection: whether the facility was selected because of quality and whether women were referred to the facility. Lastly, I explored intraclass correlations (Appendix 6B) and using multi-level models by adding a random effect for facilities to account for any unmeasured variance by facility. However, intraclass correlations for all PC-ISP indicators were low and likelihood ratio tests (random intercept model nested within traditional logistic model) showed that none of the multi-level models were shown to be a better fit than traditional logistic regression models, indicating that the facility factors included in models were able to account for facility-level effects. Thus, I only present the results of single-level logistic models.

I also conducted sensitivity analyses to check the robustness of results by SP types and facilities. I examined SP types as their original 8-category classification and alternative variables collapsing SP types into different categories. These analyses produced similar results. I also performed analyses stratified by facility to explore possible facility-specific effects. Comparisons of individual facilities did not reveal any notable patterns or differences by facility.

For the secondary objective (Sub-Aim 2b), I explored factors associated with the A) types of SPs, B) number of SPs, and C) timing of support. I analyzed bivariate associations between each of these three dependent variables and factors at different levels of the socioecological model. For dependent variabls that were reported by both SPs and women (i.e., SP type, timing of support), I conducted separate analyses for both SP and women-reported variables.

Because women could report multiple SP types (mean 1.5), for analyses of women-reported SP types, I compared women who reported having a given SP type with those who did not report that type (i.e., women who reported a male partner SP vs. women without a male partner SP). Because only one SP was interviewed per woman and thus mutually exclusive, for SP-reported SP type, I compared SP types against other types (i.e., male partner vs. mother/mother-in-law vs. other family members vs. friend/neighbor/other). I analyzed women's and SPs' reports of three different timings of support (accompanying to the facility, present during labor/delivery, visited postpartum). However, given that SPs were recruited from postpartum wards, nearly all SPs surveyed reported visiting women postpartum. I therefore did not analyze SPs' reports of postpartum support due to lack of variation in the data.

I used chi-square tests, t-tests and ANOVA to test for statistically significant differences by the factors investigated (two-sided $\alpha = 0.05$). I visually inspected scatter plots of continuous-by-continuous variables (e.g., number of SPs and age) and used Spearman's rank correlation coefficient to assess statistical dependence. I also conducted sensitivity analyses to check the robustness of results by SP types and facilities. I examined SP types as their original 8-category classification and alternative variables collapsing SP types into different categories. These analyses produced similar results. Results and discussion for this secondary objective (Sub-Aim 2b) are presented in Appendix A.

Results

Descriptive characteristics of the sample of SPs

In total, there were 606 SPs who stayed and supported women during labor, delivery, and/or postpartum (Table 6.2). Partners represented the most frequently interviewed type (42.7%), followed by friends/neighbors/others (20.0%), sisters (14.7%), other family members (13.2%), and mothers/mothers-in-law (8.7%). Most SPs reported accompanying the woman to the facility (80.2%) and visiting the woman post-partum (99.3%), while less than a quarter reported staying with the woman during labor and/or delivery (22.1%). The average age of SPs was 30.9 years of age (SD 8.1). Most SPs were married or partnered (82.5%), Christian (97.5%), and born outside of Nairobi or Kiambu counties (80.5%). Most SPs were employed (77.7%) and were distributed somewhat evenly across occupational categories. On average, SPs rated themselves as being "very close and connected" to the delivering woman (6.3, SD 1.2) but nearly half (47.8%) only knew the woman for 5 years or less. Less than half of SPs accompanied women to an antenatal care appointment (42.9%).

On average, SPs supported women who were 25.1 (SD 5.02) years old with 1.98 (SD 0.98) live births. Most women were married or partnered (82.0%), not employed (63.0%), and had health insurance coverage (86.6%). Nearly half of women's educational attainment was primary or less (45.9%). Most women reported excellent/very good or good health (73.5%), and only 7.4% of women reported having problems during delivery, such as prolonged labor or hemorrhage.

Among women who had an SP interviewed, they reported an average of 1.49 (SD 0.67) SPs. Almost all women reported being accompanied to the facility (93.7%), a small fraction

reported an SP during labor and/or delivery (6.8%), and almost half reported an SP visit postpartum (45.4%). The average household size of women was 4.23 (SD 1.41) members and approximately half (52.8%) of women were empowered in household decisions.

Most SPs interviewed were at government hospitals (71.6%), followed by private facilities (15.7%), then government health centres/dispensaries (12.7%). Of this sample, women reported an average of 1.16 (SD 0.40) providers assisting delivery. Almost half of SPs (46.0%) reported that the facilities were crowded. Nearly all SPs reported that they felt safe in the facility (95.5%), facilities were clean (95.7%), and had water (94.7%) and electricity (98.2%). Most women selected the facility because of quality (63.0%) and 15.8% of women were referred to their facility.

Table 6.2. Descriptive characteristics of the sample of SPs. (n=606)

Factors	N or mean	% or (SD)
Support Person's characteristics		
Relationship to woman		
Male partner	259	42.7%
Mother	10	1.7%
Mother-in-law	43	7.1%
Sister	89	14.7%
Father	1	0.2%
Brother	3	0.5%
Other Family	80	13.2%
Friend/Neighbor/Other	121	20.0 %
SP Age (mean)	30.9	(8.05)
SP currently married or partnered	501	82.5%
Time SP has known the woman		
Less than 1 year	32	5.3%
1-2 years	116	19.1%
3-5 years	142	23.4%
6-10 years	95	15.7%
11+ years	221	36.5%
SP Born in Nairobi or Kiambu counties	118	19.5%
SP currently employed	471	77.7%
Occupation		
Casual Labor	124	20.5%
Salaried Worker	128	21.1%
Self-employed in petty trade	183	30.2%
Self-employed small-scale industry	36	5.9%

Factors	N or mean	% or (SD)
Unemployed/homemaker	135	22.3%
SP connectedness rating [1]		
Mean connectedness (range 1-7)	6.25	(1.20)
Time SP has known the woman		
less than one year	32	5.3%
1-2 years	116	19.1%
3-5 years	142	23.4%
6-10 years	95	15.7%
11+ years	221	36.5%
SP accompanied woman to any antenatal care appointments	260	42.9%
Timing of support SP provided		
Accompanied to facility	486	80.2%
Present during Labor and/or Delivery	134	22.1%
Visited post-partum	602	99.3%
Women's characteristics		
Woman's Age (mean)	25.1	(5.02)
Parity (mean)	1.98	(0.98)
Multiparous	371	61.2%
Woman currently married or partnered	497	82.0%
Woman's Educational attainment		
Primary or less	278	45.9%
Vocational/Secondary	242	39.9%
College/University	86	14.2%
Woman currently employed	224	37.0%
Woman born in Nairobi or Kiambu Counties	126	20.8%
Woman's self-rated health status		
Excellent or very good	203	33.5%
Good	244	40.3%
Fair	97	16.0%
Poor or very poor	62	10.2%
Woman covered under health scheme or health insurance	525	86.6%
Pregnancy complications	169	27.9%
Delivery complications	45	7.4%
Additional SP factors		
Total number of SPs	1.49	(0.67)
Timing of support from any SP		
SP accompanied to facility	568	93.7%
SP present during labor and/or delivery	41	6.8%
SP visited postpartum	275	45.4%
Household factors		
Household size	4.23	(1.41)
Empowerment in household decisions [2]		
Not empowered in all HH decisions	286	47.2%
Empowered in all household decision	320	52.8%
Facility factors		
Facility type		
Government hospital	434	71.6%
Government HC/Disp	77	12.7%
Private facility	95	15.7%
Total number of delivery assistants	1.16	(0.40)
SP's perception of facility		

Factors	N or mean	% or (SD)
Feel safe in the facility		
Not safe	27	4.5%
Safe	579	95.5%
Crowding		
Crowded	279	46.0%
Not crowded	327	54.0%
Clean wards, washrooms, general		
Dirty/very dirty	26	4.3%
Clean/very clean	580	95.7%
Water in the facility		
No	32	5.3%%
Yes	574	94.7%
Electricity		
No	11	1.8%
Yes	595	98.1%
Referred to facility	180	15.8%
Selected facility because of quality	382	63.0%

Notes: [1] n=601, 5 refused to answer
[2] n=494, Asked only of women who were married/partnered

Support Persons' reports of Person-Centered Integration of Support Persons (PC-ISP)

Table 6.3 displays frequencies of SP-reported PC-ISP indicators. For SP-reported PC-ISP, the highest proportion of SPs reported that they had the ability to ask questions (81.0%). In contrast, less than one-in-five SPs reported that they were provided information about the woman (19.7%) or baby (17.1%). Among those who reported staying with the mother during labor and delivery, most reported helping the woman make decisions (63.4%) and helping to speaking up on behalf of the woman (64.2%).

Table 6.3. SP-reported PC-ISP frequencies

Indicator	N	%
Provided information about woman		
No	486	80.3%
Yes	119	19.7%
Provided information about newborn		
No	501	82.9%
Yes	103	17.1%
Welcome to ask questions		
No	115	19.0%
Yes	490	81.0%
Help decide during health care*		
No	49	36.6%
Yes	85	63.4%
Help speak up during health care*		

No	48	35.8%
Yes	86	64.2%

Note: *asked of the subsample of SPs who reported staying with the woman during labor/delivery (n=134)

Factors associated with SP-reported PC-ISP

Full multivariable logistic regression models for the three PC-ISP indicators administered to all SPs (i.e., *provided information about woman, provided information about newborn*, *welcome to ask questions*) are presented in Table 6.4.

Provided information about women: Regarding communication and receiving information, Mothers/mothers-in-law or other family were more likely to be *provided information about the woman* compared to friends/neighbors/others (Mothers/mothers-in-law aOR=2.35, 95%CI: 1.30, 4.25; Other family members aOR=1.82, 95%CI: 1.20, 2.75). On the other hand, male partners were just as likely as friends/neighbors/others to report that they were *provided information about the woman*. SPs' employment was negatively associated with being *provided information about the woman*, but further analyses of SPs' occupation did not reveal any patterns by occupation. SPs reporting staying with the woman during labor and/or delivery was positively associated with being *provided information about the woman* (aOR=1.80, 95%CI: 1.18, 2.74). SPs were also less likely to be *provided information about the woman* if women had poorer self-rated health or reported delivery problems. SPs at government health centres/dispensaries (aOR=0.44, 95%CI: 0.30, 0.63) and private facilities (aOR=0.57, 95%CI: 0.35, 0.93) were both less likely to be *provided information about woman* compared to government hospitals. SPs who perceived that the facility was not crowded were more than twice as likely to report *provided information about the woman* (aOR=2.84, 95%CI: 1.99, 4.07).

Provided information about newborn: SPs were more likely to be *provided information about the newborn* if they accompanied the woman to antenatal care appointments (aOR=1.69, 95%CI: 1.05, 2.72) or were present during labor and/or delivery (aOR=1.80, 95%CI: 1.11, 2.94). In contrast, SPs of women who had delivery problems were less likely to report being *provided information about newborn*. SPs were less likely to report *provided information about newborn* at government health centres/dispensaries compared to government hospitals. SPs who perceived that the facility was not crowded were also more than twice as likely to report *provided information about newborn* compared to SPs who perceived the facility as crowded (aOR=2.30, 95%CI: 1.35, 3.92).

Welcome to ask questions: SPs were also more likely to report feeling *welcome to ask questions* if they had accompanied women to antenatal care appointments (aOR=1.80, 95%CI: 1.17, 2.77) or were present during labor and/or delivery (aOR=1.71, 95%CI: 1.05, 2.78). Feeling *welcome to ask questions* was also positively associated with increases in women's age and women's empowerment in household decisions, but negatively associated with women's employment and increases in the number of total SPs. Further analysis disaggregating women's employment by occupation showed that the association between women's employment and SPs feeling *welcome to ask questions* was driven by women who were self-employed in small scale industries (results not shown). SPs were also more likely to feel *welcome asking questions* in a government health centre/dispensary (aOR=1.52, 95%CI: 1.22, 2.88) or private facility (aOR=2.88, 95%CI: 1.98, 4.19) compared to government hospitals. SPs who reported that the facility was not crowded were twice as likely to report feeling welcome to ask questions (aOR=2.00, 95%CI: 1.39, 2.89) than those who thought the facility was crowded.

Table 6.4. Multivariable logistic regression results for SP-reported PC-ISP indicators: provided information about woman, provided information about newborn, welcome to ask questions (n=605)

	Provided info about woman (n=605)		Provided info about newborn (n=604)		Welcome to ask questions (n=605)	
	aOR	**95% CI**	**aOR**	**95% CI**	**aOR**	**95% CI**
Support Person's factors						
Relationship to woman (ref. Friend/Neighbor/Other)						
Male partner	1.45	(0.71, 2.96)	1.02	(0.40, 2.60)	0.73	(0.39, 1.34)
Mother/mother-in-law	2.35**	(1.30, 4.25)	1.11	(0.52, 2.35)	0.92	(0.44, 1.92)
Other Family	1.82**	(1.20, 2.75)	1.60	(0.87, 2.94)	1.23	(0.75, 2.03)
SP Age	1.00	(0.97, 1.02)	1.02	(0.97, 1.06)	1.02	(0.99, 1.04)
SP born in Nairobi or Kiambu	1.07	(0.51, 2.23)	0.96	(0.67, 1.36)	1.45	(0.70, 3.01)
SP currently employed (ref. no)	0.71***	(0.59, 0.86)	0.75**	(0.61, 0.91)	1.45	(0.61, 3.44)
SP connectedness rating	0.96	(0.82, 1.12)	0.96	(0.79, 1.16)	0.89	(0.75, 1.05)
Accompanied woman to antenatal care appointments (ref. no)	1.56	(0.97, 2.52)	1.69*	(1.05, 2.72)	1.80**	(1.17, 2.77)
Accompanied woman to facility (ref. no)	1.47	(0.89, 2.43)	1.30	(0.62, 2.70)	0.77	(0.45, 1.33)
Present during Labor and/or Delivery (ref. no)	1.80**	(1.18, 2.74)	1.80*	(1.11, 2.94)	1.71*	(1.05, 2.78)
Women's factors						
Age	1.03	(0.96, 1.10)	1.01	(0.97, 1.06)	1.04***	(1.02, 1.06)
Parity	0.98	(0.66, 1.47)	1.04	(0.79, 1.34)	0.77**	(0.64, 0.92)
Married/partnered (Ref. not)	0.62	(0.25, 1.56)	0.67	(0.27, 1.68)	0.99	(0.52, 1.90)
Education (ref. Primary or less)						
Vocational/Secondary	0.88	(0.57, 1.37)	1.10	(0.61, 2.01)	0.92	(0.55, 1.54)
College/University	1.00	(0.63, 1.58)	1.51	(0.90, 2.51)	0.77	(0.41, 1.45)
Employed (ref. no)	1.35	(0.99, 1.83)	1.30	(0.96, 1.75)	0.60***	(0.46, 0.80)
Birthplace in Nairobi or Kiambu counties (ref. born elsewhere)	0.75	(0.46, 1.23)	0.78	(0.49, 1.23)	0.98	(0.65, 1.47)
Self-rated health	0.78*	(0.63, 0.98)	0.82	(0.64, 1.06)	1.03	(0.91, 1.18)
Covered under health scheme or health insurance (ref. no)	0.82**	(0.71, 0.94)	0.73	(0.44, 1.20)	1.010	(0.71, 1.43)
Delivery problems (ref. no)	0.58*	(0.37, 0.92)	0.55*	(0.34, 0.91)	0.95	(0.56, 1.61)
Other SP & Household factors						
Total SPs	1.04	(0.75, 1.44)	0.97	(0.71, 1.32)	0.69**	(0.53, 0.90)
Empowered in HH decisions (ref. not empowered)	1.19	(0.80, 1.76)	1.14	(0.64, 2.04)	1.55*	(1.09, 2.21)
Facility factors						
Facility type (Ref. Gov't hospital)						
Gov't HC/Disp	0.44***	(0.30, 0.63)	0.48***	(0.31, 0.74)	1.52***	(1.22, 1.88)
Private facility	0.57*	(0.35, 0.93)	0.81	(0.47, 1.42)	2.88***	(1.98, 4.19)
Total providers assisting delivery	1.02	(0.82, 1.27)	1.15	(0.93, 1.43)	1.07	(0.41, 2.82)
SP reported facility not crowded (ref. crowded)	2.84***	(1.99, 4.07)	2.30**	(1.35, 3.92)	2.00***	(1.39, 2.89)

	Provided info about woman (n=605)		Provided info about newborn (n=604)		Welcome to ask questions (n=605)	
	aOR	95% CI	aOR	95% CI	aOR	95% CI
Selected facility based on quality	1.25	(0.73, 2.13)	0.96	(0.43, 2.19)	2.11***	(1.47, 3.01)
Referred to facility	1.07	(0.71, 1.61)	0.85	(0.40, 1.79)	0.71*	(0.50, 0.99)
Constant	0.12	(0.03, 0.57)	0.09	(0.02, 0.41)	1.59	(0.56, 4.51)

Notes: *p<0.05, **p<0.01, ***p<0.001

Multivariable logistic regression models for *help decide during health care* and *help speak up during health care* are displayed in Table 6.5, the measures administered only to SPs who reported being present at labor and/or delivery.

Help woman decide during health care: SPs were more likely to report that they *helped women decide during health care* if they were at government health centres/dispensaries (aOR=4.97, 95%CI: 2.19, 11.27) compared to government hospitals. Notably, higher SP connectedness ratings were positively associated with *helping a woman decide during health care* in smaller models (including only SP and woman factors) but became non-significant once facility factors were added to the model.

Help speak up during health care: Women's empowerment was negatively associated with SPs reporting that they *helped speak up during health care* on behalf of women. Being at a government health centre/dispensary compared to government hospitals and having more providers assisting delivery were positively associated with reporting they *helped speak up* for women. SPs accompanying women to any antenatal care appointments and increases in women's age were marginally positively associated with *help speak up*. In smaller models including only women's and SPs' factors, male partners and SPs born in Nairobi/Kiambu counties were negatively associated with *helping speak up* for women, but these associations became non-

significant once women's empowerment was added to the model, suggesting that SPs who were male partners and locally born reflected the effect of women's empowerment.

Table 6.5. Multivariate results for PC-ISP indicators: *help decide during health care,* and *help speak up during health care* (n=134)

	Help decide during health care (n=134)		Help speak up during health care (n=134)	
	aOR	**95% CI**	**aOR**	**95% CI**
Support Person's factors				
Relationship to mother (ref. Friend/Neighbor/Other)				
Male partner	1.49	(0.21, 10.40)	0.36	(0.09, 1.40)
Mother/mother-in-law	0.85	(0.01, 61.93)	1.15	(0.01, 104.90)
Other Family	3.55	(0.13, 94.77)	0.40	(0.05, 2.98)
SP Age	1.07	(0.93, 1.22)	0.96	(0.82, 1.12)
SP born in Nairobi or Kiambu Counties (ref. no)	0.93	(0.36, 2.43)	0.65	(0.36, 1.15)
SP currently employed (ref. no)	0.51	(0.02, 12.01)	0.58	(0.14, 2.31)
SP connectedness rating	1.23	(0.81, 1.86)	0.93	(0.61, 1.43)
Accompanied woman to antenatal care appointments (ref. no)	2.00	(0.78, 5.17)	2.50	(1.00, 6.29)
Accompanied woman to facility (ref. no)	0.37*	(0.16, 0.86)	1.68	(0.45, 6.31)
Present during Labor and/or Delivery (ref. no)	---		---	
Women's factors				
Age	0.95	(0.80, 1.12)	1.17	(1.00, 1.37)
Parity	0.87	(0.34, 2.21)	0.61	(0.34, 1.09)
Married/partnered (Ref. not)	1.66	(0.49, 5.65)	1.11	(0.65, 1.90)
Education (ref. Primary or less)				
Vocational/Secondary	2.17	(0.60, 7.75)	2.12	(0.45, 10.03)
College/University	3.06	(0.34, 27.76)	0.68	(0.14, 3.31)
Employed (ref. no)	0.61	(0.23, 1.61)	1.37	(0.49, 3.83)
Birthplace in Nairobi or Kiambu counties (ref. born elsewhere)	2.35	(0.88, 6.29)	0.92	(0.29, 2.90)
Self-rated health	0.94	(0.45, 1.96)	0.81	(0.50, 1.30)
Covered under health scheme or health insurance (ref. no)	0.36	(0.07, 1.94)	1.76	(0.59, 5.26)
Delivery problems (ref. no)	0.85	(0.18, 3.96)	0.56	(0.19, 1.64)
Other SP & Household factors				
Total SPs	0.71	(0.30, 1.66)	1.35	(0.70, 2.59)
Empowered in HH decisions (ref. not empowered)	0.58	(0.29, 1.17)	0.57*	(0.35, 0.92)
Facility factors				
Facility type (Ref. Gov't hospital)				
Gov't HC/Disp	4.97***	(2.19, 11.27)	3.45*	(1.14, 1.48)
Private facility	0.94	(0.44, 1.98)	2.19	(0.93, 5.16)
Total providers assisting delivery	1.96	(0.98, 3.94)	2.50*	(1.24, 5.04)
SP reported facility not crowded (ref. crowded)	0.95	(0.46, 1.98)	0.58	(0.15, 2.24)
Selected facility based on quality	1.26	(0.65, 2.44)	0.56	(0.21, 1.50)
Referred to facility	3.73	(0.72, 19.17)	0.84	(0.42, 1.69)
Constant	0.47	(0.00, 165.22)	0.21	(0.01, 5.83)

Notes: *p<0.05, **p<0.01, ***p<0.001

Discussion

In this study, I used SP-reported PC-ISP measures to examine how SPs perceived being integrated into maternity care. Findings highlighted poor communication between providers and SPs and SPs lack of information about care. Only 20% of SPs reported receiving information about the woman and even fewer, 17%, reported receiving information about the newborn. Having information about the well-being and maternity care processes is crucial to providing needed support during childbirth (Kululanga et al., 2012; Wanyenze et al., 2022). Because failure to provide information to SPs and poor provider-SP communication is associated with greater mistreatment in maternity care (Diamond-Smith, Sudhinaraset, Melo, et al., 2016), this finding has implications for women's vulnerability in maternity care.

I also found that many of the results were contrary to my expectations: SPs of lower social status were not less likely to be integrated into care, factors related to women's social status were only associated with one measure of integration (i.e., *welcome to ask questions*), provider types were not associated with any PC-ISP indicators, and facility types were inconsistently associated with SPs' integration into care. On the other hand, I found that PC-ISP associations with SPs' perceptions of facility crowding were consistent with my hypotheses—SPs who reported that the facility was crowded were less likely to report integration.

Support Person factors associated with increased Person-Centered Integration of Support Persons (PC-ISP)

Results from multivariate analyses revealed that several SP factors influenced whether SPs reported receiving information from providers. For example, SPs who were mothers/mothers-in-law were more likely to report receiving information about the woman

compared to friends/neighbors/others. In contrast, results showed that male partners were just as likely to report receiving information as friends/neighbors/others (i.e., less likely than mothers/mothers-in-law or other family members). This sheds light on who may need more information: in Chapter 5 (Aim 1), results show that women with male partner SPs preferred to consult SPs on decisions—male partners may need more information to effectively support women in decision-making during care.

These findings are consistent with multiple studies that have highlighted male partners' perceived exclusion from maternal health care (P. Afulani, Kusi, et al., 2018). Childbirth and maternity care have been described as a "woman's affair" and studies have detailed the multiple provider and institutional barriers male partners perceive when supporting women (Aborigo et al., 2018; Ampim et al., 2021; Kabakian-Khasholian et al., 2018). For example, male partners have reported that providers deny them information about women even in instances when women have been transferred to other facilities (Kaye et al., 2014). Lacking information contributes to male partners' sense of helplessness and incompetence when assisting women who need help or are in pain (Kululanga et al., 2012).

SPs who reported accompanying women to antenatal care appointments were more likely to report that they were provided info about newborns and were welcome to ask questions. SPs' prior experience with antenatal care may have increased their familiarity interacting with providers that helped them ask for and receive information. This highlights how integrating SPs in all stages of maternal health care may have implications for women's support and health care use throughout pregnancy and after birth (Ampim et al., 2021; Mullany et al., 2007). Fostering SPs' integration in women's antenatal care can also be a useful strategy to educate them about

how to monitor women's health, advocate for women, and become more comfortable engaging with providers.

In addition, SPs who reported being present during labor/delivery were more likely to receive information about women and newborns and feel welcome to ask questions. Being present during this critical period of childbirth likely increases opportunities to interact and communicate with providers. Women often look to their SPs to help communicate with providers during labor and delivery when they need medical attention (Kaye et al., 2014; McMahon et al., 2014). Giving information to SPs during labor and delivery can also help women understand information, make decisions, and be informed and involved in their own care (Ampim et al., 2021; Kululanga et al., 2012; M. K. Longworth et al., 2015). Communicating information to SPs, especially information about labor and delivery problems, potentially has implications for maternal mortality and morbidity. Hemorrhage and hypertensive disorders, which often occur postpartum, account for approximately 54% of Kenya's maternal deaths (Kassebaum et al., 2016). If informed and present, SPs can closely monitor women's blood loss, watch for danger signs, and summon health providers in emergencies (von Dadelszen & Magee, 2016).

Women's factors associated with improved Person-Centered Integration of Support Persons (PC-ISP)

PC-ISP indicators also varied by women's characteristics, corroborating evidence that providers differentially grant women access to SPs (Sudhinaraset et al., 2019). Women with lower parity were more likely to have SPs report that they felt welcome to ask questions. This may be because providers are more willing to answer SPs' questions about women with less birthing experience. Primiparous women may face greater challenges than multiparous women

such as feeling less psychologically and physically ready for childbirth and need more support to prepare for birth and motherhood (Salarvand et al., 2020). Primiparous women also desire more communication and information from providers (Jenkins et al., 2014; van der Pijl et al., 2021). Some studies have reported the providers give special attention to educating first-time mothers, including additional breastfeeding counseling (Abu-Moghli et al., 2009), but other studies have found that first-time mothers have been disappointed by the lack of communication guiding them through childbirth (Bradley et al., 2016b). When providers can give clear, specific information in response to women and SPs' concerns during maternity care, women and SPs anxiety is reduced and they are better able to manage pain (Beake et al., 2018).

Results also suggest that SPs may be integrated according to women's social status. SPs were more likely to feel welcome asking questions when they were with older women, but less likely if women were employed. Further analysis showed that this result was driven by women who were self-employed in petty trade and small scale industries—an occupation with low prestige. People employed in this type of occupation are considered as "low productivity subsistence entrepreneurs" and, while self-employed, tend to live in poverty (Cho et al., 2016). In sub-Saharan Africa, these self-employed people are more likely to be women and 80% live in poor households. Women of lower social status are already subject to discrimination in maternal health care (P. Afulani, Sayi, et al., 2018; Andersen, 2004; Bayo et al., 2020; Simmonds et al., 2012) and less likely to be allowed birth companions (P. Afulani, Kusi, et al., 2018). This study adds to the literature by showing that women of lower social status are also less likely to have their SPs integrated into care.

I found associations between women's health factors and PC-ISP: SPs were less likely to report being given information about women's condition and care when women had poorer self-

rated health and delivery problems. This corroborates other literature that have found that providers tend not to allow companions for women with complications because of a need to maintain confidentiality (e.g., HIV status), monitor women's conditions, or protect women from SPs negative influences (e.g., fear, anxiety, discouragement) (P. Afulani, Kusi, et al., 2018). However, while providers in that study described excluding companions, they also acknowledged the need to provide SPs with information about the procedures and examinations they were performing.

Although SPs should be given more information about women when they have health concerns or experience health problems, it is plausible that providers were busy providing clinical care to these women with health issues and thus had less time to give information to SPs. Providers may see their primary responsibility as ensuring positive clinical outcomes, they may view SPs as extraneous or an extra burden and feel that interacting with SPs as unimportant (P. Afulani, Kusi, et al., 2018; Bruggemann et al., 2014; Giessler et al., 2020; Horstman et al., 2017). It is also possible that providers withheld information from SPs out of fear of being blamed for poor outcomes and potential legal trouble (Rominski et al., 2017). Alternatively, SPs may have had greater expectations of receiving more information when women had poor health and thus perceived that information was insufficiently provided (Kaye et al., 2014). Regardless, SPs cannot adequately support women if they do not understand women's conditions or are not educated about how to support women with poor health (Alio et al., 2013; Bäckström & Hertfelt Wahn, 2011; Bondas-Salonen, 1998). Because women who have poorer health need more support from their SPs, health care systems need to develop procedures to ensure SPs are informed.

Household factors associated with increased Person-Centered Integration of Support Persons (PC-ISP)

Women's empowerment in household decisions was inconsistently associated with SP-reported PC-ISP. Women's empowerment was positively associated with SPs feeling welcome to ask questions but negatively associated with SPs speaking up on behalf of the woman. I hypothesized that higher empowerment would be correlated with greater SP integration because more empowered women may want their SPs to advocate on their behalf, especially if they are concerned with the quality of care. The finding that SPs *felt welcome to ask questions* when women were empowered was consistent with my expectations. This explanation behind this result is unclear: it may reflect SPs' expectations of engaging with providers or it may reflect providers' differential treatment by social status. For example, Kenyan providers have reported giving better treatment to empowered, well-informed women (P. A. Afulani et al., 2020), so that more empowered women were given more attention and SPs had more opportunities to ask questions. On the other hand, women's empowerment is correlated with higher educational attainment (Andriano et al., 2021), so it is plausible that women and SPs who are more educated may be more inclined to ask questions and expect that providers will answer them. Since we lacked data on SPs' education, however, I was not able to test these theories.

The finding that women's empowerment was negatively associated with SPs speaking up on behalf of women during health care was contrary to my expectations. This result suggests that women's lower household decision-making power was associated with SPs' greater perceived involvement in care. I argue that this finding may reveal social and cultural norms in how SPs and women relate in the Kenyan context. Some studies have found similar results: in contexts where women are less involved in household decision-making, other family members may

expect to communicate with providers on their behalf (Moyer et al., 2014; Simmonds et al., 2012). However, literature has reported inconsistent associations between women's empowerment and male partner involvement, for instance, revealing differences due to sociocultural context. In Malawi, less empowered women were more likely to have male partners involved in health care because they had less decision-making power to decide on their SPs (Jennings et al., 2014). Other studies have found opposite associations, where more empowered women include their male partners because they know that they will maintain a sense of control in their own care (Jennings et al., 2014; Miedema et al., 2018). Nonetheless, this finding raises questions about women's autonomy in care and SPs' roles to bolster or hinder autonomy. Did these women want their SPs to speak on their behalf? When these SPs spoke with providers, did it undermine women's control over their own care? Although results from woman-reported PC-ISP preferences do not provide strong support one way or another, these questions merit further investigation. This also emphasizes the need to tailor PC-ISP indicators to specific populations. Indicators may need to be adjusted by context to ensure that integrating SPs advances women's autonomy and control over their own maternity care.

Facility factors associated with increased Person-Centered Integration of Support Persons (PC-ISP)

Facility factors also played a large role in SPs' PC-ISP experiences. Similar to results in Chapter 5 (Aim 1), I did not find associations between provider type and PC-ISP as hypothesized. Facility factors appeared to be more consistent across indicators and consistent with my hypotheses. SPs were more likely to report receiving information and feeling welcome to ask questions when they reported the facility was not crowded. This study corroborates

previous literature has reported that SPs have been excluded from maternity wards in Nairobi when they are crowded and space is inadequate, especially when patient volumes are high (Oluoch-Aridi, Afulani, Guzman, et al., 2021; Sudhinaraset et al., 2019). This study also adds to this literature showing that crowded wards contribute to less interaction between providers and SPs about women's care. SPs were also more likely to report speaking up during care when there were more providers assisting delivery. Several studies have reported on the challenges of understaffing in Nairobi leading to the provision of lower person-centered care (Giessler et al., 2020; Oluoch-Aridi, Afulani, Guzman, et al., 2021).

Facility types were associated with PC-ISP but the direction of associations varied by indicator. SPs were more likely to report receiving information at government hospitals compared to government health centres/dispensaries and private facilities, net of other factors. In contrast, SPs were more likely to report feeling welcome to ask questions, helping women decide, and helping speak up during health care at health centres/dispensaries compared to government hospitals. These results suggest that facilities likely normalize certain practices which may vary by governance or level of resources. Maternity care in health centres and dispensaries has been characterized by understaffing and overstretched staff, since they often need to simultaneously provide a wide range of health services (UNICEF, 2017). Results show, however, that although facility resources influence PC-ISP, SPs are more likely to report some PC-ISP indicators at health centres/dispensaries than government hospitals when controlling for crowding and number of providers. This highlights the possibility that health centres/dispensaries have developed different practices and ways of interacting with women and SPs compared to hospitals, potentially because they are designed to be primary care facilities and frequently have a greater connection with communities. Taken together, results on facility factors corroborates

findings from women's PC-ISP experiences (Chapter 5, Aim 1) that organizational factors have a greater influence on PC-ISP than individual provider characteristics.

Additionally, there were no statistically significant differences in PC-ISP by facility type in bivariate analyses, which suggest that SPs' and women's factors in bivariate results obscured the role of facilities in PC-ISP and that the populations of women and SPs attending different types of facilities varied.

Limitations

Although this is one of the first studies to survey SPs, our data had some notable limitations. While women reported an average of 1.5 SPs, we only interviewed one SP. Other SPs who were not interviewed may have had different experiences of PC-ISP, and it is unclear if they may have played a more significant role compared to the SP that was interviewed. Data about SPs was limited and subject to reporting error. Women provided little information about their SPs, so we could not triangulate some dyadic measures, such as if women perceived the same relational connectedness as SPs.

Analyses also showed notable discrepancies between women's and SPs' reports of timing of support (detailed in Appendix 6E). For example, 89% of SPs who reported being present with the woman during labor and delivery were contradicted by women's reports of having no SP present during labor and delivery. This highlights how survey questions may be understood differently by women and SPs; SPs may likely have reported being "present" with the woman if they were at the facility, even if they were not staying with the woman in the labor and delivery wards.

To address this, I compared differences in factors associated with 1) women's and SPs' reports of timing of support and 2) concordant vs. discordant reports between women and SPs, to assess if certain groups of women or SPs were associated with contradictory reports. These analyses revealed that the factors associated with women's and SP's reports of labor/delivery were entirely different. In addition, SPs' employment status and greater relational connectedness were associated with discordant reports. It is likely that SPs with higher social status who feel closer relationships with women may perceive that they provide greater support during childbirth. For these reasons, I expect that women's reports are more valid and reliable and that results regarding SPs' timing of support should be interpreted conservatively. SP reports, rather, could potentially capture continuity of support—whether SPs remained at the facility throughout the duration of labor/delivery through postpartum. Because there was notable reporting error and because self-report measures may often underreport negative maternity care experiences (Bohren, Mehrtash, et al., 2019), I still expect that findings may be conservative estimates of PC-ISP.

In addition, because I examined many factors in multivariable models, it is possible that some associations are spurious, especially factors that are not consistent across indicators or that were in a direction opposite of hypothesized associations (e.g., SPs' employment status, household empowerment). Models for two indicators, *help decide* and *help speak up during health care* should be interpreted cautiously because of small, poorly defined samples.

Future research

As with woman-reported PC-ISP measures, PC-ISP measures administered to SPs should be formally developed and validated. Future development of PC-ISP measures should also

consider tailoring PC-ISP indicators to specific contexts to ensure that integrating SPs advances women's autonomy and control over their own maternity care. For example, future scales may also explore SPs' attitudes towards integration and motivations for being integrated into women's care. Given that many women had more than one SP, it may also be useful to survey multiple SPs to better understand women's structures of support and how different SP types corresponding to the same women may experience care differently. Future development of measures should also include validating SPs' and women's responses with observational data in order to better compare women's and SPs' perceptions.

More research is also needed on SPs experiences of care, in general. Little is known about SPs and their characteristics, and this study was also limited in SPs' data (e.g., educational attainment). Future research should collect more data about SPs' characteristics to better understand how their social position influences their expectations, attitudes, and experiences of care.

Lastly, future research should investigate how integrating SPs is consequential for women's and newborns' health. For example, although SPs were seldom informed (and especially not if women had poor health) nor integrated during labor/delivery and postpartum, it would be useful to understand how these practices may be linked to reduced mortality and morbidity.

Study Implications

Childbirth and the early postpartum period continue to be high-risk periods for maternal and neonatal mortality in Kenya (Masaba & Mmusi-Phetoe, 2020; The World Bank, 2017), and at a county-level, the neonatal mortality rate is the highest in Nairobi County (UNICEF Kenya,

2018). This study highlights gaps in providing SPs with crucial knowledge about women and newborns' health—a key area to focus efforts for integrating SPs into maternity care. Equipping SPs with information to monitor women's and newborns' health and provide essential assistance can be a community-based strategy to reduce mortality and morbidity.

Findings add evidence to inequitable access to care since SPs supporting women of lower social status and those who were male partners are less likely to report SP integration. Because health care systems can be defined by social hierarchies (WHO, 2016c) and more inclusive policies and accountability systems are needed to ensure women are provided equal access to SPs. For example, a policy may grant that all women are allowed one SP or be able to communicate with SPs during all periods of care which can be enforced by the facility. Establishing protocols may also help providers interact with women and SPs in a standardized way, for example, providing specific information about care processes, or asking if women and SPs have questions during specific procedures or certain times during labor and delivery. Providers should be trained on standard practices in how to integrate SPs, including providing information and interacting with SPs. Continued efforts are also needed to better integrate male partners in care, when desired by women. Despite political will to increase male partner involvement, practical barriers for male partners persist in care. But rather than focusing on male partner integration, I argue that interventions should focus on the equitable treatment of all SPs, addressing providers' biases and ensure privacy for all women and SPs.

This study also stresses the importance of SPs' continued experiences with formal maternal health care, especially because involvement in antenatal care and labor and delivery was associated with increased integration. Continued involvement as a SP in care will help SPs feel more comfortable and familiar with health care settings and interacting with providers in

constructive ways. It will also help SPs be more aware of care processes and aid providers in caring for women outside of the institutional setting. Health care systems should design programs and processes to educate and inform SPs throughout the spectrum of maternal health services, including pre-conception, antenatal, delivery, postpartum, and newborn care. Continuity of support also has the potential to prevent maternal morbidity and mortality if SPs have adequate information to assess women's conditions and assist them to seek medical attention.

Lastly, facility policies and normalized practices must be addressed to better integrate SPs into care. Given that health centres/dispensaries demonstrated higher PC-ISP than government hospitals, it is worth exploring whether practices at health centres/dispensaries can be scaled up to be used at government hospitals and adapted by private hospitals. For example, some health centres have developed community engagement programs that have informed the design of maternity wards, improved person-centered care and increased utilization of services (Kenya Ministry of Health, 2013). Collaborative partnerships between facilities and communities may yield innovative solutions that meet the needs of more stakeholders and achieve mutual goals of improving women's health.

SPs are stakeholders and participants in maternal health care system and important to women's experiences of care. Integration and equitable treatment of SPs is part of the equitable treatment of women. Integrating SPs, especially by communicating information about women's and newborns' condition and care, has implications for the support women receive during the vulnerable period of childbirth.

Chapter 7. How does integrating support persons influence the quality of care?: Associations of Person-Centered Integration of Support Persons (PC-ISP) with person-centered and clinical outcomes: Aim 3

Abstract

Integrating support persons may be a potentially important strategy to improve the person-centered and clinical quality of maternity care, but little research has closely examined how SP integration (including specific experiences of integration) is linked to quality of care outcomes. This study uses the Person-Centered Integration of Support Persons (PC-ISP) concept and measures to investigate how integrating support persons is associated with quality of care indicators specified by the WHO Quality of Care Framework for maternal and newborn health, specifically person-centered outcomes (i.e., Person-Centered Maternity Care (PCMC), satisfaction with care, and willingness to return to the facility) and clinical outcomes (i.e., coverage of key practices). I leveraged women's (n=1,138) and SPs' (n=606) data from the Strengthening Person-Centered, Accessibility, Respectful Care, and Quality (SPARQ) study from six facilities in Nairobi and Kiambu counties in Kenya. I used linear and logistic regression to estimate associations between PC-ISP indicators and QoC outcomes. I found that each additional women-reported PC-ISP experience was associated with a 3.64-point increase in PCMC (95% CI: 2.39, 4.90) and 0.28-point (95% CI: 0.18, 0.39) increase in satisfaction with care. Although each additional woman-reported PC-ISP experience was associated with a 32% increase (95% CI: 14%, 52%) in likelihood of willingness to return to the facility, I found evidence that SPs' report of receiving information about women was negatively associated with women's willingness to return to the facility (aOR=0.55, 95% CI: 0.34, 0.89). Integrating SPs was associated with women's reports of an additional 1.26 (95% CI: 1.13, 1.40) key clinical

practices performed, and that integrating SPs was particularly important for newborn key practices. Consistently, women's report of providers listening to SPs concerns was strongly associated with QoC indicators. I also found evidence of a statistical interaction between PC-ISP and facility measures of patient volume and crowding such that associations between PC-ISP and quality of care indicators were stronger at crowded, high-volume facilities. Integrating support persons, particularly improving communication between support persons and providers, can potentially improve multiple dimensions of the quality of maternity care.

Introduction

Calls to improve the quality of maternal and newborn health care in Kenya highlight the need for preventive interventions during labor, delivery, and postpartum periods (Keats et al., 2017). The WHO defines quality of care as 'the extent to which health care services provided to individuals and populations improve desired health outcomes' which are 'safe, effective, timely, efficient, equitable, and people-centred' (Tunçalp et al., 2015; WHO, 2006). Poor quality of maternity care continues to contribute to high rates of maternal and newborn mortality and morbidity; 90% of maternal deaths in Kenya have been linked to substandard maternity care (Godia et al., 2017) and low quality of care underlies Nairobi county's high neonatal mortality rate despite higher numbers of births occurring in facilities compared to elsewhere (Murphy et al., 2016). In addition, mistreatment in maternity care is prevalent, with studies in Kenya reporting that 20% of women are treated with disrespect or feel humiliated during the childbirth experience (Abuya et al., 2015).

Integrating support persons is a potential strategy to improve the quality of care (QoC). A support person (SP) is defined as a lay person (i.e., one who is not a medical professional

employed by the facility) who accompanies a woman to the facility or stays in or near the maternity ward during labor, delivery, or postpartum (Maimbolwa et al., 2001; Simmonds et al., 2012). Doulas, Accredited Social Health Advocates (ASHAs), or community health workers who provide support but are not employed by the health facility may also be included within the definition of SPs. WHO's policy framework for People-Centered Health Care asserts that engaging women, families, and communities in maternal and newborn health is essential for increasing patient safety, improving treatment, and improving interactions with the health care system (WHO, 2007, 2017b).

Social support of choice essential to Quality of Care

The WHO Quality of Care Framework for maternal and newborn health identifies social and emotional support of choice as one essential component of the experience of care (Tunçalp et al., 2015). The experience of care (i.e., how women were treated by providers and their perceptions of service) is posited to interplay with the provision of care (i.e., evidence-based practices for routine care and management of complications) to improve outcomes specified within the WHO vision: person-centered and clinical outcomes (Tunçalp et al., 2015). Because I used a person-centered approach, I investigated women-reported indicators specified by the WHO QoC framework, specifically, clinical QoC outcomes (i.e., *coverage of key practices*); and people centered outcomes (i.e., *person-centered maternity care*, *satisfaction with care* and *willingness to return* to the facility).

Person-centered outcomes refers to outcomes that takes into account patients' and families' values, needs, and concerns (Institute of Medicine (US), 2001). Person-centered maternity care (PCMC) refers to care during childbirth that is respectful and responsive to

individual women and their families' preferences, needs, and values. Satisfaction with care captures women's perceptions of the quality and adequacy of care (Srivastava et al., 2015).

Integrating SPs into care likely increases person-centered outcomes. Person-Centered Maternity Care (PCMC) is defined as 'care that is respectful of and responsive to women's preferences, needs, and values' (P. Afulani, Diamond-Smith, et al., 2017; Sudhinaraset et al., 2017). Integrating SPs in care may increase PCMC, since SPs can increase respectful care and facilitate communication between women and providers (Abuya et al., 2015; Diamond-Smith, Sudhinaraset, Melo, et al., 2016). PCMC is also one pathway that integrating SPs can influence health outcomes: greater PCMC is associated with improved maternal mental health and decreased maternal and newborn complications (Sudhinaraset et al., 2020, 2021). Patients' *satisfaction* measures the extent that patients' health care needs are met (Melese et al., 2014), gauges the quality of health care, and indicates their likeliness of adhering to treatment (Kigenyi et al., 2013; Onyango-Ouma et al., 2001). Because SPs are one of the most important factors that improve women's perceptions of the childbirth experience (Hodnett, 2002) and can help women receive the care they want (Ampim et al., 2021; Kigenyi et al., 2013), women may be more satisfied with care when SPs are integrated. Finally, *willingness to return* to the facility for care is a measure of future care-seeking attitudes refers to women's stated intentions to return to the facility for future deliveries (Paudel et al., 2015). since women's decisions to seek care are influenced by family and communities' attitudes (Moyer et al., 2014; Ochieng & Odhiambo, 2019), SPs' experiences of care potentially shape women's future care-seeking behavior. Women's *willingness to return* for future care is related to how women were treated during care, perceived quality, and satisfaction with care (Kujawski et al., 2015), which may also be influenced by how SPs were integrated.

Integrating SPs likely improves clinical care as well. Coverage of key practices refers to the number of quality measures performed within defined standards of care (WHO, 2016b). SPs can act as liaisons between women and providers, provide accountability for medical practice, and advocate for better care (Ampim et al., 2021; Kaye et al., 2014). Evidence also indicates that, in addition to maternal care, SPs are important for newborn clinical care: companion support is associated with lower neonatal intensive unit admissions and better breastfeeding outcomes (Gadappa & Deshpande, 2021).

Yet, despite recognition that women's support of choice is essential to QoC, provider and facility barriers to support persons persist, including exclusion of birth companions and negative attitudes from providers (P. Afulani, Kusi, et al., 2018; Kabakian-Khasholian & Portela, 2017). Integrating SPs, particularly during labor and delivery, has been proposed to increase women's receipt of support and improve health outcomes (Bohren, Berger, et al., 2019). More evidence is needed, however, to understand how integrating SPs translates to improved outcomes, especially those identified by the WHO framework: person-centered and clinical outcomes.

Gaps in understanding how integrating support persons can improve outcomes

We lack an understanding of the pathways by which integrating SPs improves care and health outcomes. Numerous studies have found positive health outcomes associated with social support (including companionship). Social support during intrapartum care is associated with better delivery outcomes (i.e., less need for pain medication, fewer delivery complications, lower likelihood of adverse birth outcomes) and better postpartum outcomes (i.e., less postpartum depression, increased exclusive breastfeeding) (Bohren et al., 2017; Hetherington et al., 2015; Hodnett et al., 2012; Sapkota et al., 2013).

Most studies have proposed underlying psychosocial mechanisms, such as SPs reducing the adverse consequences of fear and distress women face when laboring alone (Bohren et al., 2017). But evidence suggests that a more likely mechanism is through improved QoC, since SPs can influence the social dynamic of care and providers' behavior (Keirse et al., 1989). Most research in this area has linked SPs with improved person-centered care and less on clinical QoC. For example, recent studies have shown that the inclusion of SPs is associated with lower mistreatment, such as physical or verbal abuse, discrimination, or non-supportive care (Balde et al., 2020) and higher person-centered care (Kiti et al., 2022). But because SPs can also advocate for medical attention and interact with providers, integrating SPs in care likely impacts multiple dimensions of care, including clinical care as well as person-centered outcomes identified by the WHO QoC Framework.

Another notable gap in literature is the need for a nuanced understanding of how specific experiences of integrating SPs (e.g., SPs feeling welcome to ask questions, opportunities to consult SPs about decisions, etc.) is associated with quality of care. Most research investigating the impact of integrating SPs have introduced companion support, which entails changing institutional policies (to permit companions) and providers' behaviors (e.g., training providers about the benefits of companion support). These studies examined the presence of an SP but not the quality of engagement in care or ways that the health care system facilitated their involvement (Banda et al., 2010; Kabakian-Khasholian et al., 2018; Munkhondya et al., 2020). We still lack information on whether particular practices to integrate SPs are more consequential for outcomes, such as providing SPs with information about women and newborns' condition and care or welcoming SPs' questions. A more granular examination of specific practices to

integrate SPs may highlight practices that are more significant for higher quality of care—knowledge that is crucial to design targeted interventions.

SPs have rarely been surveyed, despite being participants and stakeholders of the health care system. The WHO policy framework for People-Centered recommends greater engagement of women, their families, and their communities to improve quality of care but the extent that health care systems facilitate SPs' involvement has not been measured (WHO, 2007, 2017b). Although qualitative research has highlighted how SPs face both institutional and provider barriers to providing support to women (Bohren, Berger, et al., 2019; Kabakian-Khasholian & Portela, 2017), little research has explored whether SPs' experiences of integration influence women's experience of care. More research is needed to assess SPs' perceptions of being integrated into care and their relationship to women-reported QoC outcomes.

Lastly, evidence suggests that the institutional context of maternity care can substantially modify the influence of social support in maternity care, but there is little quantitative research in this area. Across qualitative studies, providers have cited that the institutional capacity of facilities inhibit their abilities to integrate SPs. Whether facilities are crowded, are adequately equipped, or properly staffed influences the extent that providers facilitate SPs' supportive roles (Kabakian-Khasholian & Portela, 2017; Mgawadere et al., 2019). For example, providers may not allow SPs in crowded wards because of a lack of space or concern for women's privacy (Mgawadere et al., 2019). One meta-analysis found that the effect of continuous support on women's health outcomes was enhanced or reduced by policies and practices in the birth setting: in settings where SPs were not normally permitted, the effect of continuous support on the likelihood of cesarean deliveries and need for pain medication was greater than in settings where SPs were normally allowed, although findings were inconclusive (Bohren et al., 2017). This

suggests that in contexts where SPs encounter more barriers—perhaps due to high-patient volumes, crowding, or understaffing—integrating SPs may be more important for women's experience of care and the clinical care received. Studies have posited that this may be because SPs can reduce the fear and distress in unfamiliar environments, especially when staff are not able to provide more supportive care (Bohren et al., 2017; Campero et al., 1998). A context-specific investigation is needed to better understand the interplay of facility capacity and integrating SPs on quality of care.

Present Study

The primary objective for this study was to estimate associations between women and SP-reported PC-ISP experiences and quality of care indicators. Guided by the WHO Quality of Care Framework for maternal and newborn health, I posited that PC-ISP is positively associated with people-centered outcomes (i.e., *person-centered maternity care*, *satisfaction with care*, and *willingness to return to the facility*) and clinical outcomes (i.e., *coverage of key practices*).

The secondary objective was to examine how facilities' capacity (e.g., facility-reported indicators of level of resources, staffing, crowding) potentially modifies associations between woman-reported PC-ISP and QoC. I hypothesized that there would be evidence of a statistical interaction between PC-ISP and facility capacity such that at facilities with fewer resources, lower staffing, and more crowding, associations between PC-ISP and QoC (i.e., PCMC, coverage of key practices, satisfaction, and willingness to return) are more positive than at facilities with lower patient volumes, greater staffing, and less crowding.

Methods

Data

This study used women's and SPs' survey data from the Strengthening Person-centered Accessibility, Respectful Care and Quality (SPARQ) study in Kenya. Data were collected from women delivering at six facilities (public and private) in Kiambu and Nairobi counties between September 2019 and January 2020. Women between the ages of 15-49 who had recently delivered in these hospitals were interviewed at the facilities. Inclusion criteria for women were a) between 15-49 years of age, b) spoke English or Kiswahili, c) vaginal birth, and d) owned a mobile phone and felt comfortable being contacted by the study team. Women were recruited from postpartum wards and provided informed consent and interviewed in a private setting for approximately one hour. Following interviews, women identified an SP for potential participation the support persons' survey. Inclusion criteria for SPs were a) anyone who accompanied the woman to the hospital, stayed and assisted the woman during labor and/or delivery or visited during the postpartum period, b) at least 18 years of age, and c) spoke English or Kiswahili. SPs provided informed consent and were interviewed in a private setting for approximately 20 minutes.

The analytic sample for this study includes 1,138 women who were interviewed postpartum at facilities and 606 of their respective SPs who were also interviewed at facilities. Although most of the data from this study were obtained from baseline surveys, one outcome, willingness to return to the facility, was asked of women at follow-up surveys at 2-4 weeks and 10 weeks postpartum over phone interviews. A total of 965 women completed at least one follow-up survey at 2-4 weeks or 10 weeks postpartum.

Measures

PC-ISP variables

PC-ISP survey measures were developed for women's and SPs' surveys. Table 7.1 summarizes PC-ISP experience measures included in women's and SPs' surveys. Women's PC-ISP indicators were combined in a total PC-ISP score, which summed responses to four PC-ISP experiences: *opportunity to consult, told condition/care, ask questions, and listened to concerns* and ranged from 0-4. The woman-reported PC-ISP score showed poor reliability (α=0.592), likely because there were few items and a degree of multidimensionality as items spanned several sub-constructs (DeVellis, 2017). Because not all measures were asked of SPs, I did not construct a combined SP-reported PC-ISP variable. Two questions, *help decide* and *help speak up during healthcare*, were only asked of SPs who reported staying with the woman during labor and/or delivery (n=134). These questions ought to have been asked of all SPs, representing a notable limitation of this study.

Table 7.1. PC-ISP indicators, for women's and SPs' surveys

Women's measures of PC-ISP experiences		
Sub-construct	**Variable name**	**Question**
Decision-making support	*Opportunity to consult*	I was given the opportunity by my health provider to consult my family about my health care decisions
Communication and provision of information	*Told condition/care*	I was asked by my health provider if my family should be told about my condition/care
Welcoming environment	*Felt welcome*	My family member(s) felt welcome by the facility at my delivery
Ability to ask questions and express concerns	*Ask questions*	My family was welcome to ask my health care provider questions
	Listened to concerns	My health care provider listened to my family members' concerns
Support persons' measures of PC-ISP experiences		
Decision-making support	*Help decide during health care*	Did you help the mother with any decisions during the labor and/or delivery? *

Communication and provision of information	*Provided info about woman*	Were you provided resources or information from the mother's health provider on how to help care for the mother?
	Provided info about newborn	Were you provided resources or information from the mother's health provider on how to help care for the newborn?
Ability to ask questions and express concerns	*Welcome to ask questions*	Were you or do you think you would have been welcome to ask the health care providers questions about the mother and baby's care?
	Help speak up during health care	Did you ever help speak up to the health facility staff on behalf of the mother? *

* Question was only asked of a subset of SPs who reported staying with the woman during her labor and/or delivery (n=134).

Dependent variables

Person-centered outcomes

Person-centered Maternity Care

The *Person-Centered Maternity Care (PCMC)* scale is a measure of the experience of care, which has demonstrated high reliability and validity in rural and urban Kenyan populations (P. Afulani, Diamond-Smith, et al., 2017). The PCMC scale was developed as an instrument to assess the extent to which maternity care is respectful and responsive to individual women's preferences, needs, and values. The 30-item PCMC scale was administered in the women's survey and is comprised of three subdomains: *dignity and respect* (6 items)*, communication and autonomy* (9 items), and *supportive care* (15 items). Response options for each item was a 4-point Likert-type scale. The total combined PCMC score ranges from 0 to 90. Similar to other studies, I standardized the total score and three separate sub-domains to 100-point scales to aid in comparisons across scales and studies (Odiase et al., 2021; Oluoch-Aridi, Afulani, Makanga, et al., 2021). Within this sample, reliability for the total PCMC score was very good (α=0.87) while subdomains had respectable to undesirable reliability (Dignity & Respect α=0.64, Communication &Autonomy α=0.71, Supportive Care α=0.78).

Satisfaction

Women's reported *Satisfaction with care* is a multidimensional construct that encompasses perceptions of the quality and adequacy of care (Srivastava et al., 2015). The *Satisfaction with care* variable is a combination of three questions of satisfaction with different types of care and services received: during labor and delivery, after delivery, and newborn care received. Possible responses corresponded to a 4-point Likert-type scale (Very satisfied; satisfied, dissatisfied, very dissatisfied). The combined *Satisfaction with care* variable sums the three items and ranges from 0-9. The *Satisfaction with care* variable demonstrated respectable reliability (α=0.78).

Willingness to return

Willingness to return refers to women's stated intentions to return to the facility for future deliveries (Paudel et al., 2015). This outcome was assessed at women's follow-up interviews (at 2-4 and/or 10 weeks after delivery) by the question "Would you go back to the same provider/facility next time you are delivering a baby? (yes/no)". Women who reported that they would go back to the same provider/facility at either follow-up interview were coded as 'willing to return.' Notably, this is the only variable used from follow-up surveys in this study. Because of attrition, the sample of women who reported willingness to return was smaller (n=965 compared to the full sample n=1,138)

Clinical Quality of Care

Coverage of key practices (Clinical QoC)

Coverage of key practices sums the total number of standard procedures or exams that women reported receiving during care at the facility (Montagu et al., 2020; WHO, 2016d). Women reported on 28 key practices from WHO's standards of maternal and newborn care. These practices include *maternal key practices* (17 items): pre-delivery practices such as whether a health provider asked how a woman was feeling, had headaches, had bleeding, if her water had broken, if she was examined, had blood pressure and pulse checked, had contractions timed, if the fetal heartbeat was assessed, if she was given a vaginal exam, and post-delivery practices such as blood pressure and pulse checks, whether she was asked if she was in pain, abdominal, perineum, and bleeding examinations, and whether staff were always accessible. *Newborn key practices* (11 items) included whether the infant was examined following birth, put immediately on the mother's chest after delivery, wiped dry, not bathed in the first 6 hours, had temperature assessed, had the cord examined, and whether a health provider counseled on newborn danger signs, checked if breastfeeding was going well, observed breastfeeding, helped show how to breastfeed, and whether breastfeeding was initiated in the first hour after birth. The *coverage of key practices* variable sums the reported number of these practices for each woman (range 0-28) and comprises two subdomains: *maternal key practices* (range 0-17) and *newborn key practices* (range 0-11*). Coverage of key practices* demonstrated very good reliability (α=0.82), while subdomains *maternal key practices* demonstrated respectable reliability (α=0.79) and *newborn key practices* had undesirable reliability (α=0.63) (DeVellis, 2017).

Other variables

Women's, SPs', Household, and Facility Factors

I included multi-level factors as covariates in models and examined any potential confounding effects. *Women's factors* included age (continuous), marital status (married or partnered vs. not), parity (continuous), educational attainment (primary or less; vocational/secondary; college/university), current employment status (employed vs. not), birthplace (born in Nairobi or Kiambu counties vs. born elsewhere), health insurance coverage (covered vs. not), and self-rated health status (ordinal variable: excellent/very good (ref.), good, fair, poor/very poor). *Support Person factors* included the type(s) of SPs (e.g., male partner; mother, mother-in-law, sister, etc.), the total number of SPs (continuous), and timing of support (dummy variables for: accompanied to the facility, labor and/or delivery, post-partum). For SP-reported PC-ISP analyses, I also examined SPs' occupation (casual labor, salaried worker, self-employed in petty trade, self-employed in small scale industry, unemployed) and whether SPs accompanied the woman to antenatal care (yes vs. no). *Household factors* included household size (continuous) and a measure of household empowerment. Surveys asked women who were married or partnered four questions regarding decision-making power for various household decisions, including woman's health care, major household purchases, daily household purchases, and visits to family or relatives (Kishor & Lekha, 2008). A composite variable was constructed using these questions, indicating whether a woman reported involvement in each type of decision (i.e., 'woman only' or 'jointly') deemed *empowered in household decisions* versus lack of involvement (i.e., 'partner only' or 'someone else') in at least one type of decision (Upadhyay & Karasek, 2012). Women who were not married or partnered were coded as being involved in all household decisions.

Facility factors included the type of facility (government hospital; government health centre or dispensary; private facility) and total number of providers assisting delivery (continuous). I examined several indicators of facility capacity related to infrastructure and level of resources. A charge nurse at each facility provided estimates for the number of beds in the facility and in the maternity ward, the number of patients per day, and the number of staff on duty per day in the maternity ward. I examined the *total number of beds* at facilities as an indicator of patient volume and overall level of resources of a given facility (Riviello et al., 2011). *Total number of beds* ranged from 18-100 across facilities. To measure staffing, I constructed a variable, *patient:staff ratio*, dividing the daily average number of maternity patients by the daily average number of clinical staff on duty. Lack of staff has been cited as a reason for excluding SPs, especially when SPs are seen as extraneous or burdensome to providers (Bruggemann et al., 2014; Rominski et al., 2017). *Patient:staff ratio* ranged from 0.6 to 6.7 patients per staff across facilities. I also constructed a measure of crowding, *patient:bed ratio*, dividing the daily average number of patients by the number of maternity beds. Crowded facilities have been considered unconducive for allowing and accommodating SPs due to lack of space and privacy (Adeyemi et al., 2018). *Patient:bed ratio* (per day) in maternity wards ranged from 0.3-5 patients per beds across facilities.

Analysis

I estimated associations using both women and SP-reported PC-ISP experiences. Analyses for women's PC-ISP used both separate PC-ISP indicators and the PC-ISP combined score as primary independent variables. Analyses for SP-reported PC-ISP only used separate PC-ISP indicators. I expected that PC-ISP and PCMC (full scale and the three sub-domains) would

be correlated and assessed associations using multiple linear regression, adjusting for women's, SPs', household, and facility factors (Eq 7.1). I also used linear regression to estimate associations between PC-ISP and *coverage of key practices* (total key practices and subdomains maternal and newborn practices) and *Satisfaction with care*. I conducted sensitivity analyses for satisfaction with types of care dichotomizing measures of satisfaction (Dissatisfied/Very dissatisfied vs. Satisfied/Very satisfied) and using logistic regression. Associations between PC-ISP and *Willingness to return* were estimated using logistic regression (Eq 7.2).

All models included theoretically relevant factors including *women's factors*: age, parity, marital status, birth location, insurance coverage, and self-rated health status; *SPs' factors*: total number of SPs, types of SPs (i.e. relation to the woman), timing of support (accompanied to facility, labor/delivery, postpartum); *household factors*: empowered in household decisions; and *facility factors*: number of providers assisting delivery, facility type, indicator of whether the facility was selected because of quality. Models of SP-reported PC-ISP also included an indicator of whether the SP accompanied the woman to antenatal care. For each outcome, I examined whether other factors were associated the outcome and included additional factors that were statistically significant (e.g., employment status, and whether the woman was referred to the facility). While covariates varied slightly by outcome, I included the same covariates in the full models for each outcome grouping (i.e., all PCMC models had the same covariates). Lists of covariates are detailed below each table of results.

The modeling approach for regression analyses followed a blocked modeling approach. Using the regression framework, I first ran a model examining only bivariate associations between PC-ISP and QoC indicator as the primary association of interest. I then added covariates in blocks corresponding to increasingly distal levels of the socioecological model to examine

how factors at each level impacts the variance of the association of interest. Because observations were clustered at facilities, I estimated robust standard errors in statistical models. Equations are specified as follows:

Equation 7.1, Linear Regression (full model):

$$Y = \alpha + \beta_{PC-ISP}x_1 + X\beta_{Woman} + X\gamma_{SP} + X\delta_{HH} + X\zeta_{Facility} + \epsilon$$

Where *Y* is the outcome (e.g. woman's *PCMC score, coverage of key practices, or satisfaction with care*)
α is the sample mean of the outcome, when all variables are evaluated at zero
$\beta_{PC\text{-}ISP}$ is the *PC-ISP* variable
β_{Woman} is the vector of parameters for women's individual factors
γ_{SP} is the vector of parameters for SP and household factors
δ_{HH} is the vector of parameters for household factors
$\zeta_{Facility}$ is the vector of parameters for facility factors, and,
ϵ is the vector of error terms

Equation 7.2, Binomial Logistic (full model):

$$logit(p) = \alpha + \beta_{PC-ISP}x_1 + X\beta_{Woman} + X\gamma_{SP} + X\delta_{HH} + X\zeta_{Facility} + \epsilon$$

Where *p* is the probability of *Willingness to return*.
α is the average *Willingness to return* across the sample, when all variables are evaluated at zero.
$\beta_{PC\text{-}ISP}$, β_{Woman}, γ_{SP}, δ_{HH} , $\zeta_{Facility}$ and ϵ are as defined in Eq. 7.1 above.

Intraclass correlations across facilities were low (min 0.012 – max 0.78) (Appendix 7A). However, to address potential unmeasured facility effects and clustering, I compared traditional OLS and logistic models with models including facility fixed effects and random-intercept models. Likelihood ratio tests, AIC and BIC showed that models with facility fixed effects were the best fit for the data compared to traditional OLS and random-intercept models. Thus, I included individual facility fixed effects in all models.

I performed diagnostics for all models, assessing whether assumptions were violated (additional information included in Appendix 7B-C). I inspected the normality of residuals visually using kernel density estimates, standardized normal probability (P-P), and quantile-quantile (Q-Q) plots and tested normality using Shapiro-Wilk tests. Shapiro-Wilk tests and Q-Q plots indicated that the residuals departed from normality for PCMC and key practices (less

severe). I found evidence of heteroskedasticity for PCMC models using the Breusch-Pagan test but examination of the plot of residuals vs. predicted values showed that heteroskedasticity was likely not too severe. Because residuals were non-normal and/or errors were heteroskedastic, I also examined other possible functional forms (e.g., log-transformed outcome, Poisson, negative binomial), however, goodness-of-fit tests, AIC, and BIC indicated that these models fit more poorly than OLS. All associations presented are thus estimated from OLS.

Using link tests and Ramsey regression specification error tests (RESET) I detected model specification error (i.e., prediction squared had explanatory power) in some of the models that used the total woman-reported PC-ISP scores. In contrast, models using separate PC-ISP indicators did not show evidence of specification error, providing further evidence that the summative PC-ISP score may not adequately measure PC-ISP as a concept as well as individual indicators. For models with evidence of specification error, I also examined other possible variables or transformed variables to add to models. For example, in *satisfaction* models, I found that adding a squared term for total delivery providers eliminated the specification error but showed that it was a much worse fit using AIC and BIC. In addition, I found that primary estimates of associations of interest (i.e., between PC-ISP and the outcome) did not change substantially (0.08-3.2%). Thus, for the sake of fit and simplicity, I did not include the squared term. Regardless, the use of cluster robust standard errors can compensate for biased standard errors.

There was no evidence of multicollinearity among variables (VIF=~1.54). I checked linearity between outcomes and continuous variables by plotting them against residuals—age, parity, and health status—and found that linearity was reasonable to assume. I also examined potentially influential points by inspecting residuals plotted against predicted values and leverage

against residuals squared. Although there were some outliers, they did not greatly influence estimates of association. I also ran models that excluded points that had leverage greater than ***(2k+2)/N*** (where k is the number of predictors and N is the sample size) (Rousseeuw et al., 1987). Although excluding the observations with high leverage led to stronger estimates of association for PCMC and Key practices models, including all 'outliers' resulted in more conservative and arguably more realistic estimates. The opposite was true for satisfaction models: excluding observations with high leverage (n=60) decreased the magnitude of association between PC-ISP and satisfaction, suggesting that influential points may have positively biased estimates. PC-ISP associations with satisfaction should thus be interpreted with caution.

For the logistic regression models for the outcome, *willingness to return*, I checked model specification using link tests and goodness-of-fit using Hosmer-Lemeshow tests. These tests showed no evidence of specification error nor poor fit. I also inspected potentially influential observations by examining standardized Pearson residuals, deviance residuals and Pregibon leverage (Appendix 7D). Running models without potential outliers (high standardized residual values) and high leverage (*>3(k-1)/N*) had minimal influence on the estimates of PC-ISP associations (Velleman & Welsch, 1981).

I also examined the moderating role of facility capacity in the association between women's PC-ISP reports and QoC variables by including a main effect for the facility capacity variable (grand mean-centered) and an interaction term between PC-ISP and facility capacity. In these models, I only used the PC-ISP score rather than individual PC-ISP indicators. I estimated associations using OLS using the the following model:

Equation 7.3, Linear regression model, moderating role of facility capacity (full model):

$$Y = \alpha + \beta_{PC-ISP}x_1 + \beta_{Fac\ Capacity}x_2 + \beta_{PC-ISP} \times \beta_{Fac\ Capacity}x_3 + X\beta_{Woman} + X\gamma_{SP} + X\delta_{HH} + X\zeta_{Facility} + \epsilon$$

Where *Y* is the *QoC variable* (i.e., PCMC, key practices, satisfaction)
$\beta_{PC\text{-}ISP}$ is the women's *PC-ISP score*
$\beta_{Fac\ Cacpacity}$ is the *Facility Capacity indicator* (i.e. beds, maternity beds, patient:staff ratio, patient:beds ratio)
$\beta_{Woman,}\ \gamma_{SP}$, δ_{HH} , $\zeta_{Facility}$, and ϵ are as defined in Eq. 7.1 above.

Willingness to return used the equivalent model using logistic regression. Sensitivity analyses included fitting a multi-level model, estimating a cross-level direct effect, but found that estimates were highly consistent. Given low intraclass correlations and poorer indicators of fit (log likelihood, AIC, BIC), I presented the single-level OLS and logistic regression models in the results. Sensitivity analyses were also conducted with different constructions of the woman-reported PC-ISP combined score (Appendix 7B), comparing the 4-item score (presented in this chapter) with a) a 5-item score also including the variable, *SP felt welcome*, and b) a binary variable: high vs. low PC-ISP, categorizing 4 or more PC-ISP experiences as high and 3 or less experiences as low. Results for these sensitivity analyses were consistent and use of the high vs. low PC-ISP variable may be useful for clinical practice.

Results

Distributions of *person-centered maternity care (PCMC), clinical quality of care, satisfaction, and willingness to return* to the facility are presented in Table 7.2. The average PCMC score was 66.7 points (SD 15.3) out of 100. Of subdomains, women generally rated Dignity & Respect measures higher (mean 77.3, SD 18.4) and Communication & Autonomy lower (mean 59.2, SD 21.3). For clinical quality, on average, women reported receipt of 17.8 (SD 5.03) practices out of 28, representing only 64% of standard key practices, approximately. Women tended to report more gaps in care in maternal practices (mean 10.0 out of 17, SD 3.4)

compared to newborn practices (mean 7.8 out of 11, SD 2.2). Most women reported being satisfied with the care they received (6.9 out of 9, mean 1.7). Most women (87.6%) reported that they would return to the same provider/facility the next time they delivered.

Table 7.2. QoC outcome distributions among the sample of women

	Mean or N	**(SD) or %**
Person-centered outcomes		
Person-centered maternity care scale total score (0-100)* (n=1,138))	66.69	(15.27)
Dignity & Respect (0-100)	77.34	(18.46)
Communication & Autonomy (0-100)	59.24	(21.34)
Supportive Care (0-100)	66.90	(15.16)
Satisfaction total (0-9)	6.93	(1.67)
Willing to return to the facility (n=1,085)		
No, not willing to return	120	12.4%
Yes, willing to return	845	87.6%
Clinical Quality of Care		
Coverage of Key Practices (total) (0-28)	17.84	(5.03)
Maternal key practices (0-17)	10.02	(3.59)
Newborn key practices (0-11)	7.81	(2.15)

*PCMC and all sub-scales were standardized to a 100-point scale

Aim 3a: Estimate how women's and support persons' reports of PC-ISP are associated with women's reports of person-centered quality of care outcomes

Person-centered outcomes

Person-centered maternity care (PCMC)

Table 7.3 presents estimates of association between woman-reported PC-ISP and PCMC scores. The combined women's PC-ISP score and all but one women-reported PC-ISP indicator was associated with higher PCMC scores. Each additional experience of PC-ISP was, on average, associated with a 3.64-point (95% CI: 2.39, 4.90) higher PCMC score. In models, estimates of association were primarily attenuated by facility factors rather than women's, SPs', or household factors (i.e., health centres/dispensaries increased PCMC scores by 3.4 points, while private facilities increased by 6.6 points).

Examination of separate indicators showed that, net of women's, SPs', household, and facility factors, PC-ISP correlations ranged from a 5.10-point (95% CI: 3.77, 6.44) higher PCMC score for women reporting providers asked if their SP should be *told about their condition/care* to a 10.52-point (95% CI: 6.64, 14.40) higher PCMC score for women reporting that providers *listened to their SPs' concerns*. There was no evidence of correlation between women reporting their SPs *felt welcome* and PCMC.

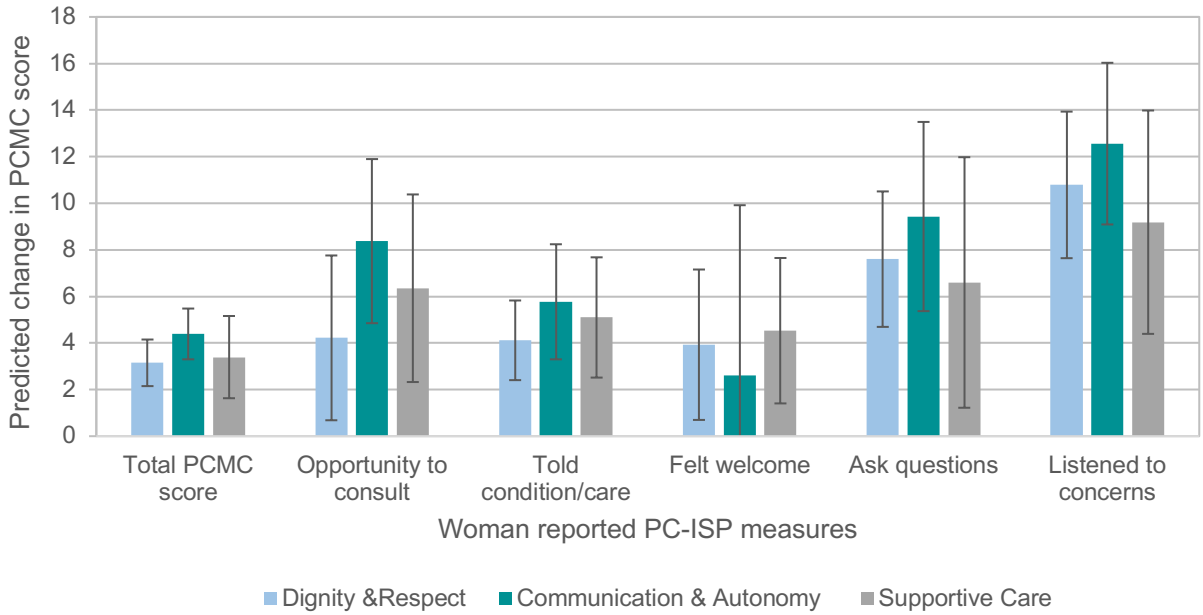
Table 7.3. Associations between women's reported PC-ISP and PCMC scores using OLS

	PCMC total score		**Sub-domains**		
	N	Coeff. (95% CI)	**Dignity & Respect** Coeff. (95% CI)	**Communication & Autonomy** Coeff. (95% CI)	**Supportive Care** Coeff. (95% CI)
Total PC-ISP score	1,138	3.64** (2.39, 4.90)	3.15*** (2.15, 4.15)	4.39*** (3.30, 5.48)	3.39** (1.63, 5.16)
Opportunity to consult	1,138	6.53** (2.92, 10.14)	4.22* (0.68, 7.76)	8.37** (4.85, 11.90)	6.35* (2.32, 10.38)
Told condition	1,138	5.10*** (3.77, 6.44)	4.12** (2.41, 5.83)	5.77** (3.30, 8.24)	5.10** (2.52, 7.68)
Felt welcome	1,138	3.84 (-0.29, 7.96)	3.93* (0.70, 7.16)	2.62 (-4.68, 9.92)	4.53* (1.41, 7.65)
Welcome to ask questions [1]	1,119	7.65** (3.59, 11.70)	7.60** (4.69, 10.51)	9.43** (5.37, 13.49)	6.60* (1.22, 11.98)
Listened to concerns [1]	1,119	10.52** (6.64, 14.40)	10.79*** (7.64, 13.94)	12.56*** (9.09, 16.03)	9.19** (4.39, 13.98)

Notes: *p<0.05, **p<0.01, ***p<0.001
Full models controlled for age, parity, marital status, education, employment status, birth location, health status, insurance coverage, male partner SP, mother SP, mother-in-law SP, father SP, sister SP, brother SP, friend/neighbor/other SP, accompanied to facility, had SP during labor/delivery, had SP postpartum, household empowerment, number of providers assisting delivery, facility type, selected facility because of quality, referred to facility.
[1] 19 women responded N/A to these questions

Estimates of association (coefficients and 95% CI) between PC-ISP indicators and PCMC subdomains are graphed in Figure 7.1. Examining PCMC sub-domains showed that the combined PC-ISP score and most PC-ISP indicators (4 out of 5) were most strongly correlated with increases in *Communication & Autonomy*.

Figure 7.1. Associations between women's reported PC-ISP measures and PCMC sub-domains



Associations of SP-reported PC-ISP experiences and woman-reported PCMC score are presented in Table 7.4. In fully adjusted models, no SP-reported PC-ISP indicators were associated with PCMC. Analyses of smaller models showed that bivariate associations for two SP-reported PC-ISP indicators (*provided info about woman* and *welcome to ask questions*) with total PCMC score could be explained by variations in facility factors. These results were not consistent with my hypotheses.

Table 7.4. Associations between SP's reported PC-ISP and women's reported PCMC using OLS

	N	**PCMC score – unadjusted** Coeff. (95% CI)	**PCMC – Full model** Coeff. (95% CI)
Provided info about woman	605	2.36** (1.04, 3.68)	1.26 (-1.04, 3.57)
Provided info about newborn [1]	604	2.72 (-1.70, 7.14)	1.72 (-3.78, 7.21)
Welcome to ask questions	605	4.19** (1.62, 6.76)	1.90 (-1.77, 5.58)
Helped decide during care [2]	134	2.30 (-4.85, 9.44)	4.67 (-1.53, 10.88)

Helped speak up during care [2]	134	0.29 (-4.31, 4.89)	-1.14 (-4.74, 2.46)

Notes: *p<0.05, **p<0.01, ***p<0.001
Full models controlled for women's characteristics (age, parity, marital status, education, birth location, health status, insurance coverage), SPs' characteristics (relation to woman: male partner SP vs. mother/mother-in-law SP vs. other family member vs. friend/neighbor/other SP; accompanied to antenatal care, accompanied to facility, had SP during labor/delivery, had SP postpartum, number of providers assisting delivery, facility type, selected facility because of quality, and a fixed effect for each facility.
[1] One missing response for this question
[2] Only asked of SPs who reported staying with the woman during labor and delivery (n=134)

Satisfaction with care

Table 7.5 reports associations between women's reported PC-ISP and their *satisfaction with care*. The combined total PC-ISP score and all separate PC-ISP indicators were associated with increased satisfaction ratings. Each increase in PC-ISP score was associated with a 0.28-point (95% CI: 0.18, 0.39) increase in satisfaction score, corresponding to a 3.1%-point increase in satisfaction. Providers *listening to SPs' concerns* was associated with the greatest increase in satisfaction (11.1%-point increase), while SPs feeling welcome was associated with the smallest increase in satisfaction (3.4%-point increase).

Two SP-reported indicators were also associated with women's increased satisfaction scores: SPs' being *provided info about newborn* and being *welcome to ask questions* (Table 7.6).

Table 7.5. Associations between women's reported PC-ISP and satisfaction with care using OLS

	Satisfaction total score	
	N	Coeff (95% CI)
Total PC-ISP score	1,138	0.28** (0.18, 0.39)
Opportunity to consult	1,138	0.46** (0.17, 0.75)
Told condition	1,138	0.45*** (0.17, 0.73)
Felt welcome	1,138	0.31** (0.16, 0.46)
Welcome to ask questions [1]	1,119	0.56* (0.21, 0.92)

Listened to concerns [1]	1,119	0.77** (0.47, 1.06)

Notes: *p<0.05, **p<0.01, ***p<0.001
Controlled for age, parity, marital status, education, employment status, birth location, health status, insurance coverage, total number of SPs, male partner, mother, mother-in-law, father, sister, brother, other family, friend/neighbor/other, accompanied to facility, had SP during labor/delivery, had SP postpartum, household empowerment, number of providers assisting delivery, facility type, selected facility because of quality, referred to facility, and a fixed effect for each facility.
[1] 19 women responded N/A to these questions

Table 7.6. Associations between SP-reported PC-ISP scores and women's satisfaction with care using OLS

	Satisfaction total score	
	N	Coeff 95% CI
Provided info about woman	605	0.04 (-0.22, 0.30)
Provided info about newborn[1]	604	0.34* (0.08, 0.59)
Welcome to ask questions	605	0.27* (0.16, 0.38)
Helped decide during care[2]	134	0.17 (-0.60, 0.94)
Helped speak up during care [2]	134	0.09 (-0.74, 0.92)

Notes: *p<0.05, **p<0.01, ***p<0.001
Full models controlled for women's characteristics (age, parity, marital status, education, birth location, employment, health status, insurance coverage), SPs' characteristics (relation to woman: male partner SP vs. mother/mother-in-law SP vs. other family member vs. friend/neighbor/other SP; SP's occupation, SP accompanied to antenatal care, woman had SP accompany to facility, woman had SP present during labor/delivery, woman had SP visit postpartum, empowered in household decisions), and facility factors (number of providers assisting delivery, facility type, selected facility because of quality, and a fixed effect for each facility).
[1] One missing response for this question
[2] Only asked of SPs who reported staying with the woman during labor and delivery (n=134)

Willingness to return to the facility

The total PC-ISP score and nearly all (4 of 5) woman-reported PC-ISP measures were associated with increased likelihood of women stating they would return to the provider/facility for future deliveries (Table 7.7). Each additional PC-ISP experience was associated with a 32% increased likelihood (aOR=1.32, 95% CI: 1.14, 1.52) of being willing to return for care. Women's report of SPs *feeling welcome* was mostly strongly associated with willingness to return, more than doubling the likelihood of willingness to return (aOR=2.12, 95% CI: 1.93, 2.34).

Table 7.7. Associations between women's PC-ISP scores and willingness to return to the facility using logistic regression

	Willingness to return	
	N	aOR – Full model (95% CI)
Total PC-ISP score	965	1.32*** (1.14, 1.52)
Opportunity to consult	965	1.96*** (1.44, 2.69)
Told condition	965	1.19 (0.83, 1.71)
Felt welcome	965	2.12*** (1.93, 2.34)
Welcome to ask questions [1]	952	1.82** (1.27, 2.60)
Listened to concerns [1]	952	1.89** (1.29, 2.76)

Notes: *p<0.05, **p<0.01, ***p<0.001
Full models adjusted for women's characteristics (age, parity, marital status, education, birth location, employment, health status, insurance coverage), SPs' characteristics (male partner SP, mother SP, mother-in-law SP, father SP, sister SP, brother SP, friend/neighbor/other SP, woman had SP present during labor/delivery, woman had SP visit postpartum), household factors (household empowerment), and facility factors (number of providers assisting delivery, facility type, selected facility because of quality, referred to facility, and a fixed effect for each facility).
[1] 13 women responded N/A to these questions

Figure 7.2 shows predicted probabilities of willingness to return by number of PC-ISP experiences (computed at the mean values of all covariates). The predicted probability of willingness to return if women reported no experiences of PC-ISP was 79.3% (95% CI: 74.3%, 84.2%) while reporting four PC-ISP experiences corresponded to a predicted probability of 91.2% (95% CI: 89.4%, 93.0%), an 11.9%-point increase in probability. Predicted probabilities for individual woman-reported PC-ISP measures showed that SPs *feeling welcome* displayed the greatest difference in predicted probability of willingness to return (8.4%-point increase in probability), followed by providers listening to SPs' concerns (7.0%-point increase), and having the opportunity to consult SPs for decisions (6.8%-point increase).

Figure 7.2. Predicted probabilities of willingness to return to the facility by women's reported PC-ISP combined score, logistic regression results

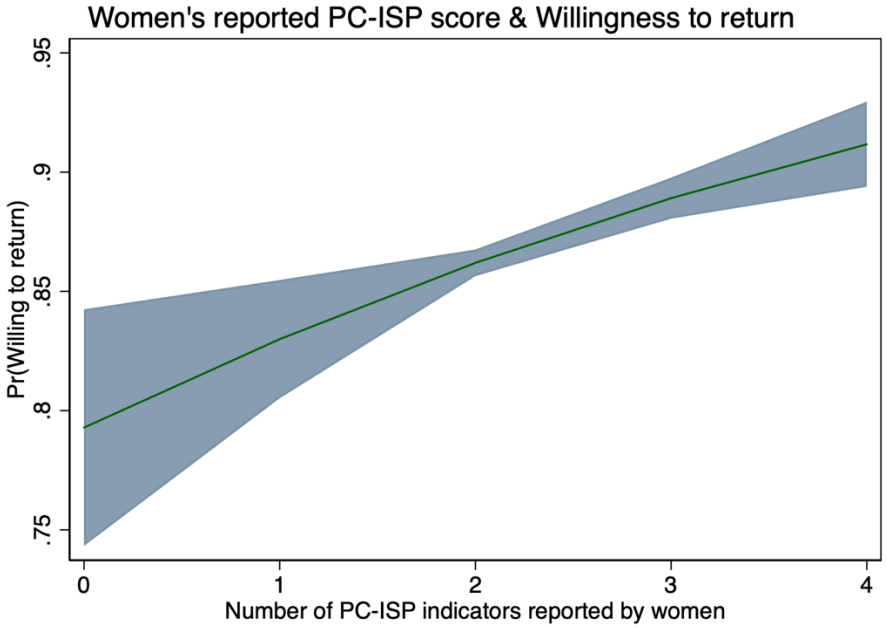


Table 7.8 shows results from SP-reported PC-ISP indicators and women's willingness to return to the facility. Contrary to my hypotheses, SPs' report of being *provided information about the woman* was associated with lower likelihood of women's willingness to return to the facility. Among factors included in the model, facility fixed effects were most strongly associated with willingness to return. No SP-reported PC-ISP indicators were positively associated with women's willingness to return to the facility.

Table 7.8. Associations between SPs' PC-ISP and women's willingness to return to the facility using logistic regression

	Willingness to return	
	N	aOR (95% CI)
Provided info about woman	525	0.55* (0.34, 0.89)
Provided info about newborn[1]	524	0.56 (0.32, 1.00)
Welcome to ask questions	525	1.26 (0.34, 4.64)
Helped decide during care[2]	103 [3]	1.66

		(0.26, 10.60)
Helped speak up during care[2]	103 [3]	1.91 (0.73, 5.00)

Notes: *p<0.05, **p<0.01, ***p<0.001
Full models adjusted for women's characteristics (age, parity, marital status, education, birth location, employment, health status, insurance coverage), SPs' characteristics (relation to woman: male partner SP vs. mother/mother-in-law SP vs. other family member vs. friend/neighbor/other SP; SP's occupation, SP accompanied to antenatal care, SP accompanied to facility, SP present during labor/delivery), household factors (empowered in household decisions), and facility factors (facility type, selected facility because of quality, referred to the facility, and a fixed effect for each facility).
[1] One missing response for this question
[2] Only asked of SPs who reported staying with the woman during labor and delivery (n=134)
[3] Models dropped 14 observations because the facility effect for one facility predicted success perfectly. Due to small sample sizes and empty cells, these models did not include covariates: SP's occupation, SP accompanied to facility, SP present during labor/delivery, and facility type.

Aim 3b: Estimate how women's and support persons' reports of PC-ISP are associated with women's reports of clinical quality of care outcomes

Clinical Quality of Care

Coverage of key practices

Table 7.9 presents associations between women's reported PC-ISP and key clinical practices. All woman-reported PC-ISP variables were associated with an increase in total reported key practices after adjusting for other factors. For the combined score, each additional PC-ISP report was associated with 1.26 (95% CI: 1.13, 1.40) additional key practices reported, corresponding to a 4.5%-point increase in clinical practices reported. Providers asking if SPs should be *told about women's condition/care* was associated with the greatest increase in key practices (2.50 additional practices, 95% CI: 2.06, 2.93), while SPs *feeling welcome* was associated with the smallest increase in key practices (1.28 additional practices, 95% CI: 0.15, 2.40).

Table 7.9. Associations between women's reported PC-ISP and coverage of key clinical practices using OLS

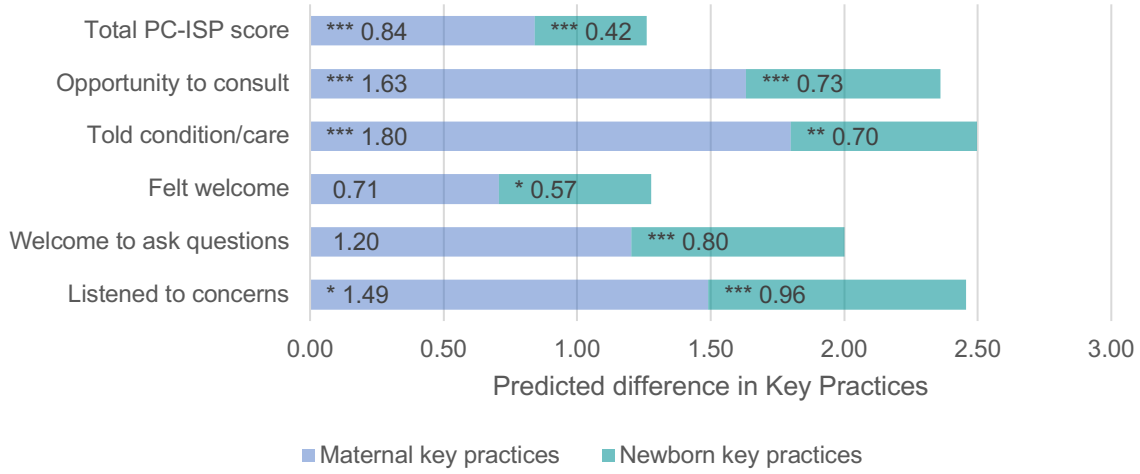
	Total key practices		**Sub-domains**	
	N	Coeff (95% CI)	**Maternal key practices** Coeff	**Newborn key practices** Coeff

			(95% CI)	(95% CI)
Total PC-ISP score	1,138	1.26*** (1.13, 1.40)	0.84*** (0.67, 1.00)	0.42*** (0.37, 0.48)
Opportunity to consult	1,138	2.36*** (1.71, 3.01)	1.63*** (1.19, 2.08)	0.73*** (0.49, 0.96)
Told condition	1,138	2.50*** (2.06, 2.93)	1.80*** (1.48, 2.12)	0.70** (0.42, 0.97)
Felt welcome	1,138	1.28* (0.15, 2.40)	0.71 (-0.19,1.60)	0.57* (0.11, 1.03)
Welcome to ask questions [1]	1,119	2.00* (0.60, 3.40)	1.20 (-0.04, 2.45)	0.80*** (0.56, 1.04)
Listened to concerns [1]	1,119	2.46** (1.32, 3.59)	1.49* (0.55, 2.44)	0.96*** (0.75, 1.18)

Notes: *p<0.05, **p<0.01, ***p<0.001
Controlled for age, parity, marital status, education, employment status, birth location, health status, insurance coverage, total number of SPs, male partner, mother, mother-in-law, father, sister, brother, other family, friend/neighbor/other, accompanied to facility, had SP during labor/delivery, had SP postpartum, household empowerment, number of providers assisting delivery, facility type, selected facility because of quality, referred to facility, and a fixed effect for each facility.
[1] 19 women responded N/A to these questions

Figure 7.3 graphically presents estimates of association by each PC-ISP variable. Each bar presents associations with maternal and newborn key practices, which, when summed together equal the estimated association for total key practices (total key practices = maternal + newborn key practices). In sub-analyses, interestingly, all PC-ISP indicators were associated with increases in newborn practices. Only three of five indicators were associated with increases in maternal practices (*opportunity to consult, told condition, listened to concerns*), mainly related to the sub-construct: provision of information and education.

Figure 7.3. Associations between women's reported PC-ISP and maternal/newborn key practices using OLS



Notes: *p<0.05, **p<0.01, ***p<0.001

Table 7.10 presents associations between SP-reported PC-ISP experiences and women-reported key practices. Only two SP-reported PC-ISP indicators were associated with key practices: *provided info about the woman* and *provided info about the newborn*. SPs reports of being provided information about the woman was associated with women reporting an additional 1.55 (95% CI: 0.77, 2.32) key practices. SPs reports they were *provided information about the newborn* was associated with an additional 0.98 (95% CI: 0.33, 1.63) key practices.

Table 7.10. Associations between SP's reported PC-ISP and key practices using OLS

	Key practices	
	N	Coeff (95% CI)
Provided info about woman	605	1.55** (0.77, 2.32)
Provided info about newborn [1]	604	0.98** (0.33, 1.63)
Welcome to ask questions	605	0.42 (-1.16, 2.00)
Helped decide during care [2]	134	1.81 (-1.11, 4.73)
Helped speak up during care [2]	134	-0.19 (-1.18, 0.80)

Notes: *p<0.05, **p<0.01, ***p<0.001
Full models controlled for women's characteristics (age, parity, marital status, education, birth location, health status, insurance coverage), SPs' characteristics (relation to woman: male partner SP vs. mother/mother-in-law SP vs. other family member vs. friend/neighbor/other SP; SP's occupation, accompanied to antenatal care, accompanied to facility, was present during labor/delivery), and facility factors (number of providers assisting delivery, facility type, selected facility because of quality, and a fixed effect for each facility).

[1] Missing one response
[2] Only asked of SPs who reported staying with the woman during labor and delivery (n=134)

Sub-Aim 3c: Examine the degree that facility factors moderate associations between PC-ISP and QoC outcomes

Facility capacity as a potential modifier of PC-ISP and Quality of Care (QoC)

Table 7.11 presents characteristics and data on measures of capacity of each of the six facilities. The sample size within each facility ranged from 48-358 participants. *Total beds in the facility*, a measure of the size and volume of a facility, ranged from 18-100 (mean 49.6, SD 34.7). *Patient:staff ratio*, a measure of staffing, ranged from 0.6 to 6.7 patients per staff (mean 4.1, SD 2.1). *Patient:beds ratio* (per day) in maternity wards ranged from 0.3-5 patients per beds (mean 2.3, SD 1.9), indicated the extent of crowding.

Table 7.11. Facility capacity measures

Facility ID	N	Facility type	Total Beds	Patient:staff ratio	Patient:bed ratio
1	48	Private	50	6.67	0.80
2	119	Private	18	0.60	0.27
3	358	Gov't hospital	100	6.00	5.00
4	237	Gov't hospital	24	1.88	0.83
5	239	Gov't hospital	30	5.63	1.80
6	137	Gov't health centre/disp	24	2.67	0.53

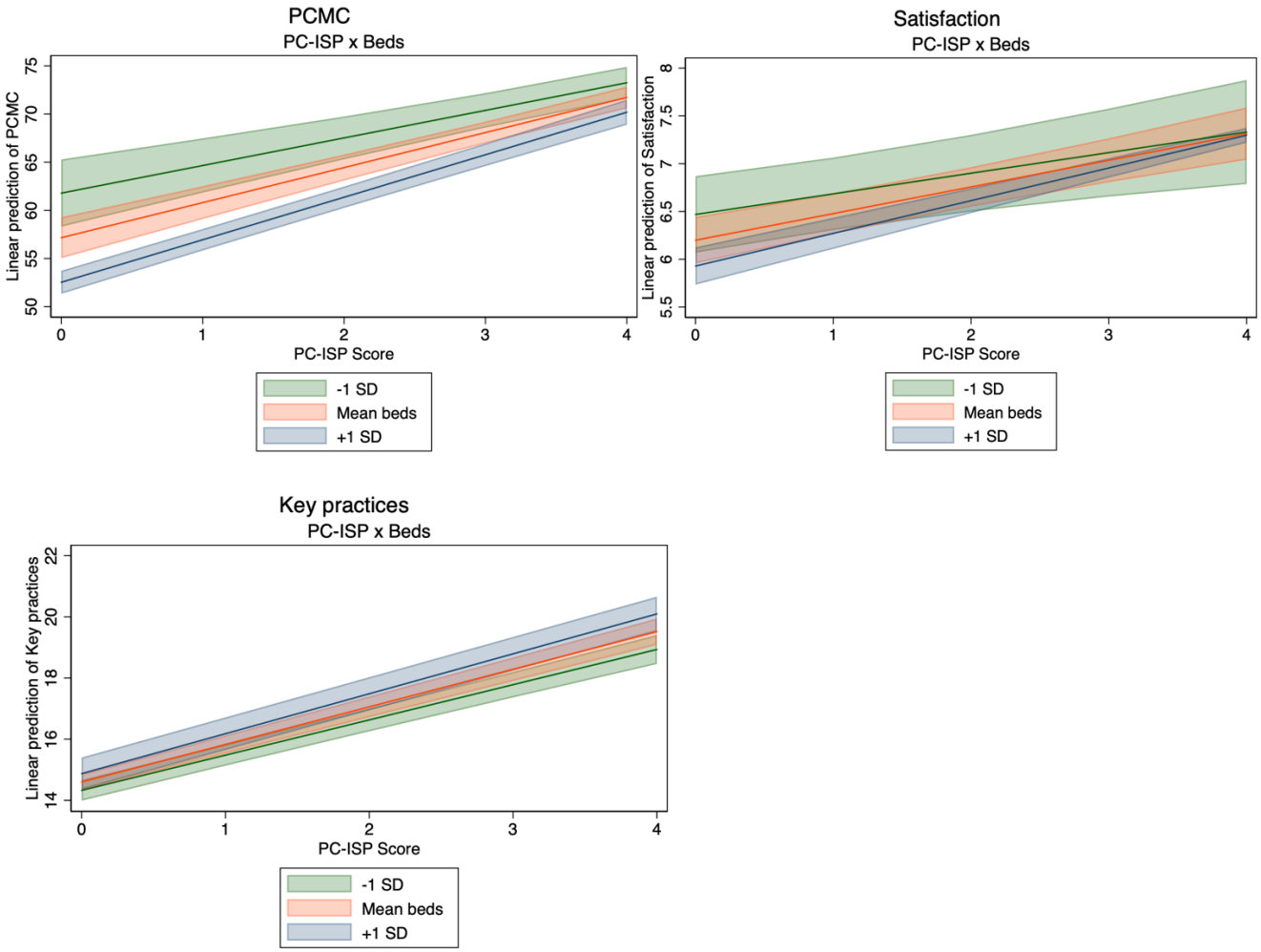
Table 7.12 presents estimates of association for main effects of PC-ISP, number of beds, and the interaction term of these two variables. I found evidence of a statistical interaction between PC-ISP and beds for PCMC, key practices, and satisfaction. For PCMC, key practices, and satisfaction, there was a small positive interaction in which the slope of PC-ISP was steeper in facilities with more total beds, although the effect is very slight for key practices and satisfaction.

Figure 7.4 graphs the predicted outcomes of these interactions. Facilities with more beds had generally lower PCMC scores but showed a greater effect of PC-ISP on PCMC. For example, comparing facilities with more versus fewer beds (+1SD vs. -1SD from the mean), the predicted difference in PCMC score between high and low PC-ISP scores (i.e., 4 vs. 0) was 17.66 vs. 11.46 points. Facilities with more beds generally had lower satisfaction scores but slightly stronger associations between PC-ISP and satisfaction. For key practices, facilities with more beds have greater coverage of key practices, I observed a stronger association between PC-ISP and key practices. This result was contrary to my expectations since PC-ISP appears to have a greater effect in high-resourced, high-volume facilities.

Table 7.12. Interactions between woman-reported PC-ISP and total beds in the facility using linear and logistic regression

		Women's PC-ISP score	**Beds**	**PC-ISP x Beds Interaction term**
QoC Outcome	**N**	**Coeff (95% CI)**	**Coeff (95% CI)**	**Coeff (95% CI)**
PCMC	1,138	3.64 (3.12, 4.16)***	-0.13 (-0.18, -0.09)**	0.02 (0.01, 0.03)**
Satisfaction	1,138	0.28 (0.20, 0.36)***	-0.01 (-0.01, -0.00)*	0.002 (0.000, 0.003)*
Key practices	1,138	1.23 (1.18, 1.28)***	0.01 (-0.00, 0.02)	0.002 (0.001, 0.003)**
		aOR (95% CI)	**aOR (95% CI)**	**aOR (95% CI)**
Willingness to return	965	1.27 (1.07, 1.52)**	0.98 (0.97, 1.00)*	1.00 (1.00, 1.01)

Figure 7.4. Moderating effect of total bed numbers on PC-ISP and PCMC, key practices, and satisfaction



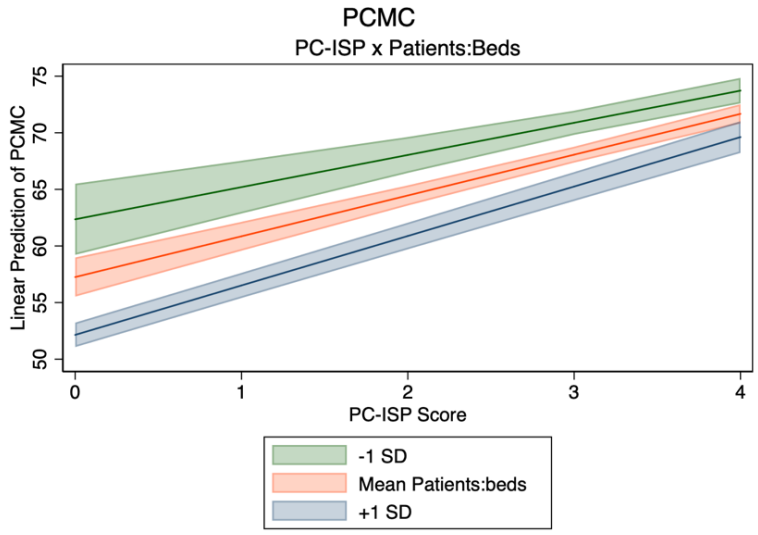
Investigations of patient:bed ratio (an indicator of crowding) showed evidence of moderation for PCMC and key practices (Table 7.13, Figure 7.5. Facilities with higher patient:bed ratios (i.e., more crowding) had, on average, lower PCMC scores but higher coverage of key practices. In facilities with higher patient:bed ratios (i.e., more crowding), I found evidence that PC-ISP was more strongly associated with both PCMC and key practices. For example, comparing facilities with higher vs. lower *patient:bed ratios* (+1SD vs. -1SD from the mean), the predicted difference in PCMC score between high and low PC-ISP scores (i.e., 4 vs. 0) was 17.47 vs. 11.37 points. Similarly (comparing facilities by patient:bed ratios), the predicted difference in key practices between high and low PC-ISP scores was 5.26 vs. 4.63

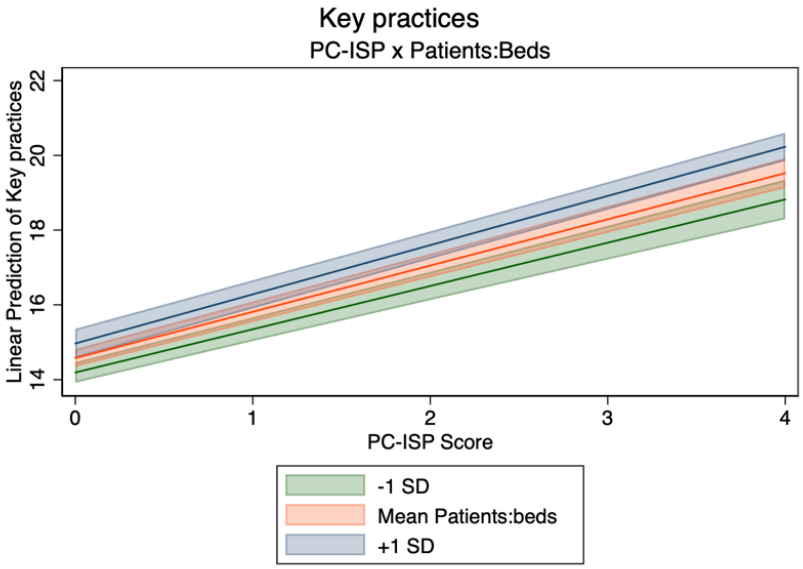
practices. This result was in line with my expectations that greater integration of SPs would have a greater effect on QoC in facilities with greater crowding.

Table 7.13. Interactions between woman-reported PC-ISP and patients:beds ratio (mean-centered) using linear and logistic regression

		Women's PC-ISP score	Patients:Beds	PC-ISP x Patients:Beds Interaction term
QoC Outcome	**N**	**Coeff (95% CI)**	**Coeff (95% CI)**	**Coeff (95% CI)**
PCMC	1,138	3.61 (3.09, 4.12)***	-2.66 (-3.49, -1.83)***	0.40 (0.21, 0.59)**
Satisfaction	1,138	0.28 (0.20, 0.35)***	-0.15 (-0.25, 0.35) *	0.03 (-0.00, 0.06)
Key practices	1,138	1.24 (1.19, 1.29)***	0.20 (0.08, 0.33)**	0.04 (0.01, 0.07)*
		aOR (95% CI)	**aOR (95% CI)**	**aOR (95% CI)**
Willingness to return	965	1.26 (1.06, 1.51)**	0.71 (0.56, 0.90)**	1.05 (0.97, 1.14)

Figure 7.5. Moderating effect of patient:bed ratio on PC-ISP and PCMC and key practices.





I also investigated potential moderation by patient:staff ratio, a measure of staffing, but found no evidence of moderation (Appendix 7E).

Discussion

Using women's and SP's PC-ISP indicators, this study provides evidence that women's perceptions of integrating SPs—as a strategy for a person-centered care approach—is linked to the quality of maternity care across multiple dimensions. This study fills critical gaps in the literature, showing that women's perceptions of integrating SPs is associated with women's positive experiences of care, better clinical care experiences, higher satisfaction with care, and greater willingness to return to facilities for care. I found mixed evidence of SPs' PC-ISP experiences related to women's QoC. Some SP's PC-ISP indicators were associated with increased key practices and women's satisfaction with care, but no indicators were associated with PCMC, and one indicator was associated with a decreased likelihood of women's willingness to return for care. These findings suggest that women's *perceptions* of integrating SPs are more important for their experiences of care than SPs' experiences of being integrated.

Although it is possible that SPs' surveys did not fully capture the experiences of all SPs, since only one SP was interviewed and there may have been other SPs who were more present, it is perhaps more likely that women's reported PC-ISP measures reflect their perceptions of QoC.

Yet, findings do underscore the importance of integrating SPs in several ways, especially by giving SPs opportunities to communicate with providers about care. Among SP's PC-ISP experiences, indicators related to communication were associated with increased key practices and women's satisfaction.

As expected, I found that facility factors critically affected associations between PC-ISP and QoC. Facility factors, such as facility type and individual facility fixed effects attenuated associations more than women's or SPs' characteristics in models. I also found that facility capacity modified the strength of PC-ISP on PCMC, key practices, and satisfaction. Evidence indicates that in facilities with high volumes and more crowding, greater integration of SPs is associated with more dramatic increases in the quality of care. This suggests that integration of SPs is particularly crucial for high volume and more crowded facilities.

Women's perceptions of integrating support persons is an indicator of person-centered care

Results showed that women's PC-ISP indicators were associated with PCMC and tended to be most strongly associated with the Communication & Autonomy subdomain. On the contrary, I did not find evidence of associations between SP-reported PC-ISP indicators and women-reported PCMC. This suggests that women's *perceptions* of integrating SPs reflect their positive interactions with providers via care that was more communicative and promoted their autonomy more than the actual extent that SPs were integrated into care.

Literature has demonstrated that women often consider SPs as a part of their experience of care. SPs can bridge communication with providers during childbirth, especially when they feel that staff do not give them adequate time or attention (Bondas-Salonen, 1998). SPs can express and reiterate women's concerns to providers (Kabakian-Khasholian et al., 2018; Kululanga et al., 2012) and SPs can also help women be properly informed by ensuring that information from providers is clearly heard and understood (Ampim et al., 2021; Elwyn et al., 2012).

Other literature has found that companion support during labor and delivery, in particular, is associated with less provider mistreatment and higher person-centered maternity care (Abuya et al., 2015; Diamond-Smith, Sudhinaraset, Melo, et al., 2016; Kiti et al., 2022) likely because providers interact with women differently when SPs are present (Keirse et al., 1989; Kozhimannil et al., 2016). It is probable that SPs' physical presence during care has more of an impact on how women are treated. When SPs can be present with women, they can be more involved in the processes of care and interact with providers as care is being delivered.

Integrating support persons is associated with increased key practices

I found that integrating SPs was associated with women's reports of receiving better clinical care; each increase in the number of woman-reported PC-ISP experiences was associated with an additional 1.3 key practices received. These results support evidence that SPs are important advocates for women during care. SPs can call for medical attention when needed, point out gaps in clinical care, and ask providers to perform needed exams or procedures (Kaye et al., 2014; McMahon et al., 2014). As witnesses, SPs can also hold providers accountable for poor treatment or malpractice (Rominski et al., 2017).

The finding that PC-ISP was associated with key practices fills a particularly notable gap in literature. Previous studies that proposed that integrating SPs can improve health outcomes posit this would be due to women's increased receipt of support. But given results that integrating SPs was associated with increased key practices, I argue that improved quality of care could be an additional mechanism. Simply put, SPs who are integrated can advocate for better QoC for women, potentially resulting in better health outcomes.

Results further suggest that integrating SPs may lead to greater partnership between providers, women, and SPs. Increased key practices was most strongly associated with women having the opportunity to consult SPs on decisions, being asked if SPs should be told about their condition/care, and providers listening to SPs concerns. This suggests that allowing women to make decisions with their SPs, especially when SPs are informed, and being able to express their concerns to providers stresses the importance of giving women and SPs opportunities to both interact with each other *and* with providers. Health services research has demonstrated that collaborative processes of health care delivery—where clinicians, patients, and their families co-assess patients' situations, co-decide on the best treatment, and co-design the care plan—lead to cost-effective, high-quality care (Elwyn et al., 2020). This study's results suggest that integrating SPs can be a strategy to foster greater partnership between providers, women, and SPs in the collaborative delivery of care.

Women are more satisfied and more willing to return for care when they perceive support persons are integrated

Several studies have found that women are more satisfied with care when they are allowed birth companions (Gadappa & Deshpande, 2021; Okumu & Oyugi, 2018). This study

extends this literature by showing that women also prefer care that integrates SPs by providing opportunities for SPs to interact with providers. Across settings, studies have consistently found that women's satisfaction with maternity care is linked to their positive interactions and communication with providers (Kumbani et al., 2012; Melese et al., 2014; Oluoch-Aridi, Afulani, Guzman, et al., 2021). Importantly, I found that some SP-reported PC-ISP indicators were also associated with women's satisfaction with care, providing evidence linking SPs' experiences of care to women's attitudes about care.

Results also shed light on implications for women's willingness to return to the facility for future care. When women perceived that SPs felt welcome, they were twice as likely to be willing to return to the facility for future deliveries. Because family and community members influence women's decisions about how and where to seek care (Moyer et al., 2014; Tunçalp et al., 2015), whether SPs feel included during care or are able to help women negotiate decisions about care can affect whether women feel comfortable returning for future care. Moreover, integrating SPs may potentially could influence broader community perceptions of care. For instance, patients' negative experiences with providers affect not only their own future care-seeking, but also influence the decisions of the social network members (Ochieng & Odhiambo, 2019). Fostering SPs' sense of inclusion in care may have a ripple effect in the community, influencing both women's and SPs' social networks' decisions to seek care.

However, while some SP-reported PC-ISP indicators were associated with women's increased satisfaction with care, SPs' report of being provided information about women's condition/care was associated with *lower* likelihood of willingness to return, which went against my expectations. These results may suggest that women desire some degree of privacy regarding their health information. Other studies have found that some women fear SPs will discuss their

private matters, gossip with others, or divulge confidential information, like HIV status (P. Afulani, Kusi, et al., 2018; Alexander et al., 2014). Future research should explore what information women consider useful to share with SPs or desire to withhold from SPs. In contrast, analyses showed that factors specific to individual facilities primarily contribute to women's willingness to return. This is consistent with other literature, supporting evidence that perceptions of quality are among the most important factors for women's selection of facilities (Escamilla et al., 2018; Njoroge et al., 2005).

Integrating support persons is important for newborn care

Sub-analyses of key practices revealed that all women-reported PC-ISP indicators were associated with higher reported newborn care practices. SPs' reports of being provided information about newborn care was also associated with the greatest increase with women's satisfaction with care. These results corroborate evidence that SPs plan an important role in newborn care, especially when women are busy with procedures or recovering postpartum. Women have reported that SPs' involvement was essential when they felt that their newborns were treated poorly (Bondas-Salonen, 1998). An intervention trial found that women who had an SP had significantly less neonatal intensive care unit admissions and earlier initiation of breastfeeding than those without an SP (Gadappa & Deshpande, 2021). Moreover, in this context, nearly one in five newborns was separated from their mother while at the facility (Nakphong et al., 2021), highlighting women's inability to be involved at times. Integrating SPs may help families be more involved in the newborn's care, ensure that newborns are receiving high-quality care, and provide a communication link to help women be aware of their newborns' well-being and care.

Facility capacity moderates the effect of integrating support persons on quality of care

Findings contribute knowledge to how the facility context modifies the experience and effects of integrating SPs. Results showed a stronger 'effect' of integrating SPs on QoC indicators at crowded, high-volume facilities. Numerous studies have cited lack of resources and space to accommodate SPs (Kabakian-Khasholian et al., 2018). When facilities cannot provide adequate space for SPs, SPs are excluded, which also has implications for the care women receive (Asefa et al., 2020; Oluoch-Aridi, Afulani, Guzman, et al., 2021). For example, lack of space for SPs to sleep or sit results in earlier discharges for women and newborns (McMahon et al., 2015). Several studies in Kenya have highlighted that many maternity wards have such high patient volumes and crowding, women must share beds and that space for providers to move around is even limited (Oluoch-Aridi, Afulani, Guzman, et al., 2021; Sudhinaraset et al., 2019). Other studies have also found that companion support yields greater benefits to women's health outcomes in settings where companion support is ordinarily not allowed compared to where it is normalized or expected (Bohren et al., 2017). It is possible that in those types of settings, which are likely crowded and have high patient-volumes, having an SP to help navigate the experience of care can make a bigger difference.

Notably, I did not find any moderation effects by the level of staffing. This finding goes against numerous other studies describing providers' perceptions that understaffing contributes to their inability to provide person-centered care or accommodate SPs (P. Afulani, Kusi, et al., 2018; Giessler et al., 2020). Interestingly, some quantitative evidence indicates that Kenyan facilities are adequately staffed despite perceived staffing shortages (IHME, 2014). That study found that most medical personnel in Kenya, especially in urban areas, treat a small number of

patients each day and most facilities had the human resource capacity to serve more patients (IHME, 2014). This present study supports the latter evidence, finding that the level of staffing did not change how integrating SPs was associated with QoC.

This study supports and extends this literature by showing that integrating SPs in particular institutional settings—those that are crowded and with high patient volumes—appears to have a greater positive effect on both women's experience of care and receipt of clinical care. Experts have proposed centralizing childbirth services at larger volume facilities that tend to have greater clinical care capabilities (e.g., surgery, cesarean deliveries), but caution that efforts to ensure equity are needed (Arsenault et al., 2020). These findings add evidence that integrating SPs is a potential strategy to improve clinical and person-centered QoC in crowded, high-volume facilities, which could help promote the equitable delivery of care.

Limitations

This study has several limitations, particularly relating to measures. It must be reiterated that PC-ISP measures were not formally developed nor validated. PC-ISP measures were also unable to examine a range of experiences of SP integration. This is particularly remarkable within the PC-ISP measures administered in the SPs' survey. Only three measures were asked of all SPs and two indicators were only asked of SPs who reported being present with the woman during labor and/or delivery (n=134), which is a poorly defined sample (discordance between women's and SPs' reports of this measure is detailed in Chapter 7). In addition, only one SP was interviewed per women, so that SP-reported PC-ISP responses may not fully capture all SPs' experiences, especially if women had more than one SP. Moreover, while I presented results from both women's and SPs' reported PC-ISP measures, I could not directly compare them since

they did not match nor align well. Lastly, I used a combined woman-reported PC-ISP score that displayed poor reliability, indicating multi-dimensionality between indicators. In addition, this score was merely the sum of PC-ISP experiences but assumed that each PC-ISP experience was weighted equally.

Self-reported QoC indicators are also limited. Literature is mixed regarding the validity of women's reports. Some studies have found notable inaccuracies in women's report of maternity practices when compared to trained observers' reports (Day et al., 2021) while others have found that Kenyan women are able to accurately report on multiple aspects of care for themselves and their newborns (McCarthy et al., 2018). Women may not be fully aware of or remember all the procedures conducted, especially if providers were less communicative. It is also possible that because many of the key practices included items assessing whether women were asked about certain symptoms (e.g., Were you asked if you have pain? Headaches? etc.) these measures may reflect better communication. However, using the reported number of key practices may still be a more objective measure of clinical quality than ratings of perceived quality typically used in studies, since women can often be unaware of care standards and expect low QoC (Kumbani et al., 2012). Similarly, satisfaction ratings have been criticized as a poor indicator of quality. Women tend to rate satisfaction high, even when care is of low quality (Rishard et al., 2021). In addition, facility capacity measures may also be inaccurate because they were reported by a charge nurse, rather than official registry data.

Because the facility-level measures on capacity were reported by a charge nurse, it is possible that there is reporting error in these indicators. It is also likely that because these measures are averages, these indicators can not capture variations in capacity since patient volumes and staffing may vary daily and even throughout the day; for example, many facilities

have fewer staff at night (P. Afulani, Kusi, et al., 2018; P. A. Afulani et al., 2020). Thus, the moderating effect of patient:bed ratios should be interpreted conservatively. Similarly, the lack of evidence of moderation for patient:staff ratios may not necessarily mean that the level of staffing does not have an effect on PC-ISP and QoC, especially since Chapter 5 and 6 (Aims 1 and 2) found that the number of providers assisting delivery influenced women's and SPs' PC-ISP experiences.

This study is also unable to establish causality and the direction of effects, given almost all measures were collected at baseline interview. In addition, the inability to establish directionality in the relationship between PC-ISP and PCMC must be reiterated, especially because PC-ISP and PCMC theoretically occur and interact simultaneously. All results presented in this study are associations and may be due to reverse causality (care that is higher quality may tend to integrate SPs more).

Results also show that women-reported PC-ISP measures were highly correlated with QoC indicators while SP-reported PC-ISP were often not. Women's perceptions of PC-ISP may have been biased when QoC was higher. Thus, a major limitation of using women-reported PC-ISP is the possibility that these measures may better represent women's perceptions of QoC than the actual extent that SPs were integrated into care. Furthermore, I did not examine how QoC measures were related to one another, although it is likely that person-centered care and clinical quality influence satisfaction, which in turn, contribute to women's willingness to return for future care.

Lastly, these findings may have limited generalizability, given that associations between mistreatment and companion support can vary widely across countries because of social and institutional differences (Balde et al., 2020). In addition, because this study was conducted in a

small number of high patient-volume facilities, these results may not be generalizable to lower-level, primary care/community facilities.

Future research

Future research should carefully design PC-ISP measures, ensure that they adequately cover PC-ISP experiences, and allow for direct comparison between women's and SPs' measures. More detailed measures are needed, especially regarding the content and nature of communication between women, SPs, and providers, to better understand what information shared with SPs is constructive and positively contributes to improved clinical care and what information women consider unhelpful or unnecessary to share.

Future research should also collect or use validated measures of facility-level data to better understand how facility factors interact with PC-ISP and QoC. Future research may also explore time variations in facility capacity variables, such as the number of staff at a given day and time. Given that this study contradicted qualitative literature about staffing constraints and person-centered care, more detailed investigation is needed to reconcile differences between qualitative and quantative studies and better understand relationships between staffing, integrating SPs, and QoC.

Since this study suggests that integrating SPs may improve QoC, intervention trials are needed to establish temporality and causality. Research should also investigate how SP integration is associated with other outcomes including maternal and newborn morbidity and mortality while investigating QoC and other factors (e.g., stress, receipt of social support) as mediators. Further investigation is needed across a larger array of facilities (e.g., national-level,

lower-level facilities) across contexts to understand whether these relationships are consistent and generalizable.

Given findings regarding associations between PC-ISP and newborn practices and the lack of literature on person-centered newborn care, more qualitative research should also explore how SPs specifically interact with newborn care, investigating how women and families navigate newborn care together and specific SPs' specific roles in care. Community-based participatory research with communities and policymakers may also help develop greater partnerships between providers, women, and SPs to collaboratively and comprehensively improve QoC.

Study Implications

This study affirms WHO Quality of Care Framework for women and newborn health, providing needed evidence that integrating SPs is related to women's more positive person-centered outcomes and higher clinical quality. Women's experiences of care are tied to how SPs are treated in the maternity care setting.

There are several practical implications for maternity care. Communication between SPs and providers, especially opportunities to engage over questions and concerns, is essential for QoC. How providers communicate with SPs—as it pertains to women's and newborns' care—must be addressed. Providers need to be trained in how to engage and interact with SPs in a productive manner. Given that poor provider-SP communication has been documented across settings, there is a broad need to develop trainings, curriculum, and tools to assist providers in effectively communicating with women and SPs.

In addition, efforts can empower SPs and communities to be more actively engaged in women's maternal health care. More education can bolster SPs' roles and maximize their benefit

to women (WHO, 2016b), especially in settings where companionship is not normalized. Community-based education surrounding maternal and newborn health has focused on increasing skilled birth attendance, seeking antenatal care, and caring for newborns (Gitaka et al., 2018; Mochache et al., 2018; Ochieng & Odhiambo, 2019), but little training has focused on helping women and communities navigate maternity care while at facilities. Education that specifically trains SPs how to effectively bridge communication between women and providers including how to advocate for women, negotiate decisions, articulate needs, and how to better partner with providers to deliver concerted care to women.

This study also adds to the literature that institutional contexts matter for integrating SPs and quality of care. Although some providers acknowledge that SPs can fill in gaps in care when facilities are crowded or lack space (Chalmers & Wolman, 1993; Maimbolwa et al., 2001), providers may continue to deny women access to their SPs because of fears that SPs will obstruct or inhibit care delivery (Bruggemann et al., 2014; Kabakian-Khasholian et al., 2018). Efforts to integrate SPs in these high-volume facilities may be particularly important as women likely have greater needs for support. In addition, integrating SPs must be in conjunction with health systems strengthening, recognizing that a stronger health system is key for more respectful and better experiences of maternity care (Asefa et al., 2020). Other infrastructure interventions, such as dedicated space for SPs to sit or sleep, may facilitate better care for women and alleviate the burden on providers.

Ideally, interventions to integrate SPs could create mutual understanding and facilitate the co-production of maternity care between providers, women, and communities. Studies have reported tensions between providers and women (and their SPs), often because providers prioritize technical aspects of care to the neglect of respectful treatment (Jolly et al., 2019;

Moyer et al., 2021). In Kenya, models of care that have encouraged collaborations (e.g., between health centres and communities or between skilled birth attendants and traditional birth attendants) have demonstrated that they are able to leverage the strengths of different groups to improve obstetric outcomes and increase respectful experiences of maternity care (Byrne et al., 2016; Kenya Ministry of Health, 2013). Health care systems should explore ways that women, SPs, providers, and facilities can co-design health services that would cooperatively deliver, monitor, and evaluate maternity care (Elwyn et al., 2020). Ultimately, women, communities, and providers share the goals of reducing adverse maternal and newborn outcomes and improving well-being.

Chapter 8. Conclusions and Research, Practice, and Policy Implications

Research Implications

In this research project I reconceptualized facilitating access to social support in maternity care, introducing the concept of Person-Centered Integration of Support Persons (PC-ISP). Because current concepts and measurement of social support during childbirth do not adequately match women's preferences nor address how the health care system facilitates support, I showed that PC-ISP can provide a more detailed perspective of how women want their SPs integrated into care and an assessment of how the maternity care treats SPs, centered in women's experience of care.

This study provides nuanced evidence regarding women's unmet need for support, which has seldom been quantified. Over one-in-four women in the sample of participants in Nairobi and Kiambu county facilities wanted but did not have an SP during labor and/or delivery. Most women also wanted social support in different ways than previously measured: consulting SPs on decisions, wanting SPs to know and understand their condition/care, and opportunities for SPs to engage with providers about their questions and concerns. I further showed that in practice, these needs for support are still unmet for a substantial proportion of women.

This project also highlighted how integrating SPs is associated with higher quality of care for women and newborns, spanning both person-centered and clinical outcomes. To our knowledge, this is the first study examining and finding associations between integrating SPs and clinical quality of care. Findings lend evidence to integrating SPs as a potential strategy to improve QoC and maternal and newborn health outcomes.

One major contribution of this study is a better understanding of how the facility context influences how SPs integration and its relationship with QoC. Facility factors, including facility

types and number of providers assisting delivery, were important determinants of SP integration. I also found that patient volume and crowding modified associations between PC-ISP and QoC outcomes: person-centered maternity care and key practices.

Inequitable access to support persons by women's factors and support person types

This research addresses gaps in understanding social determinants that shape structures of social support for women by revealing inequalities in access to SPs by women's individual factors and SP types. For example, SPs who supported women with low-income, low-prestige occupations were less likely to report feeling welcome to ask questions. Providers frequently look down on poorer, less educated women, especially if they fail to bring needed supplies (e.g., cloths, sanitary pads) and give greater attention to wealthier, more informed women (P. A. Afulani et al., 2020).

Findings also revealed complexities in how different SP types were treated, particularly male partners. For example, treatment of male partners yielded unexpected results. For instance, women who had male partner SPs were more likely to report that their SPs felt welcome at the facility than those without male partner SPs. On the other hand, male partners were less likely to report being given information about women's condition and care than mothers/mothers-in-law. Male partners also tended to be excluded from staying with women during labor or delivery while mothers and mothers-in-law were more likely to be included. Male partners are given preferential treatment in some ways yet excluded in other ways.

These findings are consistent with some studies that have found that some providers grant male partners some benefits, such as allowing women with male partners shorter wait times but

are frequently pushed out of maternity wards since childbirth and maternity care is by-and-large regarded as a woman's affair (Ampim et al., 2020, 2021).

Tension between women's autonomy and experiences of integrating support persons

This study also addressed a gap in literature about understanding women's preferences for social support during maternity care beyond companionship finding that women had specific ways they wanted to integrate their SPs into care even when they did not desire labor or delivery companionship. Findings also underscored the need to better assess women's preferences to ensure person-centered care as results revealed the tension between experiences of integrating SPs and women's autonomy.

Most women preferred integrating their SPs into care and results suggest a trend that these preferences will increase over time since younger, more empowered women tended to prefer integrating SPs. But this research also indicates that women desire privacy: a higher number of SPs was negatively associated with greater PC-ISP preferences, fewer women wanted SPs to know about their condition and care compared to other PC-ISP indicators, and SPs report of receiving information about women was associated with a lower likelihood of women's willingness to return for future care. Future research is needed to develop simple tools to help providers assess, acknowledge, and respect women's preferences for SP types and roles, especially because providers may be overworked and under resourced.

Integrating support persons is associated with quality of care

This research addressed gaps in investigating SPs' experience of care in relation to (or as a part of) women's experience of care and measuring the extent that it influences the care women

receive, especially in contexts like Kenya where women continue to face barriers to SPs during maternity care. Developing PC-ISP measures for both women and SPs, I put woman-reported and SP-reported PC-ISP measures in conversation with one another, estimating how both were associated with QoC indicators reported by women. I showed that both women's and SPs' perceptions of SP integration were associated with coverage of key practices, a clinical outcome prioritized by the WHO (Tunçalp et al., 2015). I also showed that women's perceptions of integrating SPs were associated with more person-centered care, higher satisfaction with care, and greater willingness to return to facilities for future care.

Associations between PC-ISP and QoC measures are arguably the most important finding of this research because they provide empirical evidence to support proposed pathways in the WHO Quality of Care framework for maternal and newborn health (Tunçalp et al., 2015). Furthermore, most literature has focused on how SPs influence women's experience of care and women's health outcomes, but this study extends the literature to show that integrating SPs is also linked with newborns' experience of care—a part of maternity care that is crucially important to women and families (Nakphong et al., 2021; Sacks & Kinney, 2015).

Communication between providers, women, and support persons must be addressed

This research addressed gaps regarding how the health care system can facilitate support for women beyond companionship by identifying specific ways SPs can be integrated, specifically emphasizing positive communication between providers, women, and SPs. Providers' communication with SPs was the lowest of reported PC-ISP indicators: less than half of women reported that a provider asked if their SP should be told about their condition or care and only one-in-five SPs reported that they received information about women's condition and

care (even fewer reported receiving information about newborn care). Results also highlighted that SPs were even less likely to receive information if women experienced problems during delivery, arguably a key area that SPs need to be better integrated.

Surprisingly, I found that SPs' reports of receiving information about women was associated with a lower likelihood of women's willingness to return for future care. This unexpected result raises questions about the nature of communication between providers, women, and SPs and points to the importance of examining *what* and *how* information is communicated to SPs. Future research is needed to investigate the content and manner of communication of information to women and SPs, examining what is useful and how women's confidentiality can be ensured.

Results show that PC-ISP indicators were most strongly associated with the Communication & Autonomy subdomain of the Person-centered maternity care scale, which suggests that integrating SPs may be a promising strategy to improve communication and autonomy in maternity care. SPs can aid communication between providers and women by acting as a liaison or ensuring information is heard and understood (Bondas-Salonen, 1998; McMahon et al., 2014). Moreover, studies have generally shown that the Communication & Autonomy subdomain is rated lowest of all three PCMC subdomains, both in Kenya and elsewhere (Dagnaw et al., 2020; Odiase et al., 2021; Oluoch-Aridi, Afulani, Makanga, et al., 2021). But, because communication with providers is among the most important factors influencing women's perceptions of care (McLellan & Laidlaw, 2013), integrating SPs may be a viable intervention to improve communication between providers and women.

Addressing facility capacity is critical for integrating support persons

In addition, this study identified several facility factors that may be targeted to improve integrating SPs into care. Across the study, facility factors consistently emerged as crucially determining or modifying SP integration into care—a finding that most closely corresponded with my hypotheses. For example, a greater number of providers assisting delivery was associated with greater SP integration, likely because greater numbers of clinical staff allow providers to deliver more person-centered care (Giessler et al., 2020). Furthermore, the likelihood that SPs were integrated into care across indicators varied by facility type, although inconsistently. However, results also showed that the type of provider assisting delivery was not associated with PC-ISP as expected, further corroborating evidence that organizational factors, rather than individual provider characteristics contributed to PC-ISP.

Maternity care practices tend to be similar within facilities and vary little between providers, indicating that facilities develop unique patterns and cultures of care (Helfinstein et al., 2020). Interventions that have primarily focused on shifting the behavior of individual maternity care providers have often not been successful in Kenya (Giessler et al., 2020). Instead, these findings suggest that interventions to integrate SPs must focus on changing the culture and the characteristics of facilities. For example, strategies to integrate SPs may include establishing overarching policies and accountability systems, standardizing communication with women and SPs, or reconfiguring maternity wards to accommodate SPs.

Although literature has highlighted facility organization and infrastructure as crucial for integrating SPs (Kabakian-Khasholian & Portela, 2017), this study provided evidence that the positive associations between SP integration and QoC varied by facility capacity. Particularly at facilities with high patient volumes and crowding, SP integration may be more beneficial for ensuring key practices are performed and promoting person-centered care. These facilities tend

to be level 4 or 5 government facilities that prioritize clinical aspects of care over person-centered care (Felarmine et al., 2016). Providing women with a needed advocate for medical attention and respectful care may be especially important in settings where women receive little individualized attention and person-centered care is lower.

The influence of broader social norms merits further investigation

Additional investigation is also needed to examine the influence of the broader social context on women's preferences for support and how they may modify the associations between integrating SPs and QoC. Social and gender norms, such as community perceptions of gender-based violence, perpetuate inequalities and mistreatment in obstetric care; normalized abuse at home and in the community corresponds with normalized abuse in health care settings (Warren et al., 2017). Future studies could use Kenya Demographic and Health Survey (DHS) data to assess community norms about attitudes towards wife-beating or prevalence of intimate partner violence, aggregating perceptions within facility catchment areas.

Support persons need to be integrated across maternal health services

Lastly, this study reflects a need to integrate SPs across the spectrum of maternal health care. Increasing women's access to SPs during childbirth, across the continuum of her birthing experience, is regarded as a priority area for improving global maternal health (WHO, 2015, 2017b). Since SPs who accompanied women to antenatal care appointments were more likely to report being integrated into maternity care, increasing opportunities for women and SPs to navigate health care experiences together may improve support for women and increase familiarity with the health care system and engaging with providers about care. Most antenatal

education for women and SPs focuses on preparing them for the experience of childbirth (e.g., pain relieving techniques, coaching, danger signs) and is helpful for developing women and SPs' childbirth confidence in line with their sociocultural values (Munkhondya et al., 2020). Formal antenatal education is needed for SPs to learn how to support women's values and decision-making, how to interact with providers, and how to advocate for high quality care (Downe et al., 2016).

Results also affirm calls to better integrate SPs into labor and delivery care (Bohren, Berger, et al., 2019; Bohren et al., 2017). I found that women who had SPs during labor or delivery were more likely to report that SPs felt welcome. In addition, SPs who were present during labor or delivery were more likely to receive information and feel welcome to ask questions, showing that being physically present with women increased opportunities for SPs to be integrated in multiple ways. Women need access to their SPs during the critical high-risk period of labor and delivery when their needs are greatest.

Practice Implications

This study has a number of practice implications for healthcare providers and staff and broader healthcare facilities. Providers need to be trained in how to better integrate SPs in maternity care as part of the delivery of high-quality care. Providers need to be educated on how women can benefit from integrating SPs and how to establish SPs as partners in maternity care. For example, providing information to SPs can help them fill in gaps in medical care to better monitor women's conditions and progress, supporting providers when providers simultaneously attend to multiple women.

Training for providers must also sensitize them to women's preferences and how to appropriately acknowledge and respond to them, since there is no one-size-fits-all approach to integrating SPs. For example, providers need to play a critical gatekeeping role, able to both facilitate access to women's chosen SPs in the ways they want and bar SPs that women do not find helpful. At a minimum, providers should ask women which SP they prefer as a way to promote women's involvement in their own care. Providers and staff also need to be given clear guidelines for how to interact with and engage with all types of women and SPs equally, regardless of social status, and be trained to recognize their implicit biases (P. A. Afulani et al., 2020).

Undoubtedly, training to integrate SPs will require more nuance than merely allowing SPs as labor and delivery companions because SP integration focuses on specific types of interactions between providers, women, and SPs. For instance, providers will need to be trained in multiple areas of PC-ISP practice: how to make SPs feel welcome, how to provide opportunities for women to consult SPs on decisions, how to provide information to women and SPs, and how to welcome questions and concerns from women and SPs. The benefit of this training is that it will give providers a framework for how to think about women's preferences and needs in these areas and help them have a more nuanced perspective of person-centered care.

Providers need to receive training in how to involve women in decisions about communicating information to SPs so that women's privacy and autonomy can be protected. This research highlighted poor communication between providers, women, and SPs. Providers must strike a balance between giving SPs timely and appropriate information while protecting women's confidential and private information, especially since recent research has shown that some women report that SPs gossip about their private information with others (Wanyenze et al.,

2022). Notably, less than half of women reported that their provider *asked* if SPs should be told about their condition and care. Asking women about whether their information should be shared should be standard practice. Additionally, providers should be trained in how to customarily check in with women and SPs throughout maternity care. For example, if women experience delivery complications, providers should ask women if SPs should be informed as a standard practice. These are some examples of how providers can be trained in how to communicate with patients and their families while keeping women at the center of maternity care.

A greater emphasis on antenatal education for women and SPs is also needed to lay a foundation for integrating SPs and help them gain familiarity with the health care system. The antenatal period is key for preparing for childbirth and education needs to also help women and SPs expect and advocate for high quality intrapartum care. Education should include curriculum preparing women and SPs for how to understand their rights as patients, navigate interactions with providers, and assert preferences during care. Although some self-advocacy curricula have been developed in high-income countries for minoritized populations (Wicks, 2021), self-advocacy training materials need to be culturally tailored to Kenyan populations and the Kenyan health care setting.

Policy implications

National and county-level policies need to normalize SPs' involvement and integrate them into maternity care with equity and consistency. Integrating SPs into maternity care aligns with Kenya's Community Health Strategy which seeks to "build the capacity of individuals and households to know and progressively realize their rights to equitable, good quality health care" (Kenya Ministry of Health, 2020). Policies are needed to ensure that women and households

have the capacity to advocate for themselves and be involved in their own care regardless of facility level or type.

This research urges the Reproductive Maternal Health Services Unit in the Kenyan Ministry of Health to issue standard guidelines for how to integrate SPs in maternity care and implement a universal policy to allow women access to an SP of choice at any point during maternity care. Although not all women desire SPs to be present, all women should be able to access their SPs regardless of social status, type of SP, providers, or facility. Because Kenya's decentralized health care system gives counties authority to govern and supervise health facilities, a nation-wide set of guidelines and policy must also be accompanied with steps for implementation and accountability processes across counties. Policies to integrate SPs into maternity care could be incorporated into other existing national campaigns that share goals of improving QoC in maternity care, such as the joint stakeholder efforts to end fistula and ensure women's rights (Kenya Ministry of Health, 2021), to enrich efforts to support person-centered care and benefit from the national coordination.

From an organizational standpoint, changes to funding allocation and human resources management can also help to integrate SPs. Funding should be earmarked to ensure that maternity wards have adequate space and privacy for women and SPs. In high-volume facilities, resources should provide for an adequate number of beds (at least enough so that women do not need to share beds) and curtains for privacy. Allocating material resources to accommodate SPs' integration should be viewed as an investment in women's and newborns' health.

Health care systems also need to adjust how providers and staff are evaluated and rewarded in their work. Providers frequently see their responsibilities as solely attending to the proper delivery of clinical care (Jolly et al., 2019; Moyer et al., 2021). Making person-centered

outcomes, such as women's perceptions of PC-ISP or PCMC, part of how providers are evaluated and rewarded may help providers see integrating SPs and person-centered care as part of their essential duties.

Conclusions

Because integrating SPs into care can potentially influence QoC, health care systems should consider integrating SPs as a low-cost, person-centered quality improvement intervention. The novel PC-ISP concept and measures in this study can be used to develop tools to better assess women's preferences and experiences of support to promote person-centered care in practice. Providers need to be trained on integrating SPs and health care systems must establish standard practices to assess and acknowledge women's preferences in maternity care, permit access to SPs when desired, and create accountability systems to ensure policies and practices are implemented equitably. Efforts to integrate SPs into care should be focused on high-capacity facilities since SP integration may yield the greatest benefit to women and their communities in crowded facilities with high-patient volumes, providing women with essential advocates and filling in gaps in care. Integrating SPs in ways that keep women at the center of their own care can increase needed support for women, boost women's experience of care, and bolster efforts to measurably improve the quality of care.

Appendices

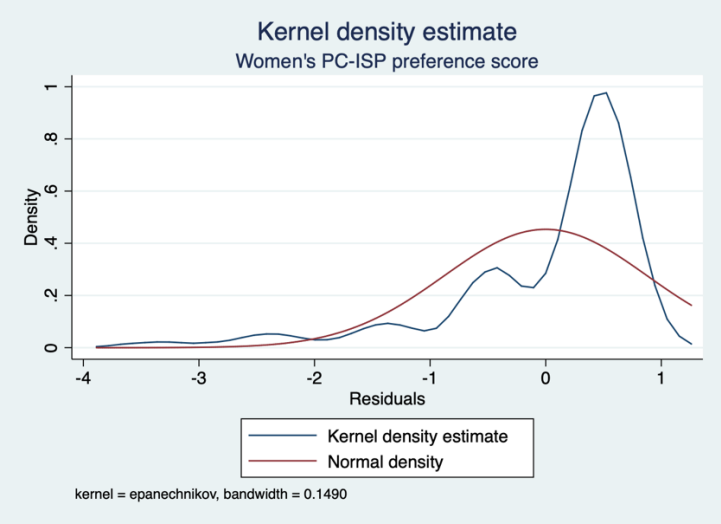
Appendix 5A-C. Chapter 5 appendices

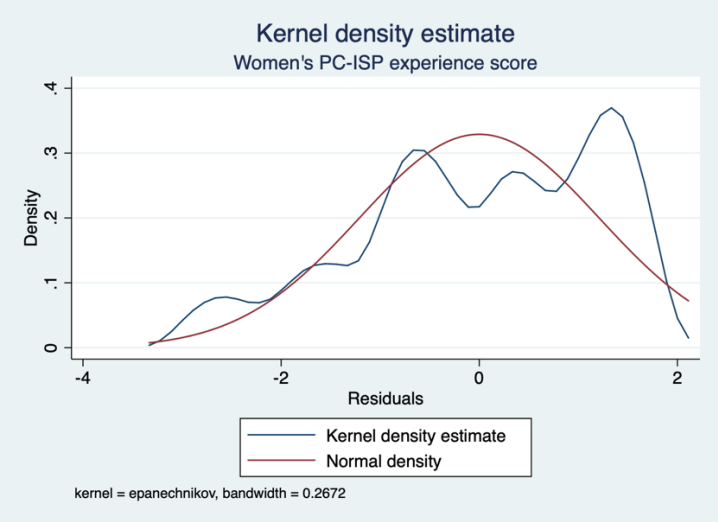
A. Correlation matrix of woman-reported PC-ISP measures

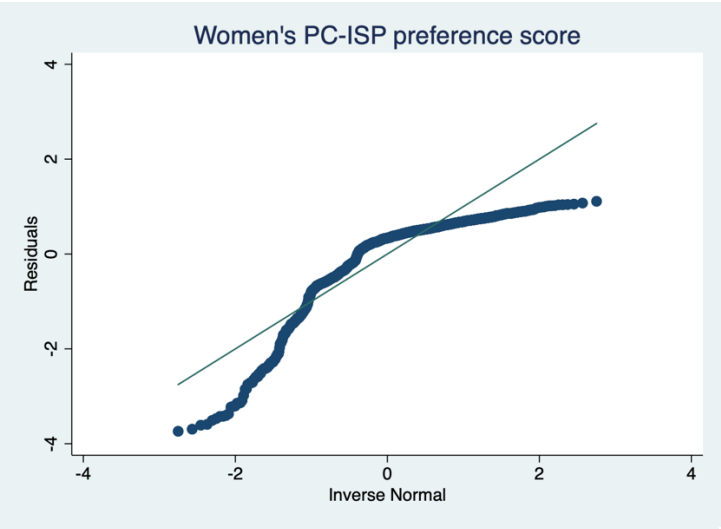
	Consult decisions	Know condition /care	Understand condition /care	Respect choices	Opportunity to consult	Told condition /care	Felt welcome	Welcome to ask questions	Listened to concerns
Consult decisions	1								
Know condition/care	0.3980	1							
Understand condition/care	0.3266	0.6368	1						
Respect choices	0.2047	0.1973	0.2349	1					
Opportunity to consult	0.2218	0.1424	0.1717	0.1813	1				
Told condition/care	0.1317	0.1175	0.1319	0.1525	0.4599	1			
Felt welcome	-0.0193	0.0416	0.0485	0.0045	0.0482	0.0548	1		
Welcome to ask questions	0.0118	0.0330	-0.0079	0.0439	0.1207	0.1488	0.2365	1	
Listened to concerns	0.0394	0.0717	0.0441	0.0939	0.1959	0.2227	0.2082	0.6122	1

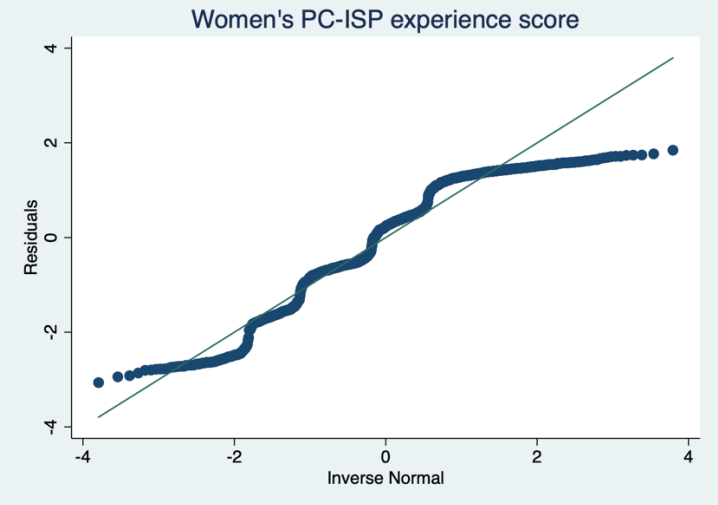
B. Model diagnostics

Normality

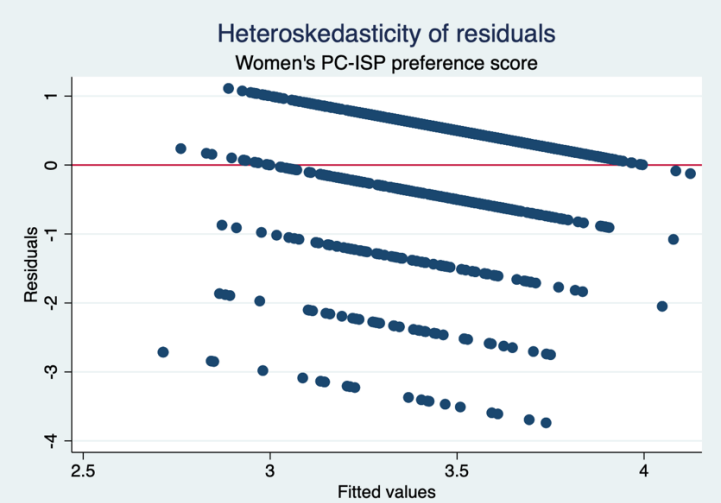


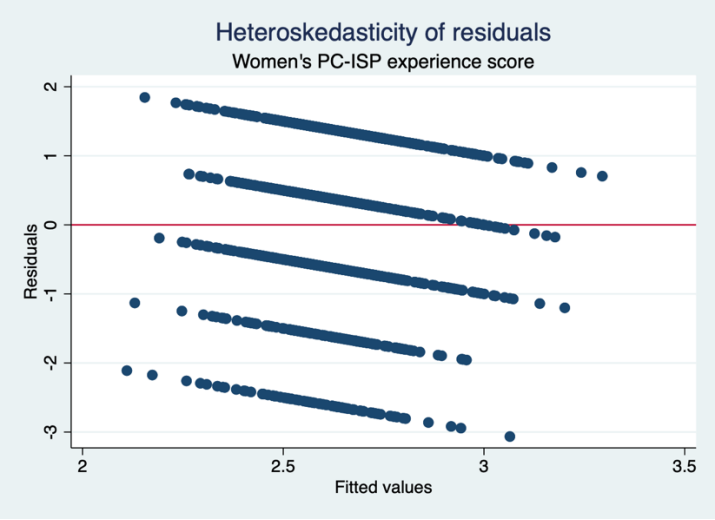




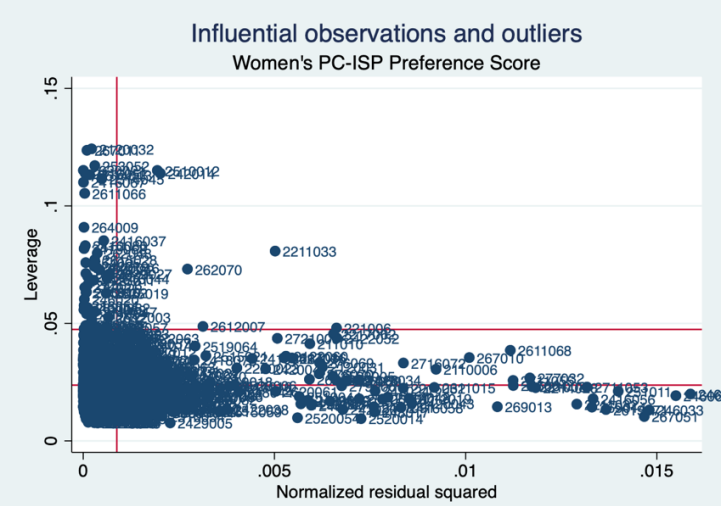


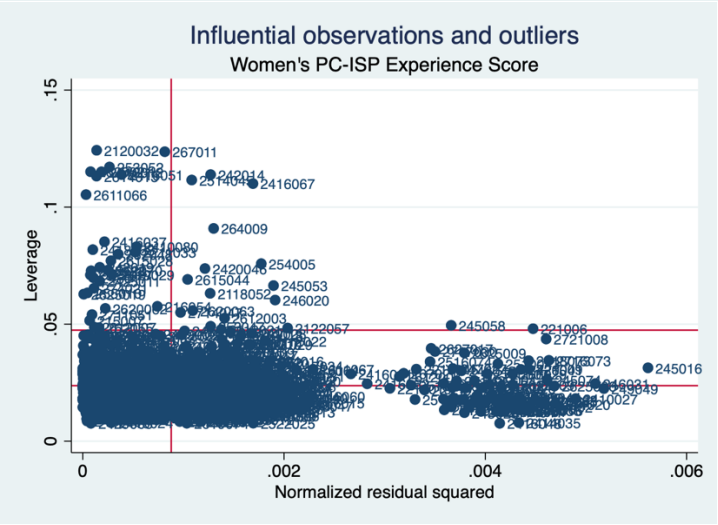
Heteroskedasticity





Assessing influential observations

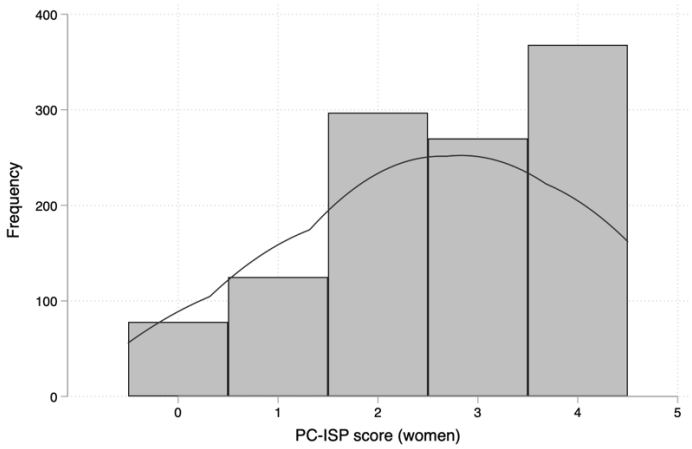




C. Intraclass correlations for woman-reported PC-ISP measures across facilities

	ICC	SE	95%CI
PC-ISP Preferences	<0.001	0.002	—
Consult decisions	<0.001	<0.001	—
Know condition/care	<0.001	<0.001	—
Understand condition/care	<0.001	<0.001	—
Respect choices	0.019	0.021	(0.002, 0.147)
PC-ISP Experiences	0.007	0.007	(0.001, 0.045)
Opportunity to consult	<0.001	<0.001	—
Told condition/care	<0.001	<0.001	—
Felt welcome	0.011	0.012	(0.001, 0.097)
Welcome to ask questions	0.033	0.029	(0.005, 0.172)
Listened to concerns	0.030	0.023	(0.007, 0.126)

D. Distribution of women's PC-ISP experience scores


400
300
200
100
0
Frequency
0
1
2
3
4
5
PC-ISP score (women)

Appendix 6A-E. Chapter 6 appendices

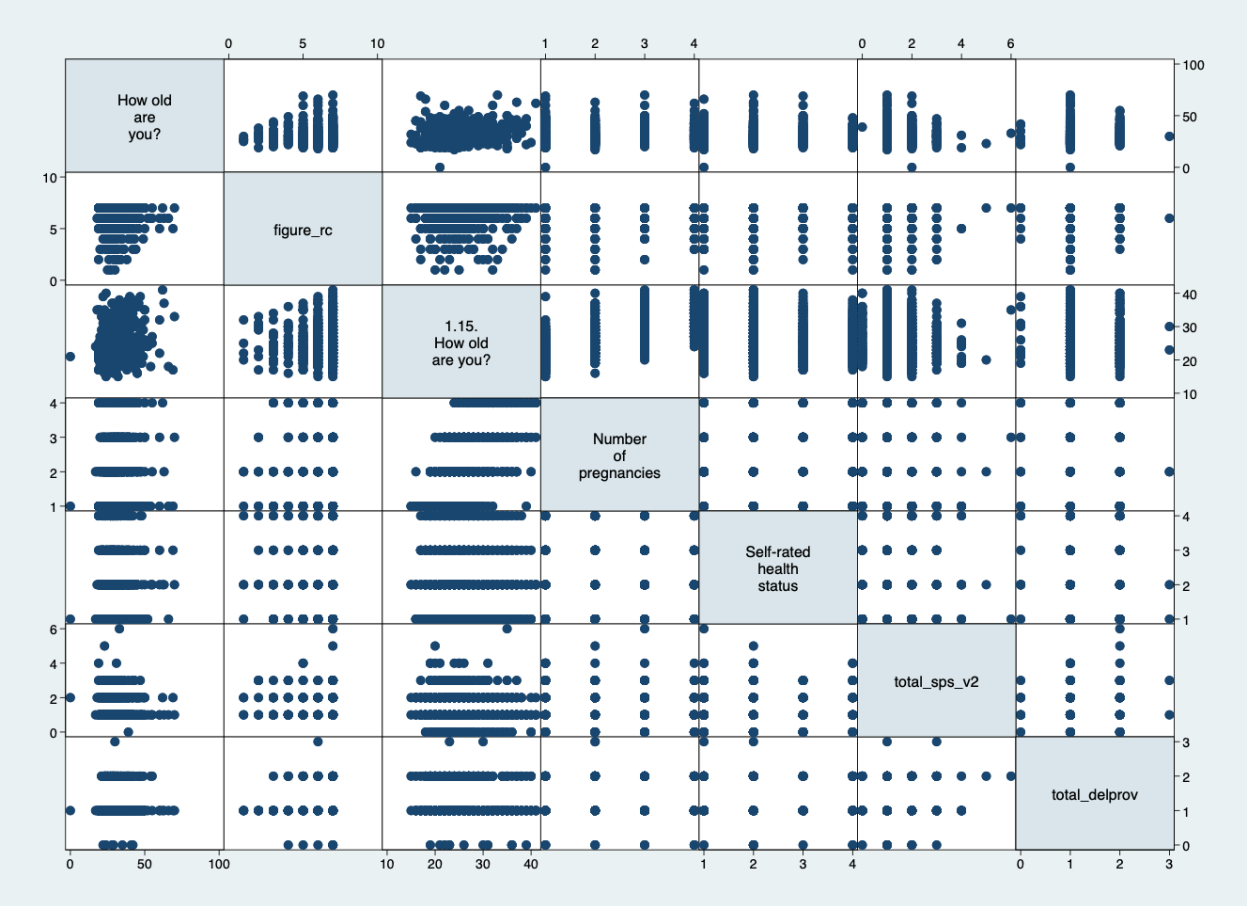
A. Correlation matrix of SP-reported PC-ISP measures

	Provided info about woman	Provided info about newborn	Welcome to ask questions	Help decide	Help speak up
Provided info about woman	1				
Provided info about newborn	0.7715	1			
Welcome to ask questions	0.1024	0.1179	1		
Help decide	0.1521	0.0692	-0.0063	1	
Help speak up	0.1430	0.969	-0.0532	0.2084	1

B. Intraclass correlations for SP-reported PC-ISP measures across facilities

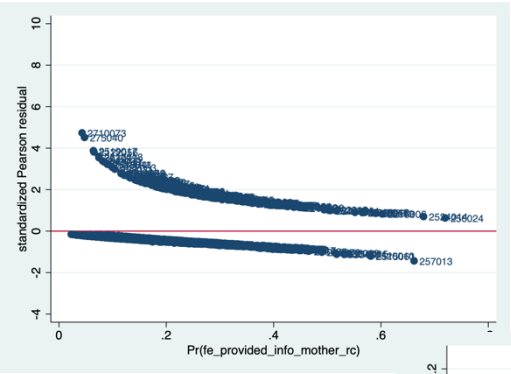
	ICC	SE	95%CI
Provided info about woman	0.418	0.032	(0.009, 0.173)
Provided info about newborn	0.036	0.031	(0.006, 0.181)
Welcome to ask questions	0.067	0.056	(0.012, 0.291)
Help decide	<0.001	<0.001	—
Help speak up	<0.001	<0.001	—

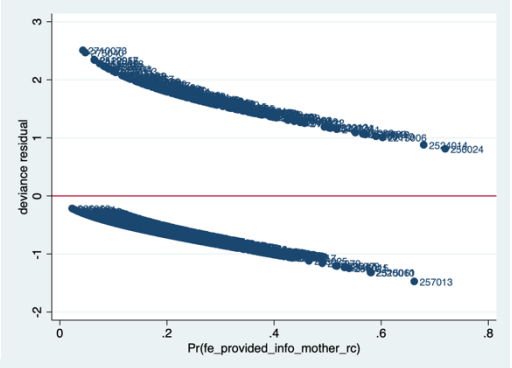
C. Evaluating multicollinearity: Matrix of pairwise scatterplots for continuous variables

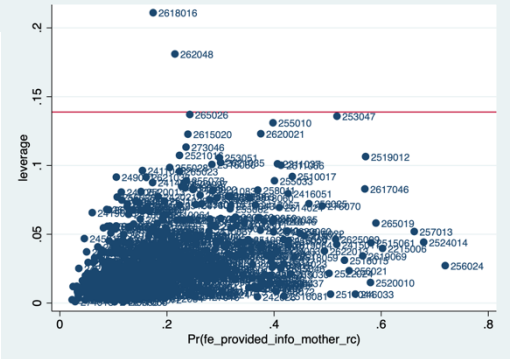


D. Assessing influential observations: Pearson residuals, deviance residuals and leverage

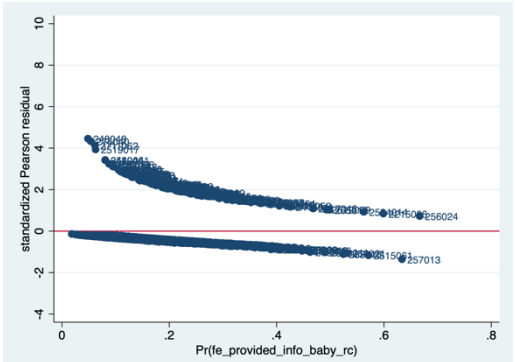
Provided info about woman

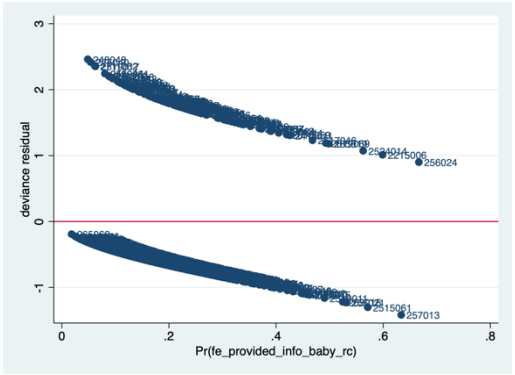


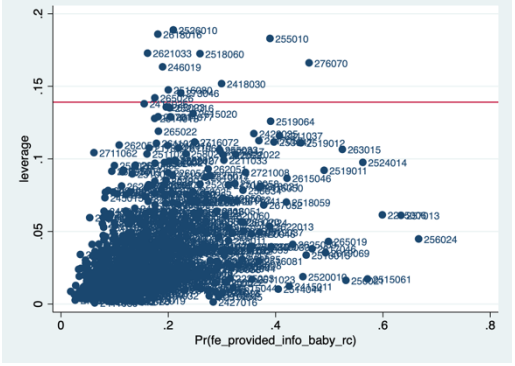




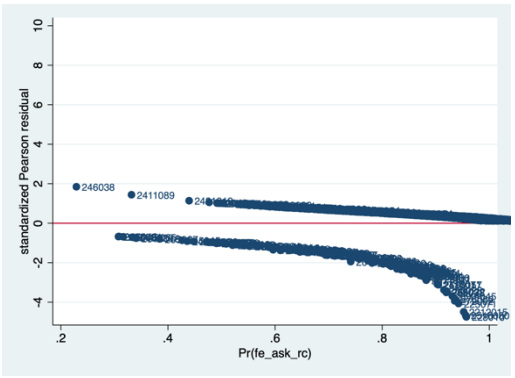
Provided info about newborn

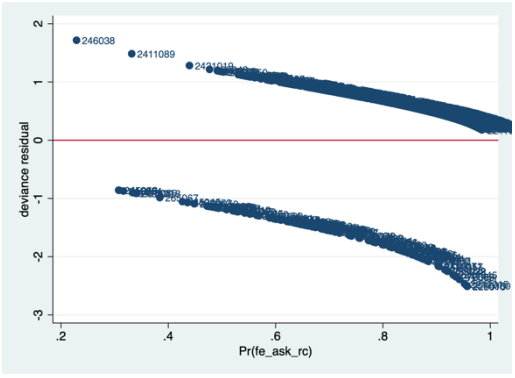


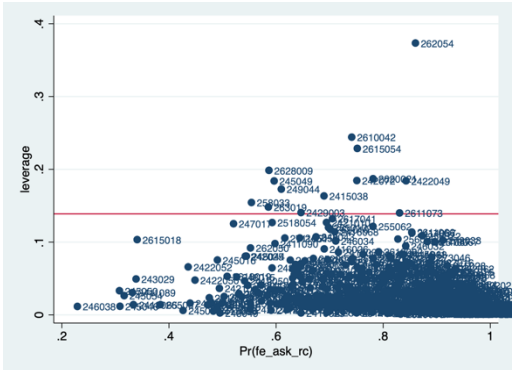




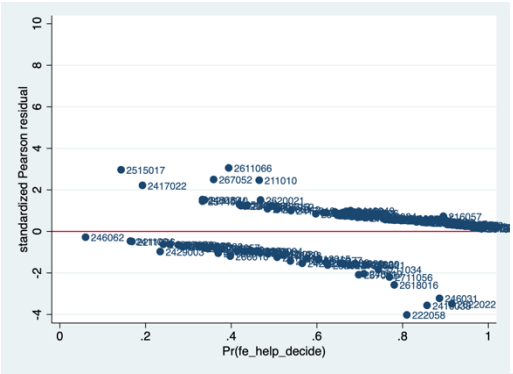
Welcome to ask questions

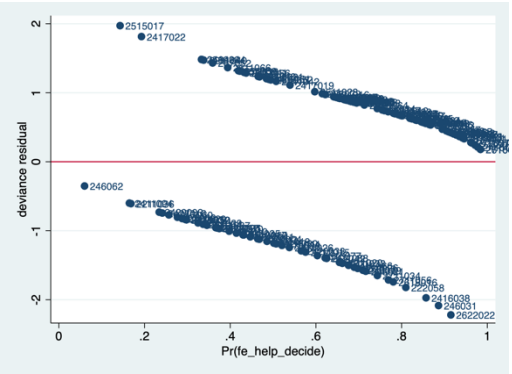


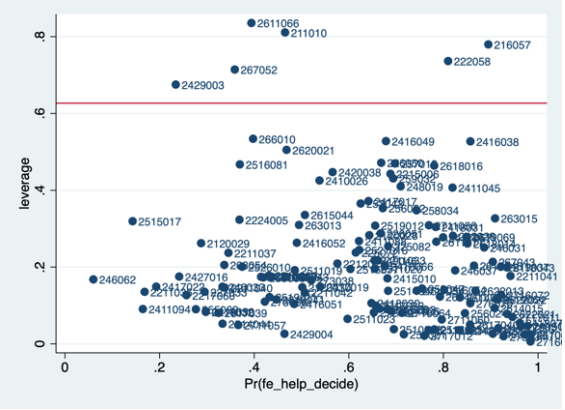




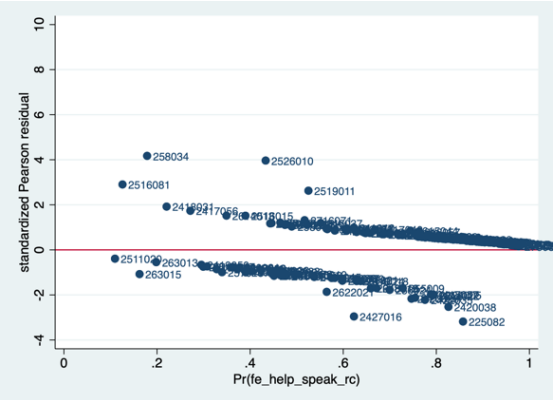
Help decide during health care

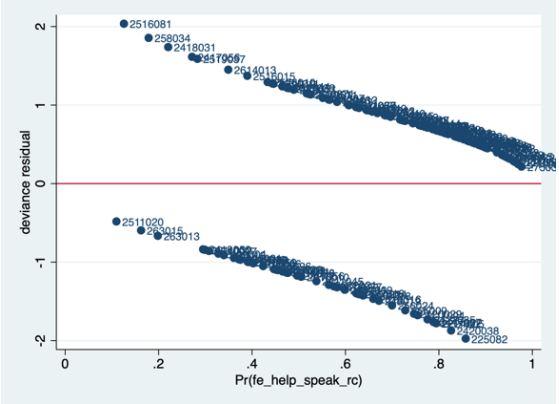


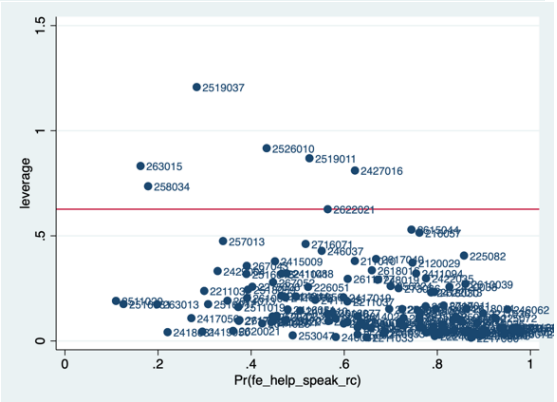




Help speak up during health care







E. Discrepancies between women's and SPs' reports of being present during labor and/or delivery

There were notable discrepancies between woman and SP-reported timing of support, especially for labor and delivery. For example, 89% of SPs who reported being present with the woman during labor and delivery were contradicted by women's reports. Analyses of discordant SP/woman reports revealed that SPs who were employed and reported being more connected to the woman were more likely to report providing labor and delivery support that were contradicted by women (Table 7E below). SP reports of labor/delivery support were not associated with any women's or household factors.

In contrast, women's reports of an SP present with them during labor and/or delivery were associated with different factors: primiparity, having a greater number of SPs, and delivering at a private hospital (vs. government hospital) compared to women without SPs during labor and/or delivery (women's reports not shown).

Table 7E. Bivariate associations between SP-reported timing of support and SPs' and facility factors (sample of SPs surveyed, n=606)

	Present during labor & delivery		
Characteristic	**No**	**Yes**	**p-value**
Total number	472	134	
Support Person's characteristics			
SP Age (mean)	30.8	31.1	0.755
SD	(8.18)	(7.60)	
SP currently married or partnered			
No	16.9%	18.7%	0.645
Yes	83.1%	81.3%	
SP born in Nairobi or Kiambu			
No	80.7%	79.9%	0.822
Yes	19.3%	20.1%	
SP currently employed			
No	24.8%	13.4%	**0.005**
Yes	75.2%	86.6%	
Time SP has known woman			
less than one year	6.4%	1.5%	0.176
1-2 years	19.5%	17.9%	
3-5 years	22.9%	25.4%	
6-10 years	16.1%	14.2%	
11+ years	35.2%	41.0%	
SP connectedness rating	6.18	6.53	**0.003**
SD	(1.27)	(0.88)	
SP Accompanied to ANC			
No	58.9%	50.7%	0.092
Yes	41.1%	49.3%	
Facility factors			
Facility type			
Gov't hospital	72.9%	67.2%	0.17
Gov't HC/Disp	12.9%	11.9%	
Private facility	14.2%	20.9%	
Total number of delivery assistants	1.14	1.22	**0.0496**

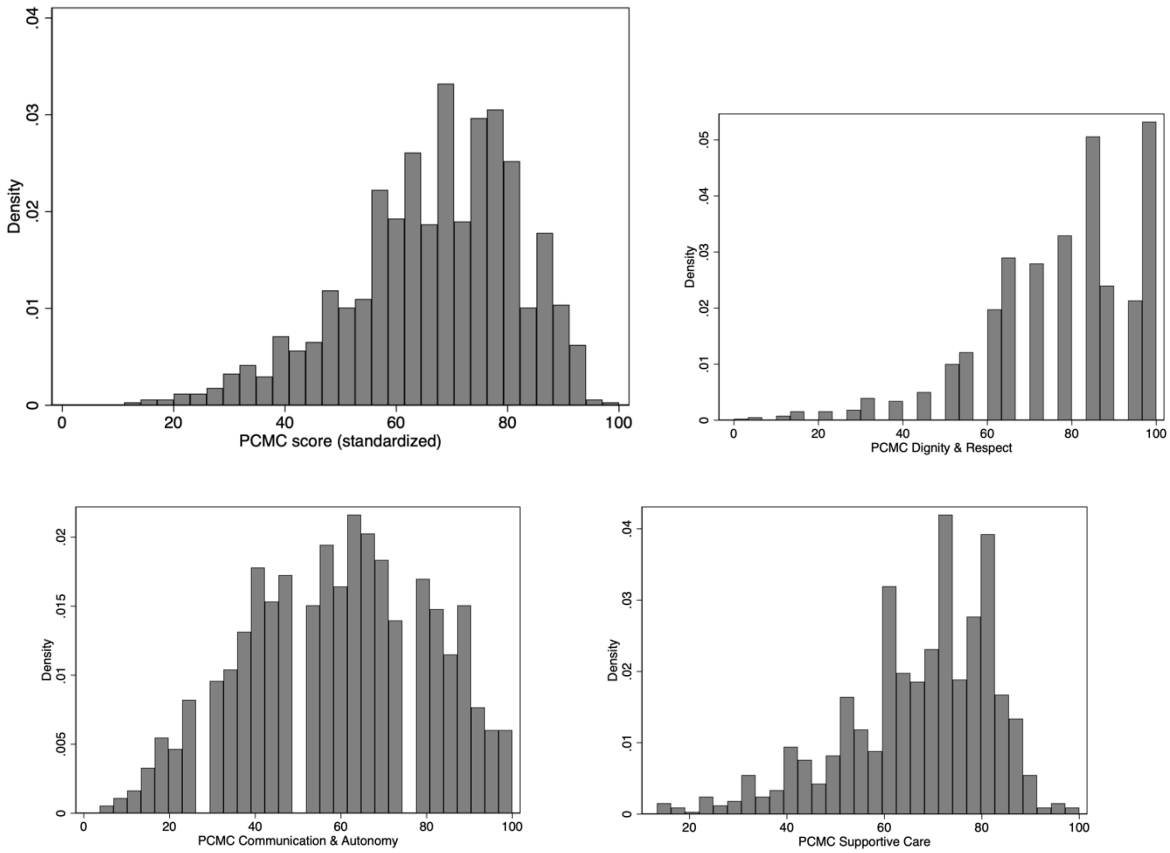
Characteristic	Present during labor & delivery		
	No	**Yes**	**p-value**
SD	(0.39)	(0.41)	
SP's perception of labor, delivery, postnatal wards			
Crowded	47.3%	41.8%	0.264
Not crowded	52.8%	58.2%	

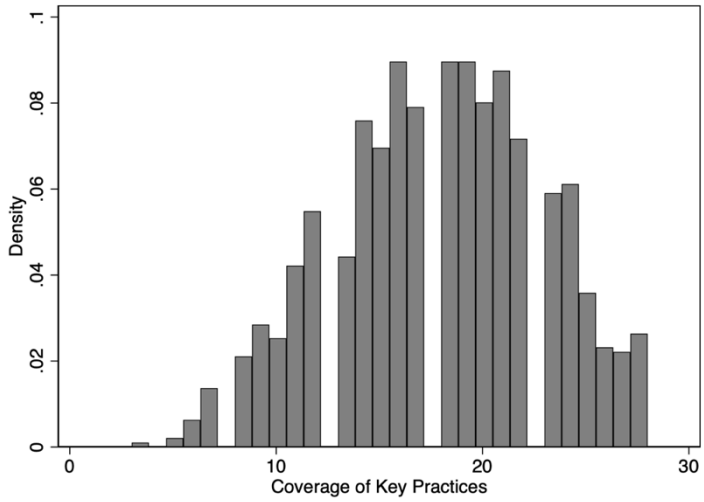
Appendix 7A-E. Chapter 7 appendices
A. Intraclass correlations for outcome measures across facilities

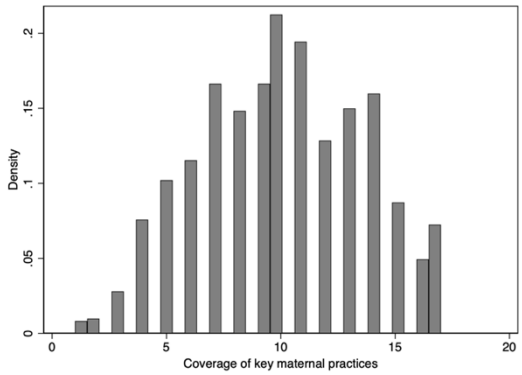
	ICC	SE	95% CI
PCMC	0.078	0.046	(0.024, 0.228)
Coverage of key practices	0.012	0.011	(0.002, 0.068)
Satisfaction	0.058	0.035	(0.017, 0.175)

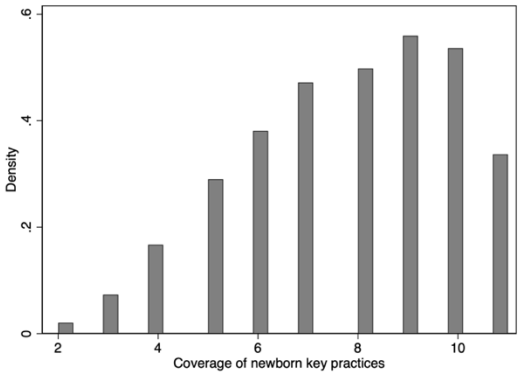
B. Diagnostic plots for women's reported PC-ISP score and PCMC, key practices, and satisfaction with care

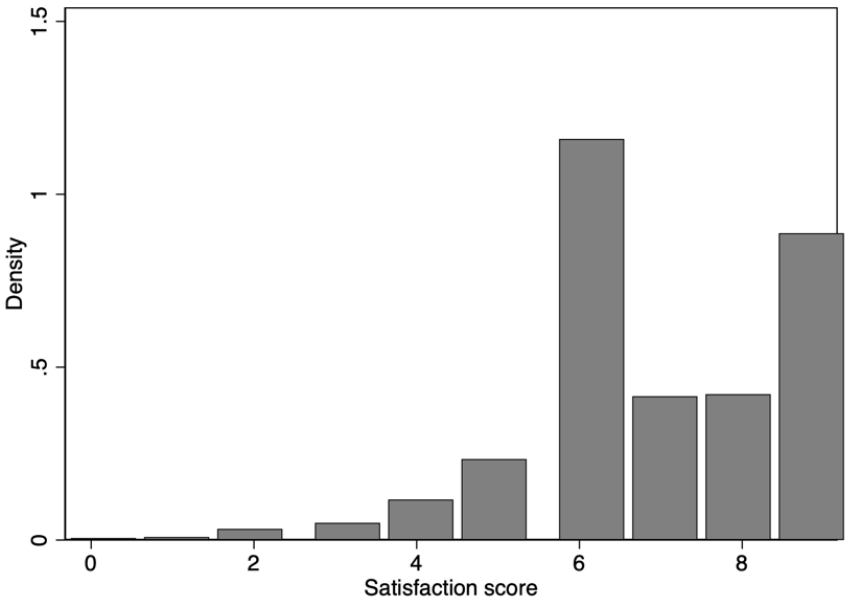
Frequencies of dependent variables: PCMC, coverage of key practices, and satisfaction



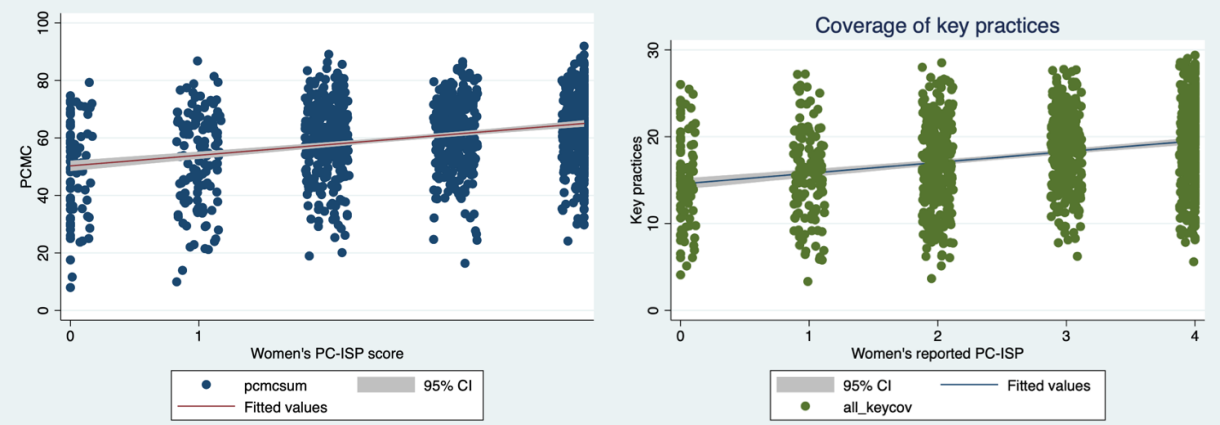




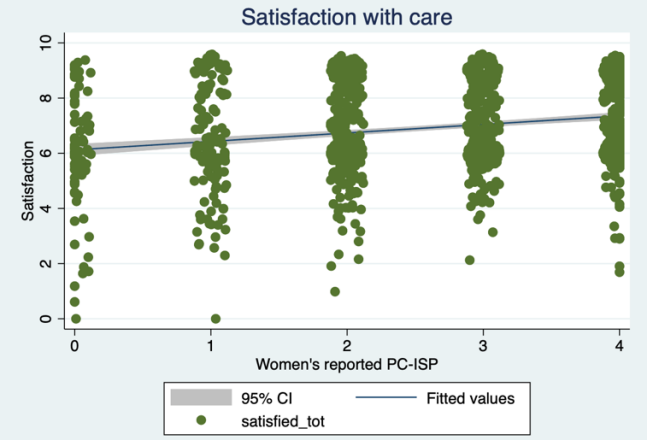




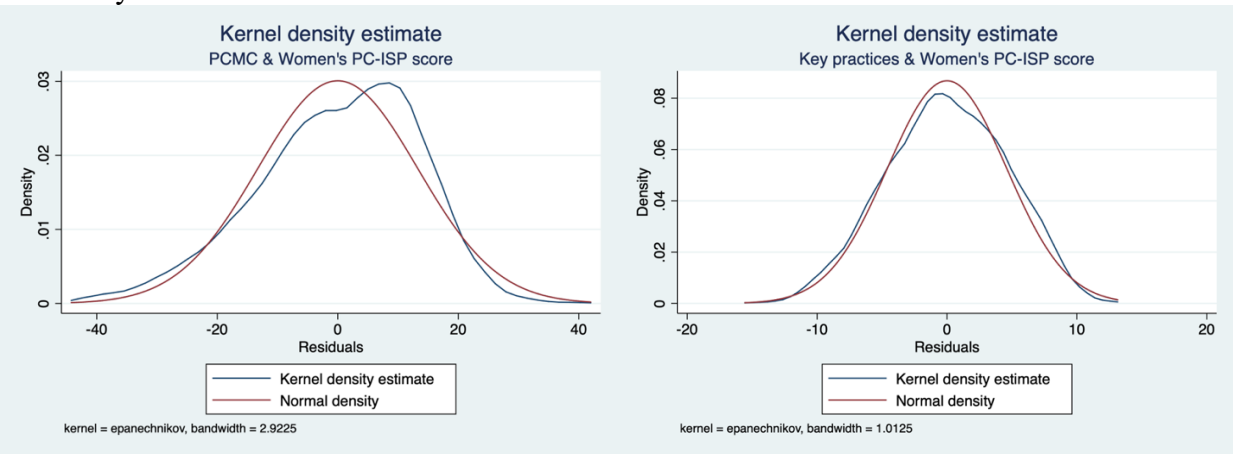
C. **Diagnostic plots for PCMC, Key practices, and Satisfaction with care**
Checking linearity

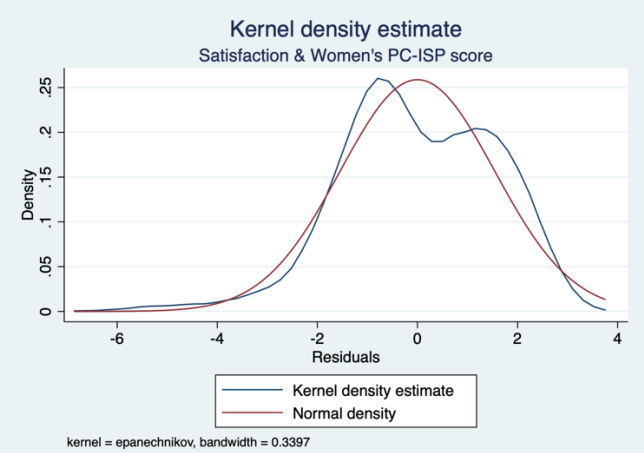

PCMC
Women's PC-ISP score
pcmcsum
95% CI
Fitted values

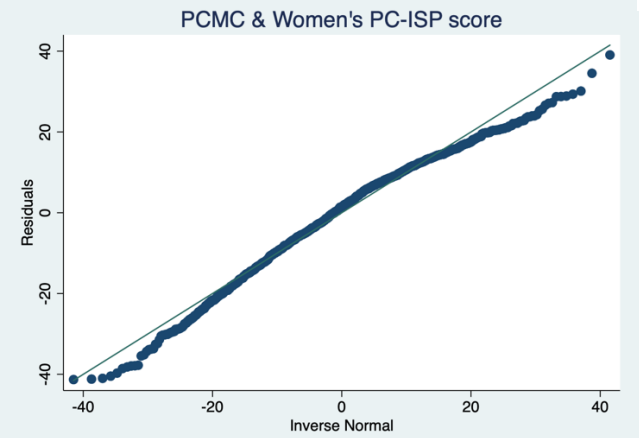
Coverage of key practices
Key practices
Women's reported PC-ISP
95% CI
Fitted values
all_keycov

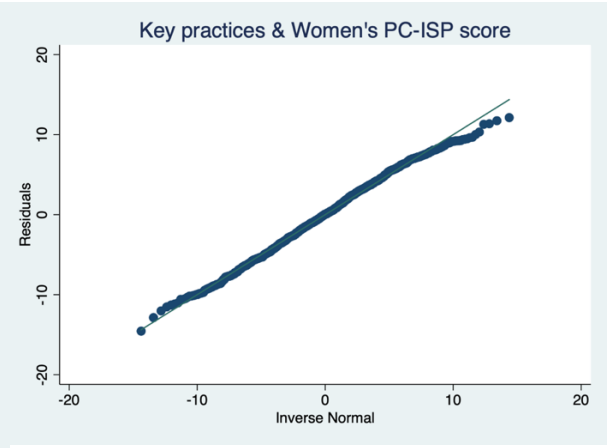

Satisfaction with care
Satisfaction
Women's reported PC-ISP
95% CI
Fitted values
satisfied_tot

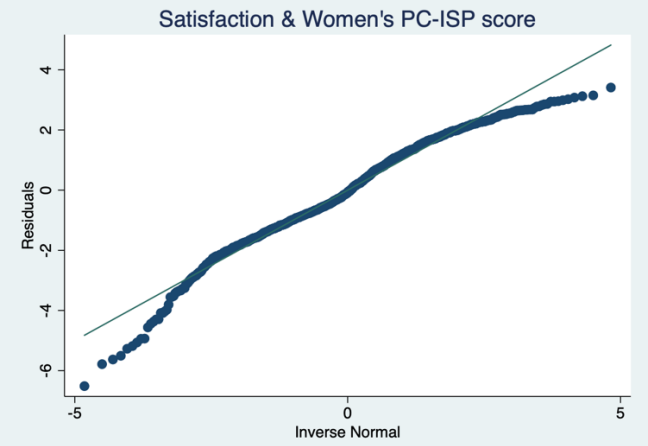
Normality


Kernel density estimate
PCMC & Women's PC-ISP score
Density
Residuals
Kernel density estimate
Normal density
kernel = epanechnikov, bandwidth = 2.9225
Kernel density estimate
Key practices & Women's PC-ISP score
Density
Residuals
Kernel density estimate
Normal density
kernel = epanechnikov, bandwidth = 1.0125

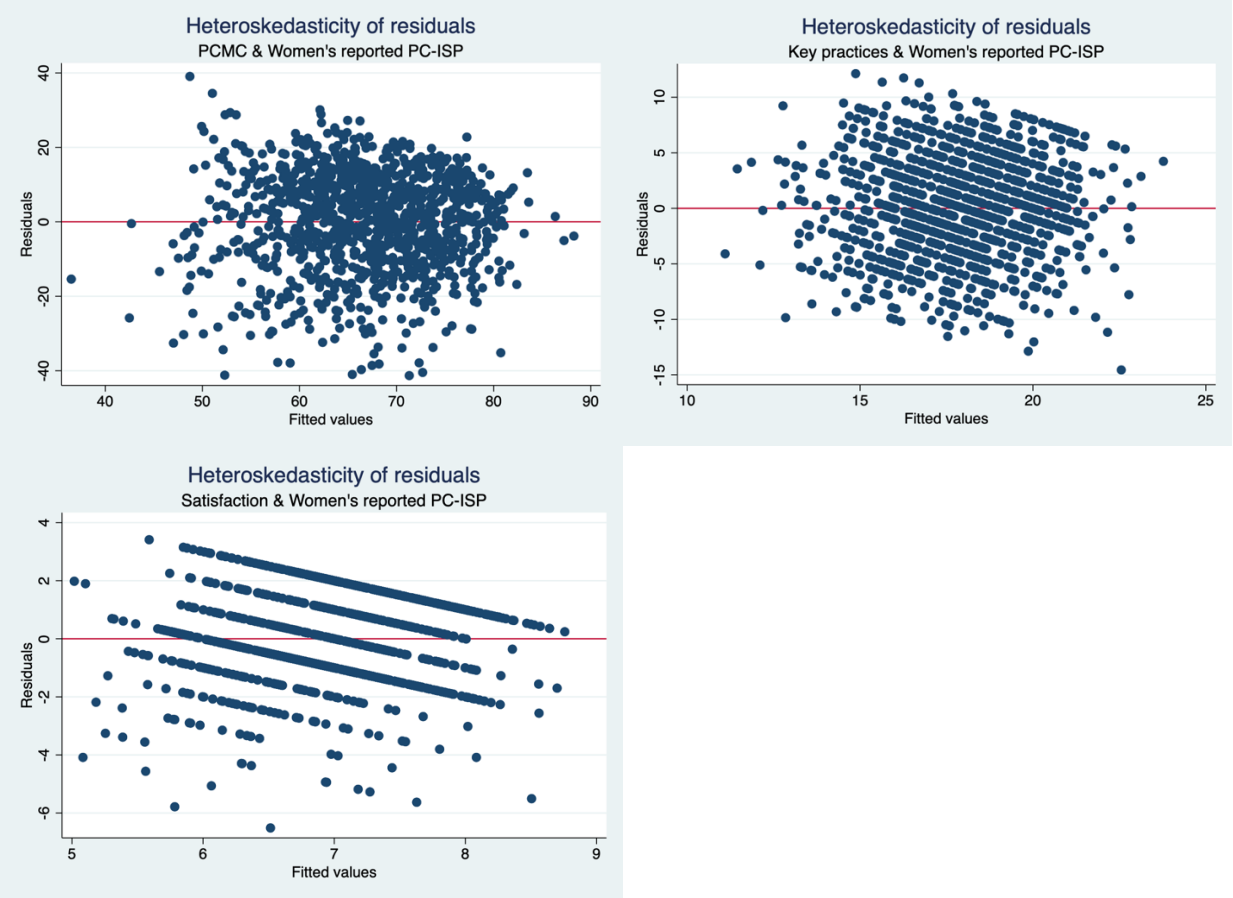




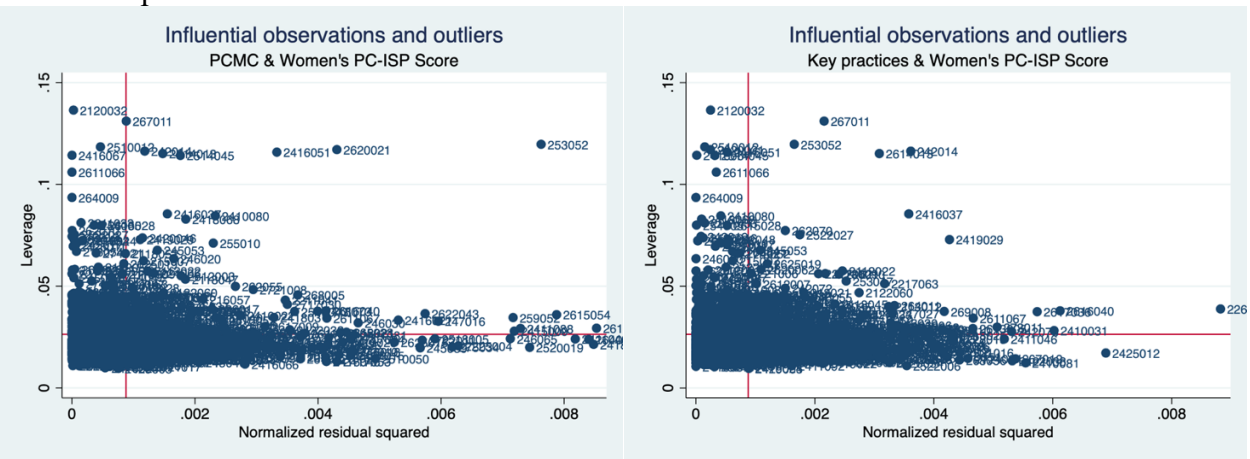


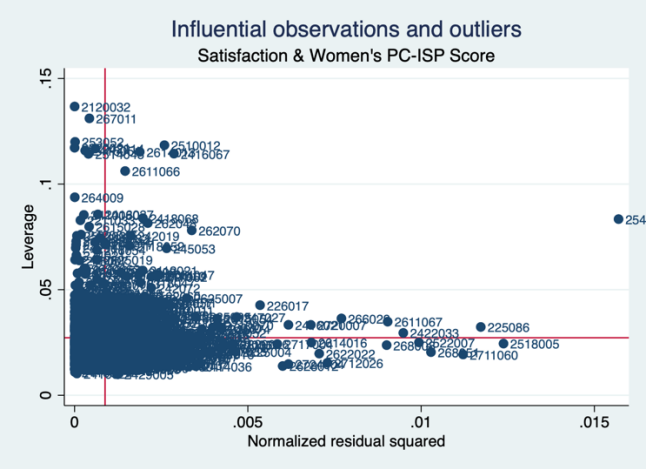


Heteroskedasticity of residuals



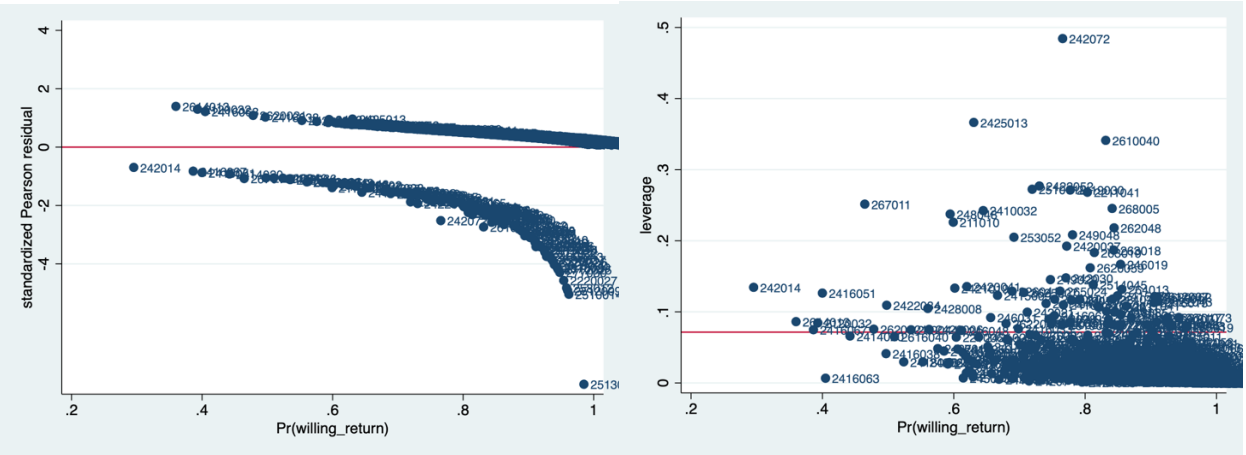
Influential points





D. Diagnostic plots for Willingness to Return

Residuals & Influential observations



E. Interactions between woman-reported PC-ISP and patient:staff ratio (mean-centered)

	Women's PC-ISP score	Patient:Staff ratio	PC-ISP x Patient:Staff ratio Interaction term
QoC Outcome	**Coeff (95% CI)**	**Coeff (95% CI)**	**Coeff (95% CI)**
PCMC	3.81 (2.95, 4.66)***	-1.63 (-3.54, 0.27)	0.31 (-0.09, 0.70)
Key practices	1.20 (1.10, 1.30)***	-0.05 (-0.51, 0.41)	0.01 (-0.05, 0.07)
Satisfaction	0.28 (0.19, 0.37)***	-0.24 (-0.37, -0.10)**	0.03 (-0.01, 0.08)
	aOR (95% CI)	**aOR (95% CI)**	**aOR (95% CI)**
Willingness to return	1.33 (1.12, 1.58)**	0.78 (0.61, 0.99)*	1.01 (0.93, 1.10)

Appendix A. SP types, number of SPs, and timing of support: Sub-Aim 2b

Objective: The objective of this sub-Aim (2a) was to explore the bivariate associations between women's, SPs', dyadic, household, and facility-level factors and three support variables: types of SPs, number of SPs, and timing of SPs' support. Little research has investigated what factors shape women's support structures in maternity care. I hypothesized that A) the type of SPs (reported by women and SPs), B) number of SPs (reported by women) and C) and the timing of support (reported by women and SPs) differ by women's, SPs', dyadic, household, and facility factors.

Methods

Data

I used survey data from 1,138 postpartum women and 606 SPs sampled from 6 facilities in Nairobi and Kiambu counties. The setting, data, and measures are detailed in Chapter 5.

Analysis

I explored factors associated with the A) types of SPs, B) number of SPs, and C) timing of support. I analyzed bivariate associations between each of these three dependent variables and factors at different levels of the socioecological model. For dependent variables that were reported by both SPs and women (i.e., SP type, timing of support), I conducted separate analyses for both SP and woman-reported variables.

Because women could report multiple SP types (mean 1.5), for analyses of women-reported SP types, I compared women who reported having a given SP type with those did not report that type (i.e., women who reported a male partner SP vs. women without a male partner

SP). Because only one SP was interviewed per woman and thus mutually exclusive, for SP-reported SP type, I compared SP types against other types (i.e., male partner vs. mother/mother-in-law vs. other family members vs. friend/neighbor/other). I analyzed women's and SPs' reports of three different timings of support (accompanying to the facility, present during labor/delivery, visited postpartum). However, given that SPs were recruited from postpartum wards, nearly all SPs surveyed reported visiting women postpartum. I therefore did not analyze SPs' reports of postpartum support due to lack of variation in the data.

I used chi-square tests, t-tests and ANOVA to test for statistically significant differences by the factors investigated (two-sided $\alpha = 0.05$). I visually inspected scatter plots of continuous-by-continuous variables (e.g., number of SPs and age) and used Spearman's rank correlation coefficient to assess statistical dependence. I also conducted sensitivity analyses to check the robustness of results by SP types and facilities. I examined SP types as their original 8-category classification and alternative variables collapsing SP types into different categories. These analyses produced similar results.

Results

A. Support Person types

Factors associated with Support Person types: Women's reports

Factors associated with various SP types reported by women are presented in Table A1. Women who reported having male partner SPs tended to be older, higher parity, born outside Nairobi or Kiambu counties and covered by health insurance. Women with male partner SPs were also more likely to be accompanied to the facility, from smaller households, but less

empowered than those who did not report male partner SPs. In contrast, women with mother/mother-in-law SPs tended to be younger, lower parity, had a smaller proportion who were married or partnered, had higher educational attainment, and were more likely to be born in Nairobi and Kiambu counties compared to women without a mother/mother-in-law SP.

Women with mother/mother-in-law SPs were more likely to have someone present with them during labor and delivery, live in larger households, be empowered in household decisions, and deliver at government hospitals (rather than government health centres/dispensaries) compared to women without mother/mother-in-law SPs.

Factors associated with other family members were similar, but weaker compared to factors associated with mothers/mothers-in-law: Women tended to be younger, of lower parity, less likely to be married or partnered, less likely to be employed, and more empowered than women without other family member SPs.

Women with SPs who were friends/neighbors/others were more likely to be multiparous, born outside of Nairobi or Kiambu counties than women without friend/neighbor/other SPs. Having friend/neighbor/other SPs was also more common at government health centres/dispensaries than government hospitals.

Women's health factors, including self-rated health, pregnancy complications, or delivery complications were not associated with any SP types.

Table A1. Bivariate associations between SP types and SPs', women's, household, and facility factors of the sample of women surveyed (n=1,138)

		Male partner Vs. no male partner			Mother/ Mother-in-law vs. not			Other Family Members Vs. not			Friend/Neighbor/ Other vs. not		
Characteristic	**Total**	**No**	**Yes**	**p-valu**	**No**	**Yes**	**p-valu**	**No**	**Yes**	**p-valu**	**No**	**Yes**	**p-value**
	1138	455	683		1009	129		897	241		743	395	
Women's factors													
Age (mean)	25.4	25.0	25.7	**0.018**	25.8	22.3	**<0.001**	25.7	24.9	**0.011**	25.2	25.7	0.109

		Male partner Vs. no male partner			Mother/ Mother-in-law vs. not			Other Family Members Vs. not			Friend/Neighbor/ Other vs. not		
Characteristic	**Total**	**No**	**Yes**	**p-valu**	**No**	**Yes**	**p-valu**	**No**	**Yes**	**p-valu**	**No**	**Yes**	**p-value**
SD	(4.97)	(5.23)	(4.78)		(4.92)	(4.27)		(4.84)	(5.15)		(5.12)	(4.66)	
Parity (mean)	2.0	1.9	2.1	**0.001**	2.1	1.4	**<0.001**	2.0	1.9	**0.006**	2.0	2.0	0.243
SD	(0.96)	(0.94)	(0.97)		(0.97)	(0.68)		(0.97)	(0.95)		(0.98)	(0.94)	
Multiparous													
No	435	44.2%	34.3%	**0.001**	33.7%	73.6%	**<0.001**	35.0%	43.6%	**0.004**	40.6%	33.7%	**0.021**
Yes	703	55.8%	65.7%		66.3%	26.4%		65.0%	56.4%		59.4%	66.3%	
Currently married or partnered													
No	193	42.4%	.0%	**<0.001**	13.3%	45.7%	**<0.001**	9.7%	29.2%	**<0.001**	17.8%	15.4%	0.32
Yes	945	57.6%	100.0%		86.7%	54.3%		90.3%	70.8%		82.2%	84.6%	
Educational attainment													
Primary or less	504	45.9%	43.2%	0.612	46.0%	31.0%	**<0.001**	45.4%	42.5%	0.466	42.7%	47.3%	0.313
Vocational/ Secondary	454	38.2%	41.0%		39.5%	42.6%		38.5%	42.2%		40.9%	38.0%	
College/ University	180	15.8%	15.8%		14.5%	26.4%		16.1%	15.3%		16.4%	14.7%	
Currently employed													
No	687	59.1%	61.2%	0.482	59.4%	68.2%	0.053	57.6%	65.1%	**0.012**	61.2%	58.7%	0.411
Yes	451	40.9%	38.8%		40.6%	31.8%		42.4%	34.9%		38.8%	41.3%	
Born in Nairobi or Kiambu Counties													
No	899	76.0%	81.0%	**0.046**	83.6%	42.6%	**<0.001**	80.5%	76.4%	0.099	76.9%	83.0%	**0.015**
Yes	239	24.0%	19.0%		16.4%	57.4%		19.5%	23.6%		23.1%	17.0%	
Covered under health scheme or health													
No	169	17.8%	12.9%	**0.022**	15.0%	14.0%	0.761	15.4%	13.9%	0.494	15.7%	13.2%	0.244
Yes	969	82.2%	87.1%		85.0%	86.0%		84.6%	86.1%		84.3%	86.8%	
Self-rated health status													
Excellent or	398	32.3%	36.7%	0.292	34.9%	35.7%	0.973	35.6%	34.0%	0.95	36.9%	31.4%	0.076
Good	456	42.0%	38.8%		39.9%	41.1%		39.6%	40.8%		38.4%	43.3%	
Fair	181	15.4%	16.3%		16.1%	14.7%		15.7%	16.3%		16.7%	14.4%	
Poor or very	103	10.3%	8.2%		9.1%	8.5%		9.1%	9.0%		8.1%	10.9%	
Pregnancy complications													
No	815	71.9%	71.4%	0.878	71.1%	76.0%	0.244	71.1%	72.4%	0.649	72.4%	70.1%	0.416
Yes	323	28.1%	28.6%		28.9%	24.0%		28.9%	27.6%		27.6%	29.9%	
Delivery complications													
No	1063	93.8%	93.1%	0.628	93.6%	92.2%	0.572	93.7%	92.9%	0.611	94.1%	92.2%	0.213
Yes	75	6.2%	6.9%		6.4%	7.8%		6.3%	7.1%		5.9%	7.8%	
SP factors													
Total number of SPs	1.5	1.2	1.6	**<0.001**	1.4	2.0	**<0.001**	1.3	1.8	**<0.001**	1.3	1.7	**<0.001**
SD	(0.66)	(0.48)	(0.72)		(0.58)	(0.94)		(0.46)	(0.79)		(0.56)	(0.74)	
Timing of support provided													
Accompanied to	1076	92.7%	95.8%	**0.029**	94.2%	97.7%	0.097	95.1%	93.6%	0.292	93.7%	96.2%	0.074
Present L&D (vs.	84	7.7%	7.2%	0.743	6.5%	14.0%	**0.002**	7.0%	8.0%	0.526	6.7%	8.6%	0.249
Postpartum	497	39.1%	46.7%	**0.012**	42.4%	53.5%	**0.017**	37.0%	55.0%	**<0.001**	40.9%	48.9%	**0.01**
Household factors													
Household size	4.2	4.5	4.0	**<0.001**	4.2	4.7	**<0.001**	4.1	4.3	**0.021**	4.3	4.1	0.078
SD	(1.42)	(1.77)	(1.09)		(1.34)	(1.92)		(1.29)	(1.62)		(1.49)	(1.27)	
Empowerment in household decisions													

		Male partner Vs. no male partner			Mother/ Mother-in-law vs. not			Other Family Members Vs. not			Friend/Neighbor/ Other vs. not		
Characteristic	**Total**	**No**	**Yes**	**p-valu**	**No**	**Yes**	**p-valu**	**No**	**Yes**	**p-valu**	**No**	**Yes**	**p-value**
Not empowered	518	33.8%	53.3%	**<0.001**	48.4%	23.3%	**<0.001**	49.2%	39.4%	**0.001**	44.1%	48.1%	0.202
Empowered	620	66.2%	46.7%		51.6%	76.7%		50.8%	60.6%		55.9%	51.9%	
Facility factors													
Facility type													
Gov't hospital	834	72.7%	73.6%	0.835	72.2%	81.4%	**0.004**	71.7%	75.9%	0.144	76.3%	67.6%	**<0.001**
Gov't HC/Disp	137	12.7%	11.6%		13.2%	3.1%		12.0%	12.0%		9.2%	17.5%	
Private facility	167	14.5%	14.8%		14.6%	15.5%		16.2%	12.0%		14.5%	14.9%	
Total number of del. Assistants	1.2	1.1	1.2	0.333	1.1	1.2	0.230	1.2	1.1	0.228	1.1	1.2	0.059
SD	(0.39)	(0.37)	(0.4		(0.38)	(0.43)		(0.39)	(0.38)		(0.38)	(0.40)	

Factors associated with Support Person types: Support Persons' reports

Support person factors

With the additional details about the SPs from the SPs' surveys, results indicate that types of SPs differed across all SP characteristics investigated (Table A2). More friends/neighbors/others (89.3%) were married or partnered than mothers/mothers-in-law or other family members (64.2%). Mothers/mothers-in-law (28.3%) or other family members (24.9%) had greater proportions of being born in Nairobi and Kiambu counties than male partners (15.8%) or friends/neighbors/others (15.7%).

Dyadic factors

SPs tended to be older than women regardless of type (mean 5.8 years, SD=8.44). The time that the SP knew the birthing woman varied widely for male partners, and most friends/neighbors/others with 79.3% reporting knowing the birthing woman for only 5 years or less. Over half of male partners (55.2%), roughly a third of other family members (36.4%) and friend/neighbors/others (32.2%), and over a quarter of mothers/mothers-in-law (28.3%) previously accompanied the woman to antenatal care appointments ($p<0.001$). The highest

proportions of male partners (86.5%) and mothers/mothers-in-law (83.0%) reported accompanying the woman to the facility, although similar proportions of mothers/mothers-in-law (24.5%), other family members (23.7%), and male partners (22.8%) reported staying with the woman during labor and/or delivery.

Women's factors

Younger women (22.2 yrs, SD=4.68) of low parity (1.4, SD= 0.74) tended to include mothers/mothers-in-law while the oldest (25.5 yrs, SD=5.08) with highest parity (2.2, SD=1.00) tended to include friends/neighbors/others. Non-married/non-partnered women (62.3% not partnered) and those with higher educational attainment also tended to have more mothers/mother-in-law SPs.

Women born in Nairobi or Kiambu counties also had more mothers/mothers-in-law, potentially because women who migrated may not have parents nearby. SP types did not differ by health insurance coverage, women's self-rated health, or pregnancy or delivery complications.

SP types were not associated with women's total number of SPs or household size. SP types, however, did vary significantly by women's empowerment. Women who were empowered in household decisions also had large proportions of mothers/mothers-in-law SPs compared to male partners (44.0%).

SP types also differed in facility types (p=0.031); for example, a high proportion of mothers/mothers-in-law were at government hospitals compared to other SP types, while greater proportions of friends/neighbors/others were at government health centres/dispensaries and private facilities compared to other SP types.

Table A2. Bivariate associations between SP types and SPs', women's, household, and facility factors of the sample of SPs surveyed (n=606)

		SP type				
Characteristic	**Total**	**Male partner**	**Mother/ Mother-in-law**	**Other family member**	**Friend/ Neighbor/ Other**	**p-value**
Total number in group	606	259	53	173	121	
Support Person's factors						
SP Age (mean)	30.9	30.5	43.8	28.6	29.3	**<0.001**
SD	(8.05)	(5.92)	(9.23)	(7.52)	(6.99)	
SP currently married or partnered						
No	105	0.0%	30.2%	37.6%	19.8%	**<0.001**
Yes	501	100.%	69.8%	62.4%	80.2%	
SP born in Nairobi or Kiambu Counties						
No	488	84.2%	71.7%	75.1%	84.3%	**0.028**
Yes	118	15.8%	28.3%	24.9%	15.7%	
SP currently employed						
No	135	3.1%	26.4%	39.9%	36.4%	**<0.001**
Yes	471	96.9%	73.6%	60.1%	63.6%	
Time SP has known birthing woman						
less than one year	32	1.5%	0.0%	1.7%	20.7%	**<0.001**
1-2 years	116	22.4%	7.5%	8.7%	32.2%	
3-5 years	142	35.5%	5.7%	8.7%	26.4%	
6-10 years	95	25.5%	3.8%	7.5%	11.6%	
11+ years	221	15.1%	83.0%	73.4%	9.1%	
SP connectedness rating mean	6.3	6.4	6.6	6.2	5.9	**<0.001**
SD	(1.20)	(1.07)	(0.89)	(1.13)	(1.54)	
Accompanied woman to any antenatal care appointments						
No	346	44.8%	71.7%	63.6%	67.8%	**<0.001**
Yes	260	55.2%	28.3%	36.4%	32.2%	
Timing of support provided						
Did not accompany to facility	120	13.5%	17.0%	22.0%	31.4%	**0.001**
Accompanied to facility	486	86.5%	83.0%	78.0%	68.6%	
Not present during Labor and/or Delivery	472	77.2%	75.5%	76.3%	82.6%	
Present during Labor and/or Delivery	134	22.8%	24.5%	23.7%	17.4%	
Women's factors						
Woman's Age (mean)	25.1	25.3	22.2	24.7	25.5	**<0.001**
SD	(5.02)	(4.77)	(4.68)	(5.07)	(5.08)	
Woman's Parity (mean)	2.0	2.1	1.4	1.9	2.2	**<0.001**
SD	(0.98)	(0.97)	(0.74)	(0.97)	(1.00)	
Multiparous						
No	235	32.8%	73.6%	45.1%	27.3%	**<0.001**
Yes	371	67.2%	26.4%	54.9%	72.7%	
Woman currently married or partnered						
No	108	.0%	62.3%	35.8%	10.7%	**<0.001**
Yes	498	100.0%	37.7%	64.2%	89.3%	
Woman's educational attainment						
Primary or less	278	42.5%	37.7%	47.4%	54.5%	**0.024**
Vocational/Secondary	242	44.4%	37.7%	41.6%	28.9%	
College/University	86	13.1%	24.5%	11.0%	16.5%	
Woman currently employed						

Characteristic	Total	SP type				
		Male partner	Mother/ Mother-in-law	Other family member	Friend/ Neighbor/ Other	p-value
No	382	62.9%	64.2%	66.5%	57.9%	0.512
Yes	224	37.1%	35.8%	33.5%	42.1%	
Woman born in Nairobi or Kiambu Counties						
No	480	81.5%	49.1%	78.0%	89.3%	**<0.001**
Yes	126	18.5%	50.9%	22.0%	10.7%	
Woman covered under health scheme or health						
No	81	13.1%	15.1%	16.8%	8.3%	0.204
Yes	525	86.9%	84.9%	83.2%	91.7%	
Woman's self-rated health status						
Excellent or very good	203	35.9%	32.1%	31.2%	32.2%	0.962
Good	244	38.6%	39.6%	42.8%	40.5%	
Fair	97	16.2%	15.1%	14.5%	18.2%	
Poor or very poor	62	9.3%	13.2%	11.6%	9.1%	
Pregnancy complications						
No	437	72.6%	71.7%	74.6%	67.8%	0.64
Yes	169	27.4%	28.3%	25.4%	32.2%	
Delivery complications						
No	561	92.7%	90.6%	90.8%	95.9%	0.383
Yes	45	7.3%	9.4%	9.2%	4.1%	
SP factors						
Total number of SPs mean	1.5	1.51	1.43	1.53	1.43	0.572
SD	(0.67)	(0.69)	(0.57)	(0.72)	(0.57)	
Household factors 2						
Household size mean	4.2	4.02	5.26	4.24	4.2	0.110
SD	(1.41)	(1.04)	(2.10)	(1.54)	(1.35)	
Empowerment in household decisions						
Not empowered in all HH	286	56.0%	18.9%	41.0%	49.6%	**<0.001**
Empowered in all household	320	44.0%	81.1%	59.0%	50.4%	
Facility factors						
Facility type						
Gov't hospital	434	71.0%	86.8%	74.6%	62.0%	**0.031**
Gov't HC/Disp	77	14.3%	3.8%	9.8%	17.4%	
Private facility	95	14.7%	9.4%	15.6%	20.7%	
Total number of delivery assistants	1.2	1.17	1.26	1.13	1.12	0.1099
SD	(0.40)	(0.42)	(0.45)	(0.36)	(0.37)	
SP's perception of labor, delivery, postnatal wards						
Crowded	279	46.7%	50.9%	50.9%	35.5%	0.056
Not crowded	327	53.3%	49.1%	49.1%	64.5%	

B. Number of SPs

Factors associated with the number of Support Persons: women's reports

Table A3 presents factors associated with the total number of SPs reported by women. On average, women reported 1.47 (SD=0.66) SPs, with a maximum value of six SPs. Having a greater number of SPs was negatively correlated with age and parity. Women who were married or partnered, born in Nairobi/Kiambu counties, and covered by insurance tended to have a higher number of SPs. Health status, household factors, and facility factors were not associated with the number of SPs.

Table A3. Bivariate associations between the number of SPs and women's, household, and facility factors of the sample of women surveyed (n=1,138)

Characteristic	Mean or rho	(SD)	p-value
Total number in group			
Women's factors			
Age	r=-0.0892		**0.0026**
Parity	r=-0.0995		**0.001**
Multiparous			
No	1.54	(0.68)	**0.007**
Yes	1.43	(0.65)	
Currently married or partnered			
No	1.34	(0.55)	**0.002**
Yes	1.5	(0.68)	
Educational attainment			
Primary or less	1.42	(0.63)	0.062
Vocational/Secondary	1.51	(0.67)	
College/University	1.52	(0.72)	
Currently employed			
No	1.51	(0.68)	**0.010**
Yes	1.41	(0.62)	
Born in Nairobi or Kiambu Counties			
No	1.43	(0.60)	**<0.001**
Yes	1.62	(0.85)	
Covered under health scheme or health insurance			
No	1.3	(0.51)	**<0.001**
Yes	1.5	(0.68)	
Self-rated health status			
Excellent or very good	1.46	(0.67)	0.897
Good	1.48	(0.67)	
Fair	1.44	(0.59)	
Poor or very poor	1.47	(0.73)	
Pregnancy complications			
No	1.47	(0.66)	0.821
Yes	1.46	(0.66)	
Delivery complications			
No	1.46	(0.66)	0.075

Characteristic	Mean or rho	(SD)	p-value
Yes	1.6	(0.68)	
Household factors			
Household size	r=-0.0618		0.038
Empowerment in household decisions			
Not empowered in all HH decisions	1.48	(0.64)	0.693
Empowered in all household decision	1.46	(0.68)	
Facility factors			
Facility type			
Gov't hospital	1.48	(0.67)	0.580
Gov't HC/Disp	1.48	(0.67)	
Private facility	1.42	(0.63)	
Total number of delivery assistants	R=-0.0379		0.201

C. Timing of support

Factors associated with timing of support: Women's reports

Table A4 presents associations with women's reports of having SPs present with them during specific times. Women who reported being accompanied to the facility tended to be younger, lower parity, and less likely to have pregnancy complications compared to women lacking accompaniment. Women who reported having an SP present with them during labor and/or delivery were more likely to be primiparous and deliver at private hospitals (vs. government hospitals) compared to women without SPs during labor and/or delivery.

Table A4. Bivariate associations between woman-reported timing of support and women's, SPs', household, and facility factors (sample of women surveyed, n=1,138)

	Accompanied to the facility			Present during L&D			Visited postpartum ward		
Characteristic	**No**	**Yes**	**p-value**	**No**	**Yes**	**p-value**	**No**	**Yes**	**p-value**
Total number in group	62	1076		1054	84		641	497	
Women's factors									
Age (mean)	27.24	25.28	**0.002**	25.41	25.05	0.522	25.47	25.27	0.509
SD	(4.66)	(4.97)		(4.95)	(5.30)		(5.08)	(4.83)	
Parity (mean)	2.40	1.95	**<0.001**	1.99	1.74	**0.019**	2.01	1.93	0.207
SD	(1.00)	(0.96)		(0.97)	(0.89)		(0.97)	(0.95)	
Multiparous									
No	16.1%	39.5%	**<0.001**	37.2%	51.2%	**0.011**	37.0%	39.8%	0.324
Yes	83.9%	60.5%		62.8%	48.8%		63.0%	60.2%	
Currently married or partnered									
No	17.7%	16.9%	0.866	16.5%	22.6%	0.151	15.9%	18.3%	0.285

Characteristic	Accompanied to the facility			Present during L&D			Visited postpartum ward		
	No	Yes	p-value	No	Yes	p-value	No	Yes	p-value
Yes	82.3%	83.1%		83.5%	77.4%		84.1%	81.7%	
Educational attainment									
Primary or less	56.5%	43.6%	0.139	44.3%	44.0%	0.669	47.3%	40.4%	0.071
Vocational/Secondary	30.6%	40.4%		40.1%	36.9%		37.8%	42.7%	
College/University	12.9%	16.0%		15.6%	19.0%		15.0%	16.9%	
Currently employed									
No	62.9%	60.2%	0.675	60.5%	58.3%	0.692	59.4%	61.6%	0.466
Yes	37.1%	39.8%		39.5%	41.7%		40.6%	38.4%	
Born in Nairobi or Kiambu									
No	85.5%	78.6%	0.197	79.2%	76.2%	0.512	77.1%	81.5%	0.069
Yes	14.5%	21.4%		20.8%	23.8%		22.9%	18.5%	
Covered under health scheme									
No	16.1%	14.8%	0.771	14.8%	15.5%	0.867	15.1%	14.5%	0.761
Yes	83.9%	85.2%		85.2%	84.5%		84.9%	85.5%	
Self-rated health status									
Excellent or very good	32.3%	35.1%	0.614	35.1%	33.3%	0.948	34.3%	35.8%	0.845
Good	45.2%	39.8%		40.0%	40.5%		39.8%	40.4%	
Fair	11.3%	16.2%		15.9%	15.5%		16.7%	14.9%	
Poor or very poor	11.3%	8.9%		8.9%	10.7%		9.2%	8.9%	
Pregnancy complications									
No	59.7%	72.3%	**0.032**	71.1%	78.6%	0.142	71.3%	72.0%	0.784
Yes	40.3%	27.7%		28.9%	21.4%		28.7%	28.0%	
Delivery complications									
No	96.8%	93.2%	0.272	93.4%	94.0%	0.807	93.9%	92.8%	0.434
Yes	3.2%	6.8%		6.6%	6.0%		6.1%	7.2%	
SP factors									
Total number of SPs mean	1.21	1.48	**0.002**	1.46	1.62	**0.030**	1.29	1.7	**<0.001**
SD	(0.55)	(0.66)		(0.65)	(0.76)		(0.49)	(0.77)	
SPs present during time									
Male partner		55.6%			40.5%			57.9%	
Mother		7.5%			14.3%			8.9%	
Mother-in-law		2.5%			3.6%			3.2%	
Sister		13.8%			9.5%			20.7%	
Father		.9%			.0%			.4%	
Brother		1.2%			.0%			1.2%	
Other Family		16.7%			20.2%			21.5%	
Friend/Neighbor/Other		30.9%			26.2%			28.8%	
Household factors 2									
Household size mean	4.39	4.2	0.309	4.22	4.1	0.449	4.23	4.18	0.599
SD	(1.36)	(1.43)		(1.41)	(1.52)		(1.41)	(1.44)	
Empowerment in household									
Not empowered in all HH	43.5%	45.6%	0.749	45.5%	45.2%	0.957	46.8%	43.9%	0.323
Empowered in all	56.5%	54.4%		54.5%	54.8%		53.2%	56.1%	
Facility factors									
Facility type									
Gov't hospital	77.4%	73.0%	0.13	74.0%	64.3%	**0.046**	75.2%	70.8%	**0.007**
Gov't HC/Disp	16.1%	11.8%		12.0%	11.9%		9.4%	15.5%	
Private facility	6.5%	15.1%		13.9%	23.8%		15.4%	13.7%	

	Accompanied to the facility			Present during L&D			Visited postpartum ward		
Characteristic	**No**	**Yes**	**p-value**	**No**	**Yes**	**p-value**	**No**	**Yes**	**p-value**
Total number of delivery	1.13	1.15	0.6965	1.15	1.18	0.445	1.15	1.14	0.499
SD	(0.34)	(0.39)		(0.38)	(0.42)		(0.39)	(0.38)	

Factors associated with timing of support: Support Persons' reports

Factors associated with SPs' reports of timing of support are presented in Table A5. SPs who were currently employed and rated being more relationally connected to the woman were more likely to report accompanying the woman to the facility and being present during labor and/or delivery. SPs who accompanied women to antenatal care appointments were also more likely to accompany women for childbirth. SPs reports of staying at labor/delivery was associated with a higher number of providers assisting delivery. SP-reported timing of support was not associated with any women's or household factors (results not shown).

There were notable discrepancies between woman and SP-reported timing of support, especially for labor and delivery. For example, 89% of SPs who reported being present with the woman during labor and delivery were contradicted by women's reports. Analyses of discordant SP/woman reports revealed that SPs who were employed and reported being more connected to the woman were more likely to report providing labor and delivery support that were contradicted by women (results not shown).

Table A5. Bivariate associations between SP-reported timing of support and SPs' and facility factors (sample of SPs surveyed, n=606)

	Accompanied to the facility			Present during labor &		
Characteristic	**No**	**Yes**	**p-value**	**No**	**Yes**	**p-value**
Total number	120	486		472	134	
Support Person's characteristics						
SP Age (mean)	30.8	30.9	0.832	30.8	31.1	0.755
SD	(8.93)	(7.82)		(8.18)	(7.60)	
SP currently married or partnered						
No	21.9%	78.1%	0.552	16.9%	18.7%	0.645

	Accompanied to the facility			Present during labor &		
Characteristic	**No**	**Yes**	**p-value**	**No**	**Yes**	**p-value**
Yes	19.4%	80.6%		83.1%	81.3%	
SP born in Nairobi or Kiambu						
No	82.5%	80.0%	0.542	80.7%	79.9%	0.822
Yes	17.5%	20.0%		19.3%	20.1%	
SP currently employed						
No	32.5%	19.8%	**0.003**	24.8%	13.4%	**0.005**
Yes	67.5%	80.2%		75.2%	86.6%	
Time SP has known woman						
less than one year	9.2%	4.3%	0.185	6.4%	1.5%	0.176
1-2 years	20.0%	18.9%		19.5%	17.9%	
3-5 years	20.0%	24.3%		22.9%	25.4%	
6-10 years	12.5%	16.5%		16.1%	14.2%	
11+ years	38.3%	36.0%		35.2%	41.0%	
SP connectedness rating	6.03	6.31	**0.021**	6.18	6.53	**0.003**
SD	(1.36)	(1.15)		(1.27)	(0.88)	
Accompanied woman to any antenatal care appointments						
No	72.5%	53.3%	**<0.001**	58.9%	50.7%	0.092
Yes	27.5%	46.7%		41.1%	49.3%	
Facility factors						
Facility type						
Gov't hospital	65.8%	73.0%	0.239	72.9%	67.2%	0.17
Gov't HC/Disp	16.7%	11.7%		12.9%	11.9%	
Private facility	17.5%	15.2%		14.2%	20.9%	
Total number of delivery assistants	1.11	1.17	0.1373	1.14	1.22	**0.0496**
SD	(0.31)	(0.42)		(0.39)	(0.41)	
SP's perception of labor, delivery, postnatal wards						
Crowded	40.8%	47.3%	0.201	47.3%	41.8%	0.264
Not crowded	59.2%	52.7%		52.8%	58.2%	

Discussion

My examination of SP types, number of SPs and timing of support showed that the women's social support structures are primarily shaped by SPs', women's, and household sociodemographic characteristics. In contrast, results also show that women's health factors do not play a role in influencing the SPs and support women have. I also found that facility factors critically determine whether women reported SPs during certain times of maternity care (labor and delivery, postpartum), but did not influence the types of numbers of SPs women have.

Women's factors

Women's characteristics and household factors had the strongest associations with the types and numbers of SPs women reported. Older, higher parity, and non-locally born women were more likely to have male partner SPs while younger, lower parity, and locally born women were more likely to have their mothers/mothers-in-law or other family members as SPs. Women who were locally born were also more likely to have more SPs than women born outside of Nairobi or Kiambu counties, potentially because their families and social networks were local. Women who were less empowered in household decisions were more likely to have male partner SPs while more empowered, more educated women tended to have mother/mother-in-law SPs. This result again raises questions about women's autonomy and whether less empowered women wanted their male partners as SPs (Jennings et al., 2014). Continued efforts are needed to ensure women's involvement in their own care. Women's health factors, including self-rated health, pregnancy complications, or delivery problems did not influence the types or numbers of SPs women reported.

My findings suggest that in this context, selection of SPs appeared to be more fixed and determined by women's individual and social network characteristics rather than the circumstantially determined by women's well-being and health needs. This suggests that social support structures are driven by sociocultural norms that are likely not adjusted to provide specific types of health condition-related supports. These findings support other literature that find that the structure and hierarchies of communities are important factors in women's delivery decisions and care (Moyer et al., 2014) and adds nuance to our understanding of the factors influence selection of SPs.

SPs' factors

SP surveys, which had additional information about SPs' characteristics, provided more information about patterns of support for women. All SP types, on average, were older than women. Older SPs may act as guides through the experience of childbirth (Simmonds et al., 2012). In addition, more friend/neighbor/other SPs were married or partnered compared to family members (80% vs. 62%), suggesting that women may select non-family member SPs specifically for experienced support. Alternatively, it is also possible that older SPs were included as a strategy to garner respect from providers. Some studies have found that women choose SPs so that providers treat them more favorably, such as including male partners to reduce wait times (Ampim et al., 2021). Further research could explore how and why women choose their SPs.

This study also sheds light on the social ties of birthing women. Unexpectedly, most friend/neighbor/other SPs that were surveyed knew the woman for five years or less. In free responses, women identified a broad range of who these "other" SPs were, including employers, church congregants, and house help. Most support literature has focused on women's family networks, assuming that childbirth support would mainly be provided by strong ties (Edmonds et al., 2012; Moyer et al., 2014). This finding provides evidence that many women rely on weaker ties for childbirth. Social support literature has found that individuals often confide in 'non-close' social network members when they are seen as knowledgeable or available (Small, 2013; Small & Sukhu, 2016). It is likely that these characteristics—SPs' knowledge and availability—also determined whether women had SPs with weaker ties.

Facility factors

The investigation of timing of support indicated that facility policies and practices play a critical role in whether women were allowed SPs during labor/delivery and postpartum. In comparison to government hospitals, private facilities were more likely to allow SPs in labor/delivery wards and health centres/dispensaries were more likely to allow SPs in postpartum wards. In addition, although a small fraction of women was allowed SPs during labor and delivery, results show that *who* was allowed differed by SP types and women's characteristics, suggesting patterns in how providers treat SPs. For example, lower parity women were more likely to report having an SP during labor/delivery. Mothers/mothers-in-law SPs were also more likely than other SP types to be allowed during labor/delivery.

Other survey questions sheds light on whether these characteristics aligned with women's preferences: the women's survey specifically asked women who did not report an SP during labor/delivery about whether and who they wanted to stay with them during labor/delivery. Of those women, 36% of primiparous women wanted someone to stay with them during labor/delivery compared to 26% of multiparous women ($p<0.001$), suggesting women with lower parity are more likely to desire labor/delivery support. These measures also reveal that mothers may be given preferential access while male partners may tend to be excluded, despite women's preferences. Similar proportions of women wanted and reported their mothers to be present during labor/delivery (18% vs. 14%, respectively). On the contrary, over half (53%) of women reported that they wanted their male partner while only 41% who had someone during labor/delivery reported their male partner, indicating that male partners continue to face barriers to providing support in the ways women want. Male partners, across contexts, are frequently "side-lined" or excluded by providers in maternity care (Alexander et al., 2014; Bäckström & Hertfelt Wahn, 2011; Kaye et al., 2014; Kululanga et al., 2012). Although, an earlier study in

public facilities in Nairobi and Kiambu counties found that some providers reported giving preferential access to male partners (Sudhinaraset et al., 2019), these findings show that, at a population-level, male partners still tend to be excluded.

Limitations

Because these analyses examined many factors using bivariate associations, it is possible that some of associations are spurious or may be confounded by other factors. Therefore, it must be reiterated that these analyses are used for exploratory purposes to expand our understanding of how factors at different levels influence women's structures of support. Future research may examine these relationships in multivariable regression models.

Conclusions

Women's structures of social support are primarily socioculturally formed. Women's support networks include SPs who vary by type and time known but are likely selected because they are knowledgeable and/or available. However, there is evidence suggesting discriminatory treatment by women's social status and type of SP. Efforts to make practices more equitable are needed, including fair and clear policies, provider trainings, and accountability mechanisms. All women should be able receive the support available to them regardless of their social status, relation to their SPs, or facility resources.

Appendix B. Sensitivity analyses using alternative constructions of the PC-ISP score
Analyses comparing different constructions of the PC-ISP score: a) 4-item summative measure, which is presented throughout the study, b) 5-item summative measure that includes SP felt welcome (these 5 items were less reliable than the 4 items in (a)), c) High vs. low PC-ISP scores, dichotomizing the 5-item score as reporting SP integration on 4 or more items (high) vs. 3 or less items (low). Approximately half (51.2%) of participants reported high integration.

Figure B1. Histogram of 5-item PC-ISP score

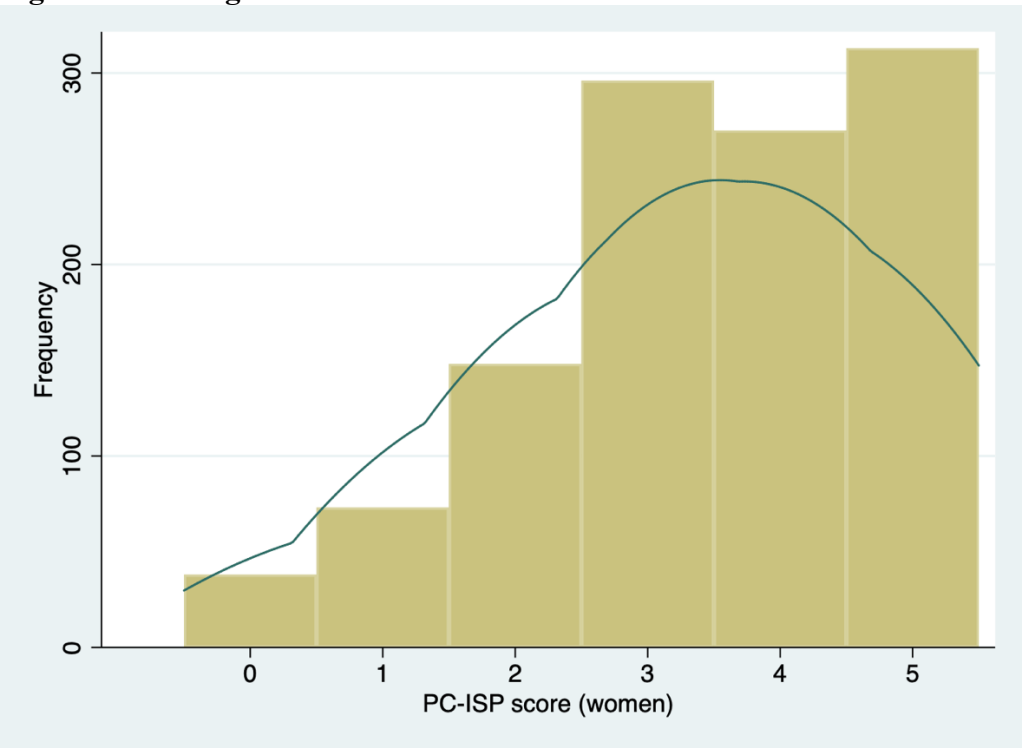


Table B1. Factors associated with high (SP integration on 4+ items) vs. low PC-ISP score, logistic model (n=1,138)

	Combined		
	aOR	**p-value**	**95% CI**
Age	0.99	0.46	(0.97, 1.01)
Parity	1.05	0.28	(0.96, 1.14)
Marital status (Ref. Not married/partnered)			
Married or partnered	0.89	0.64	(0.55, 1.44)
Education (ref. Primary or less)			
Vocational/Secondary	0.95	0.58	(0.78, 1.15)
College/University	0.78	0.21	(0.53, 1.15)
Employed (ref. no)			

	Combined		
	aOR	**p-value**	**95% CI**
Yes	1.03	0.86	(0.73, 1.46)
Birthplace (ref. born elsewhere)			
Born in Nairobi or Kiambu Counties	0.95	0.81	(0.64, 1.42)
Self-rated health	0.89	0.08	(0.78, 1.01)
Covered under health scheme or health insurance (ref. No)			
Yes	1.04	0.69	(0.86, 1.26)
Total SPs	0.89	0.50	(0.64, 1.24)
Male partner SP (Ref. No)			
Yes	1.23	0.07	(0.98, 1.55)
Mother SP (Ref. No)			
Yes	1.26	0.07	(0.98, 1.63)
Mother-in-law SP (Ref. No)			
Yes	1.39	0.36	(0.68, 2.83)
Father SP (Ref. No)			
Yes	1.75	0.55	(0.27, 11.15)
Sister SP (Ref. No)			
Yes	1.11	0.53	(0.79, 1.57)
Brother SP (Ref. No)			
Yes	1.13	0.77	(0.51, 2.49)
Other family members SP (Ref. No)			
Yes	1.17	0.09	(0.97, 1.42)
Timing of support: Accompanied to facility (Ref. No one accompanied)			
Accompanied	0.79	0.31	(0.50, 1.25)
Timing of support: Labor & Delivery (Ref. No one during L&D)			
Labor & Delivery	**1.46***	**0.01**	**(1.10, 1.95)**
Timing of support: Postpartum (Ref. No one postpartum)			
Postpartum	0.95	0.77	(0.69, 1.31)
Household decision-making (Ref. Does not have say in all decisions)			
Empowered in HH decisions	1.12	0.41	(0.85, 1.47)
Facility type (Ref. Gov't hospital)			
Gov't HC/Disp	**1.46****	**0.004**	**(1.13, 1.88)**
Private facility	1.02	0.92	(0.73, 1.41)
Total providers assisting delivery	1.45	0.09	(0.95, 2.21)
Selected facility based on quality	1.08	0.63	(0.80, 1.45)
Referred to facility	1.14	0.53	(0.76, 1.72)
Constant	1.10	0.84	(0.43, 2.85)

Notes: *p<0.05, **p<0.01, ***p<0.001
The Friend/Neighbor/Other SP indicator was omitted from models because of collinearity.

Table B2. Associations between women's reported PC-ISP and PCMC scores

	PCMC total score		Sub-domains		
	N	**Coeff.** (95% CI)	**Dignity & Respect** Coeff. (95% CI)	**Communication & Autonomy** Coeff. (95% CI)	**Supportive Care** Coeff. (95% CI)
Total PC-ISP score (4 items)	1,138	3.64** (2.39, 4.90)	3.15*** (2.15, 4.15)	4.39*** (3.30, 5.48)	3.39** (1.63, 5.16)
Total PC-ISP score (5 items)	1,138	3.31** (2.04, 4.57)	2.91** (1.95, 3.88)	3.81*** (2.67, 4.95)	3.17** (1.51, 4.82)

Hi vs. lo PC-ISP (4+ vs. <4)	1,138	7.22** (3.99, 10.46)	5.10** (2.75, 7.45)	8.93** (5.93, 11.93)	7.95** (2.81, 11.29)_

Notes: *p<0.05, **p<0.01, ***p<0.001
Full models controlled for age, parity, marital status, education, employment status, birth location, health status, insurance coverage, male partner SP, mother SP, mother-in-law SP, father SP, sister SP, brother SP, friend/neighbor/other SP, accompanied to facility, had SP during labor/delivery, had SP postpartum, household empowerment, number of providers assisting delivery, facility type, selected facility because of quality, referred to facility.

Table B3. Associations between women's reported PC-ISP and satisfaction with care

	Satisfaction total score	
	N	Coeff (95% CI)
Total PC-ISP score (4 items)	1,138	0.28** (0.18, 0.39)
Total PC-ISP score (5 items)	1,138	0.26*** (0.18, 0.33)
Hi vs. lo PC-ISP (4+ vs. <4)	1,138	0.52* (0.18, 0.85)

Notes: *p<0.05, **p<0.01, ***p<0.001
Controlled for age, parity, marital status, education, employment status, birth location, health status, insurance coverage, total number of SPs, male partner, mother, mother-in-law, father, sister, brother, other family, friend/neighbor/other, accompanied to facility, had SP during labor/delivery, had SP postpartum, household empowerment, number of providers assisting delivery, facility type, selected facility because of quality, referred to facility, and a fixed effect for each facility.
[1] 19 women responded N/A to these questions

Table B4. Associations between women's PC-ISP scores and willingness to return to the facility

	Willingness to return	
	N	aOR – Full model (95% CI)
Total PC-ISP score (4 items)	965	1.32*** (1.14, 1.52)
Total PC-ISP score (5 items)	965	1.34*** (1.20, 1.51)
Hi vs. lo PC-ISP (4+ vs. <4)	965	1.80*** (1.33, 2.42)

Notes: *p<0.05, **p<0.01, ***p<0.001
Full models adjusted for women's characteristics (age, parity, marital status, education, birth location, employment, health status, insurance coverage), SPs' characteristics (male partner SP, mother SP, mother-in-law SP, father SP, sister SP, brother SP, friend/neighbor/other SP, woman had SP present during labor/delivery, woman had SP visit postpartum), household factors (household empowerment), and facility factors (number of providers assisting delivery, facility type, selected facility because of quality, referred to facility, and a fixed effect for each facility).
[1] 13 women responded N/A to these questions

Table B5. Associations between women's reported PC-ISP and coverage of key clinical practices

	Total key practices	Sub-domains

	N	Coeff (95% CI)	**Maternal key practices** Coeff (95% CI)	**Newborn key practices** Coeff (95% CI)
Total PC-ISP score (4-item)	1,138	1.26*** (1.13, 1.40)	0.84*** (0.67, 1.00)	0.42*** (0.37, 0.48)
Total PC-ISP score (5 items)	1,138	1.14*** (1.01, 1.27)	0.75*** (0.56, 0.93)	0.40*** (0.33, 0.46)
Hi vs. lo PC-ISP (4+ vs. <4)	1,138	2.64*** (2.11, 3.18)	1.82*** (1.24, 2.41)	0.82*** (0.65, 0.98)

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