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Predictors of Depression among Adult Omani Women in Wilayat of Rustaq



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# Predictors of Depression among Adult Omani Women in Wilayat of Rustaq

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in Nursing

by

Shawana Masad Al Harrasi

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ABSTRACT OF THE DISSERTATION

Predictors of Depression among Adult Omani Women at Wilayat of Rustaq

by

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Doctor of Philosophy in Nursing
University of California, Los Angeles, 2017
Professor MarySue V. Heilemann, Co-Chair
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**Background:** Depression is a major public health problem worldwide. It is estimated that 350 million individuals around the world are affected by depression. Depression is known to be more prevalent in women than men. Several social, economic, biological, behavioral, psychosocial, and health-related factors have been identified as predictors of depression in women worldwide. However, whether or not these factors have similar effects on Omani Arab women, and the mechanism of their effects on depression among adult Omani women have not been well examined.

**Aims:** This study focuses on assessing predictors of depression among adult Omani women, including socioeconomic status (SES), material circumstances, bio-behavioral, psychosocial, and health care system factors, as well as age. Moreover, this study examined the utility of the revised Social Determinant of Health (rSDH) conceptual model in assessing the predictors of depression in the targeted population.

**Method:** A cross-sectional study was conducted involving 240 adult women, 18-72 years old from urban and rural areas of Wilayat (province) of Rustaq. An Arabic version of the Beck Depression Inventory (BDI-II) scale was used to assess depression scores. A bivariate analytical model was used to identify correlations between each independent variable and depression in adult Omani women. Path analysis using Partial Least Square Structural Equation Modeling (PLS-SEM) was used to test the effects of factors within the conceptual model (rSDH), the mediator effects of latent variables between SES and depression, and the effect of age as a moderator of the association between SES and depression.

**Results:** Fifty-two of the participants (21.7%) were found to be depressed. Of all participants, 12.5% were mildly depressed, 6.7% were moderately depressed, and 2.5% were severely depressed. Depression scores were significantly correlated with education level, employment, place of residence, number of children, domestic violence, social support, coping strategies, seeking professional help, comfort level regarding talking to a health care professional, perceived stigma, and age. Path analysis results showed that the examined factors explained a variance of 62% on the dependent variable (depression scores). Moreover, path analysis through PLS-SEM indicated that the bio-behavioral latent variable is the significant mediator of the association between SES and depression. Age was not a significant moderator of the association between SES and depression.

**Conclusion:** Depression scores are high among adult Omani women and different factors were linked to higher levels of depression among those women. It will be important to consider socioeconomic, bio-behavioral, psychosocial, and health care system factors, as well as material circumstances, that may all impact the mental and emotional health of Omani women. This study

is a step towards exploring predictors of an important mental disease as well as developing cost-effective prevention, promotion, and management programs to address the mental and emotional needs of adult Omani women.

The dissertation of Shawana Masad Al Harrasi is approved.

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2017

# DEDICATION

This dissertation is dedicated to the soul of my father, who though he left this world before I attained my doctoral degree was so supportive to my sisters and me in encouraging us to pursue a higher education. I also dedicate this dissertation to all the women who participated in this study. Their positive attitudes towards participating were inspirational and helpful in allowing me to complete this dissertation and better understand the challenges faced by these women in relation to mental health.

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Nyamathi, A., Ekstrand, M., Srivastava, N., Carpernter, C.L., Salem B.E., Al-Harrasi, S., Ramakishnan, P., & Sinha, S (2015). ASHA-life intervention perspectives voiced by rural Indian women living with AIDS. Health Care for Women International.

Shouana M. Al-Harrasi (2005). Type II diabetes in Oman. Alpha Nu's News, 23 (2).

## Chapter 1: Introduction

Depression, clinically known as major depression, is a major contributor to global health disability as reported by the World Health Organization (WHO). Globally, it is estimated that 350 million individuals suffered from depression (WHO, 2017a). Adults aged 25-44 years have the highest prevalence rate of major depression, worldwide (Ferrari et al. (2013a). Globally, depression is more prevalent in women than men (Bromet et al., 2011; Kessler, 2003). In fact, women experience depression twice as often as men (Bromet et al., 2011; Kessler, 2003). The National Institute of Mental Health (NIMH) (2015a) reported that 8.5% of American adult women, aged 18 years and above, suffered from at least one major depressive disorder in 2014 as compared with 4.7% of men at the same year. Center for Disease Control and Prevention (CDC) (2016) reported that 1 out of 10 adult women (18-44 years old) suffered from symptoms of depression.

As in many other regions in the world, depression was reported as the third cause of healthy years lost due to disability in women, across all ages, in North Africa and the Middle East in 2010 (Ferrari et al., 2013b). Based on the latest report regarding the global burden of disease in 2010, major depressive disorder ranked first as the disease with the highest burden on individual health among Omani women of all ages (Institute for Health Metrics and Evaluation [IHME], 2013). However, in the global burden of disease report of 2015, mental problems and substance use ranked second as the health problem with the highest burden among women in Oman at all ages, and the first health problem with highest burden on the health of Omani women, aged 15-49 years (IHME, 2015). The report did not state what mental problems have more burden effect on the health of Omani women. Al-Salmani et al. (2015) reported depression

prevalence rate of 8.1% among Omani adults aged 18 years and more in Muscat governorate. More than 67% of the depressed Omani adults were women (Al-Salmani et al., 2015). According to Al-Busaidi et al. (2011), nearly 31% of Omani women in a college-based sample of 481 reported experiencing depression. To best of our knowledge, however, there is no study conducted to explore the risk factors or predictors of depression in adult Omani women.

Studies that have examined the prevalence of depression in Omani populations focused only on school-and college-age students (Afifi, Al Riyami, Morsi, & Al Kharusi, 2006; Al-Busaidi et al., 2011; Jaju, Al-Adawi, Al-Kharusi, Morsi, & Al-Riyami, 2009) in exception to Al-Salmani et al. (2015) study. Moreover, studies about depression in women from neighboring countries, such as Kuwait (Al-Otaibi et al., 2007), Saudi Arabia (Becker, 2004), and United Arab Emirates (Daradkeh, Eapen, & Ghubash, 2005; Hamdan, Hawamdeh, & Hussein, 2008), have been limited to women attending primary health care centers or hospitals, and focused mainly on assessing demographic and socio-economic variables as predictors of depression in women.

**Symptoms of Depression**

Depression is also labeled as major depressive disorder (NIMH, 2015a; 2015b), or major depressive episode (WHO, 2017a). Depression is characterized by episodes of sadness and disturbed mood, lack of interest in pleasurable activities, increased feelings of guilt, symptoms of anxiety, a greater sense of worthlessness, and disturbance in normal eating, sleeping, and energy level, for a period of at least two weeks (Bromet et al., 2011; CDC, 2016; WHO, 2017a). Cognitively, patients with major depressive disorder suffer from poor concentration and diminished decision-making ability (CDC, 2016; WHO, 2017a).

The Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5) described major depression as episodes of low mood or lack of interest for at least two weeks with the presence of a minimum of four other symptoms of depression (DSM-5: American Psychiatric Association [APA], 2013). These symptoms include an increase or decrease of body weight in the absence of dieting or change in appetite, significant change in sleeping patterns, observable agitation, diminished daily energy or excessive fatigue, increased feelings of guilt or worthlessness, poor concentration or indecisiveness, and recurrent suicidal thoughts or attempts (DSM-5: APA, 2013). These symptoms relate to depression in the absence of another psychological condition, such as substance abuse or due to medical illness (DSM-5: APA, 2013).

**Predictors of Depression**

The predictors and risk factors of depression in women may differ across ages and cultures. Due to the increasing burden of depression in women, there is an ongoing effort to identify the predictors of depression in women across race/ethnicities and age groups (Smith, McCullough, & Poll, 2003). The etiology of depression in women is complex, and has been described as an interaction between biological, psychological, and social factors (Rosenquist, Fowler, & Christakis, 2011).

Research conducted on both Western and non-Western populations have concluded that there are specific predictors that have a great impact on the prevalence, incidence, and severity of depression in women across ages, ethnicities, and cultures (Bromet et al., 2011; Hamdan et al., 2008). Socioeconomic status (education level, marital status, employment, and income) (Akhtar-Danesh & Landeen, 2007; Camino, Harris, Silove, Manicavasagar, & Harris, 2000; Lorant et al.,

2003; Mossakowski, 2009; Patten et al., 2006; Velde, Bracke, & Levecque, 2010), history of chronic illness (Egede & Ellis, 2010; Golden et al., 2008; Moussavi et al., 2007), history of depressive episodes or depressed mood during pregnancy (Chaaya et al., 2002; Hamdan & Tamim, 2011); physical activity (Brown, Ford, Burton, Marshall, & Dobson, 2005; Galper, Trivedi, Barlow, Dunn, & Kampert, 2006; Harris, Cronkite, & Moos, 2006; Jacka et al., 2011), body mass index (BMI) (Pan et al., 2012; Simon et al., 2010; Zhao, Ford, Dhingra, Strine, & Mokdad, 2009), religiosity (Smith et al., 2003), domestic violence (Hegarty, Gunn, Chondros, & Small, 2004), perception of body image (Winstanley & Dives, 2005), social support (Kendler, Myers, & Prescott, 2005), coping (Kelly, Tyrka, Price, & Carpenter, 2008), access to health care (Druss, Rask, & Katon, 2008), and age (Akhtar-Danesh & Landeen, 2007; Kessler et al., 2010a; Patten et al., 2006) are some of the predictors that have been investigated among Western women. However, less attention has been paid to Arab women, specifically women living in Gulf Co-Operation Council Countries (GCC), which are Oman, Bahrain, Kuwait, the United Arab Emirates (UAE), the Kingdom of Saudi Arabia (KSA), and Qatar.

***Socioeconomic Status (SES)***

Education status, marital status, employment, and income level are other common indicators that have been investigated in terms of social and economic factors in GCC countries; further, their predictive association with depression has been confirmed in a majority of GCC and international studies (Al-Otaibi et al., 2007; Al-Salmani et al., 2015; Hamdan et al., 2008; Lorant et al., 2007; Lorant et al., 2003; Roxburgh, 2009).

### *Living Arrangements*

The family structure (whether living alone, in a nuclear family, or with extended family) is a predictive factor that has been linked with depression in Western women (Hughes & Waite, 2002; Joutsenniemi et al., 2006; Mowbray et al., 2005). The evidence about predictive role of family structure on depression in Arab women is lacking.

Number of children is another predictive factor that has been linked with depression in Arab women (Al-Otaibi et al., 2007; Daradkeh et al., 2002; Hamdan et al., 2008). However, the findings were inconsistent, which indicates the needs of further investigations.

Place of residence (urban versus rural residency) is another living arrangements variable that the effect of it on mental illness, including depression, was assessed in Western communities but not in Arab region (Peen, Schoevers, Beekman, & Dekker, 2010; Romans, Cohen, & Forte, 2011; Wang, 2004).

### *History of Chronic Illness*

Existing data and statistics reveal that men and women with chronic diseases experience a higher risk of comorbid depression, regardless of the type of chronic disease (Egede & Ellis, 2010; Moussavi et al., 2007). Chronic diseases, including cardiovascular disease, diabetes, and arthritis are associated with increasing the risks of developing depression (Moussavi et al., 2007; Egede & Ellis, 2010) and depressive symptoms (Golden et al., 2008). However, two studies revealed that women with diabetes have a greater risk of depression than diabetic men in Pakistan (Khuwaja et al., 2010) and the United states (Li, Ford, Strine, & Mokdad, 2008).

### *History of Depressed Mood during Pregnancy*

The assessment of linkage between depressed mood or depressive symptoms during pregnancy and depression in later life was not done in the targeted population or neighborhood communities to the best of our knowledge. The limited existing studies in the region focused on examining the effect of antenatal depression and postpartum depression (Chaaya et al., 2002; Hamdan & Tamim, 2011). These studies revealed that there is an increase of risk of postpartum depression among women who suffered depressive disorders during their pregnancy (Chaaya et al., 2002; Hamdan & Tamim, 2011). However, further investigation on the effect of depressive symptoms during pregnancy on later-life depression is important to understand the diagnostic and care needs for depressive symptoms during pregnancy.

### *Physical Activity*

The existing literature supports the hypothesis that the association between physical activity and depression is inverse. Evidence from the US (Galper et al., 2006; Harris et al., 2006) and Australia (Brown et al., 2005; Jacka et al., 2011) showed that women who are highly active experience fewer depressive episodes or symptoms. This association has not been well investigated among Arab women, and studies that have been conducted among Arab women have focused on assessing the nature and types of physical activity in this population (Al-Hazzaa, 2006; Al-Kaabi et al., 2009) but not its association with depression or other mental health problems.

### *Body Mass Index (BMI)*

A significant positive association between high BMI and current depression, and lifetime depression has been confirmed in the literature for women in the US (Pan et al., 2012; Simon et al., 2010; Zhao et al., 2009). In fact, being a woman increased the risk of the association between depression and high BMI, i.e. obesity and overweight problems (Zhao et al., 2009). Regardless of this fact, there is less attention paid to assess the association between BMI and depression in Arab women.

### *Religiosity*

The influence of religiosity has been one of the predictors receiving great attention in studies of general health and mental or emotional health specifically, across world regions (Abdel-Khalek, 2012a; 2012b; Abdel-Khalek & Eid, 2011; Smith et al., 2003; Vasegh and Mohammadi, 2007). Religiosity is negatively associated with depressive symptoms, across gender, ethnicity, and age, where people who are more adherent to religious practices experience fewer depressive episodes or symptoms (Smith et al., 2003). Children, adolescents, and college students have been the most popular groups studied as it relates to religiosity among Muslims and Arabs and its association with health and subjective well-being (Abdel-Khalek, 2006; 2012b; Abdel-Khalek & Eid, 2011). Studies that included adults are limited, and mainly include studies of general mental health and subjective well-being.

### *Domestic Violence*

Regardless of the type of abuse, domestic violence is strongly linked to depression and other psychiatric disorders in women (Alhabib, Nur, & Jones, 2010; Almosaed, 2004; Hegarty et

al., 2004). The existing data on domestic violence experienced by Arab women and its relationship to depression does not differ from data published in Western countries, where a positive association has been noted between abuse and psychological problems, including major depression, anxiety, somatization, and low self-esteem (Alhabib et al., 2010; Haj-Yahia, 2000a). However, the issue of abuse of women is extremely sensitive in Arab culture, which results in a scarcity of studies on the prevalence of the problem and its relation to overall mental health in Arab women (Alhabib et al., 2010; Almosaed, 2004).

### *Perception of Body Image*

Body image perceptions and depression are related, and women who perceive their weight as normal are less depressed than those who perceive themselves to be overweight or obese (Kim & Lee, 2010; Winstanley & Dives, 2005). Social and cultural determinants have a great impact on the association between perception of body image and depression (Winstanley & Dives, 2005), due to the difference in the value and criteria of beauty norms by culture (Furnham & Baguma, 1994; Winstanley & Dives, 2005).

### *Social Support*

The social network of an individual has been found to impact mental health and predict many behavioral disorders (Rosenquist et al., 2011). Although depression is primarily linked to individualistic risk factors, such as gender, history of long-term exposure to traumatic events or stressors, and history of mental illness (National Institute of Mental Health [NIMH], 2015b), research has found that depression is partially driven by social factors, including social support and networking (Rosenquist et al., 2011). The impact of emotional support that American

women received from social networks, i.e. parents, relatives, spouse, and friends, has shown effectiveness in protecting women from developing depressive symptoms (Kendler et al., 2005).

### *Coping*

It has been shown that women cope differently with specific stressors then do men, which provides one explanation of the higher prevalence of depression in women (Kelly et al., 2008; Matud, 2004). The lack of using positive reframing during stressors assists in increasing the risk of depression in women (Kelly et al., 2008). One major problem that women struggle with in regard to coping with stressors and anxiety is their proclivity towards emotionally-oriented coping strategies, such as blaming oneself, as opposed to problem-focused strategies that are commonly implemented by men (Kelly et al., 2008; Matud, 2004). According to Matud (2004), women tend to use less effective coping strategies compared to men because of differing stressors experiences. For example, women commonly report family and health-related stressors, while men commonly report negative events related to work, finances, and relationships with friends and partners (Matud, 2004). It is possible that Arab women may cope less effectively than men because women are faced with additional social and cultural challenges, such as gender inequalities (Douki et al., 2007) and may be dealing stigma of mental illnesses (Hamdan, 2009). Further research is needed to answer the question of how Arab women, specifically Omani women, cope with differing negative life events and depressive episodes. Understanding the coping styles used by this population may provide a potential explanation for the effectiveness or ineffectiveness of these coping styles in stopping the development of major depression.

***Health Care System (Access to Health Care)***

Lack of access to health care by individuals with mental disorders is globally documented, and is thought to be relevant either to individual choice of seeking help or to the availability and accessibility of health care services (Al Riyami, Al Adawi, Al Kharusi, Morsi, & Jaju, 2009). There is evidence that adult Arab women prefer traditional healers or therapists for treating and managing mental and emotional health problems, rather than seeking help from professional health care providers (Al Riyami et al., 2009; El-Islam, 2008; Hamdan, 2009). This is due to the strong beliefs that emotional and mental health problems are caused by evil spirits (Bener & Ghuloum, 2011).

Additionally, the stigma of mental health disorders is remarkable in Arab culture as in other parts of the world (Al-Krenawi & Graham, 2000; Hamdan, 2009). Familial and societal expectations are to conceal any mental disorder; this concealment is associated with the growing prevalence of psychiatric disorders in Arab women (Al-Krenawi & Graham, 2000; Okasha, 2003).

For these reasons, seeking help from a specialist consultant only occurs when the mental disorder becomes more evident and cannot be concealed from public (Hamdan, 2009). Al Riyami et al. (2009) found that Omani adolescents with identified symptoms of major depression reported a nine-year median delay for initial contact with a health care professional, and female adolescents with depressive disorders reported a greater likelihood of earlier contact with health care professionals in comparison to male adolescents. However, it is not clear if this situation is similar for Omani adult women.

Another factor that may affect women accessing health care in Oman is the lack of sufficient mental health facilities and psychiatrists. The limited governmental psychiatric centers in several areas in the country (WHO, 2011) and non-availability of private psychiatric clinics will hinder easy access to mental care and treatment. As a result, difficulty to access specialized centers and care may affect women's' attitude towards seeking professional help for emotional and mental health problems.

***Age***

With respect to age**,** women all age groups are at risk for depression; nevertheless, some age groups are at a higher risk than others (Al-Otaibi et al., 2007; Al-Salmani et al., 2015; Kessler et al., 2010a; Patten et al., 2006). Studies conducted in GCC region showed different findings across region countries that are relevant to the prevalence of depression in women by age (Al-Otaibi et al., 2007; Al-Salmani et al., 2015; Bener, Ghuloum, & Abou-Saleh, 2012; Daradkeh, Ghubash, & Abou-Saleh, 2002; Hamdan et al., 2008; Moselhy et al., 2012).

In summary, the limited evidence on the prevalence rate of depression in Omani women (Al-Busaidi et al., 2011; Al-Salmani et al., 2015) warrant a better exploration of the predictors and risk factors of depression among adult Omani women. The existing studies assessing depression in Oman are primarily focused on the prevalence of disorder, and specifically in school-aged children and adolescents at the college level (Afifi, Al Riyami, Morsi, & Al Kharusi, 2006; Al-Busaidi et al., 2011; Jaju et al., 2009). In addition, the majority of the existing studies that assess the prevalence of depression and depressive symptoms among Arab population, specifically neighboring countries, took place in primary health care setting or hospitals (Al-Otaibi et al., 2007; Becker, 2004; Daradkeh, Alawan, Al Ma'aitha, & Otoom, 2006; Daradkeh et

al., 2005; Hamdan et al., 2008). To best of our knowledge, Al-Salmani et al. (2015) study is the only national study that assessed the predictors of depression among adult Omani women. However, the assessment of predictors was limited to gender, sociodemographic factors (age, education, marital status, and employment), and chronic illness. Additionally, Al-Salmani et al. (2015) study included adult women attended health care centers in Muscat governorate only.

The prevalence of depression in women and its associated risk factors has been the focus of many researchers across world regions. Evidence from existing literature suggests a remarkable association between depression and numerous factors. These include socioeconomic status (SES) (Akhtar-Danesh & Landeen, 2007; Al-Otaibi et al., 2007; Bromet et al., 2011; Hamdan et al., 2008; Kessler et al., 2010a; Patten et al., 2006), material circumstances (living arrangements), bio-behavioral factors, such as history of chronic illness (Egede & Ellis, 2010; Moussavi et al., 2007), history of depressed mood during pregnancy (Chaaya et al., 2002; Hamdan & Tamim, 2011), physical activity (Brown et al., 2005; Galper et al., 2006; Harris et al., 2006; Jacka et al., 2011), and BMI (Pan et al., 2012; Simon et al., 2010; Zhao et al., 2009); psychosocial factors including religiosity (Smith et al., 2003), stressors such as domestic violence (Dienemann et al., 2000; Evans-Campbell, Lindhorst, Huang, & Walters, 2006), perception of body image (Kim & Lee, 2010; Winstanley & Dives, 2005), social support (Aranda, Castaneda, Lee, & Sobel, 2001; Delgard et al., 2006; Kendler et al., 2005) and coping style (Kelly et al., 2008; Matud, 2004); health care access (Druss et al., 2008; Nasir & Al-Qutob, 2005; Okasha, 2003), and age (Akhtar-Danesh & Landeen, 2007; Al-Otaibi et al., 2007; Al-Salmani et al., 2015; Hamdan et al., 2008; Kessler et al., 2010a),. There is lack of knowledge on impact of these factors on prevalence and incidence of depression in Omani women. Knowing to

which extent these factors predict depression in Omani women is essential for policy makers and health care professionals for early detection of cases and effective management.

**Conceptual Framework**

For the purpose of this study, a modified version of the World Health Organization (WHO) Social Determinants of Health (SDH) conceptual framework has been selected to assess depression in Omani women. Because the current study is not designed as a population-based study, only part of the WHO SDH model will be applied in this study to assess predictors of depression in adult Omani women. The proposed model, the revised SDH (rSDH) model, consists of two categories that are adopted from the original SDH model (WHO, 2010a), which are structural social determinants of depression and intermediary social determinants of depression. The variables under each category were selected based on evidence from existing literature about the main predictors of depression in women, which fit within the original SDH conceptual framework (WHO, 2010a)

For the current SDH model, the structural determinants of depression assesses multiple SES factors, including education, marital status, employment, and family income. Living arrangement factors; history of chronic illness, history of depressed mood during pregnancy, physical activity, and body mass index (BMI) (bio-behavioral factors); religiosity, domestic violence, perception of body image, social support, and coping (psychosocial factors); access to health care (health system), and age, as a moderator, were included under the category of intermediary social determinants of depression.

## Specific Aims

**Specific Aim 1.** To describe the prevalence of depression among targeted population.

**Specific Aim 2.** To describe socioeconomic status (SES) (education, marital status, employment status, and family income level); material circumstances (living arrangements [family structure, number of children, place of residence]); bio-behavioral (history of chronic illness, history of depressed mood during pregnancy, physical activity, BMI; psychosocial (religiosity, domestic violence, perceived body image [perception of body image, perception of ideal body image], social support, coping); health care system (access to health care) including attitudes towards seeking professional help [willingness of seeking professional help, comfort level of talking to a health care professional, and stigma around seeking professional help] and availability of psychiatric clinic; and age characteristics among adult Omani women, 18 years and older, those experiencing depression and those not experiencing depression.

**Specific Aim 3.** To assess the association among the socioeconomic, material circumstances, bio-behavioral, psychosocial, health care system, and age variables in relation to the dependent variable of depression in adult Omani women.

**Specific Aim 4.** To examine the utility of the revised SDH (rSDH) conceptual framework in assessing the predictors of depression in the targeted population

## Proposed Research Design

A quantitative cross-sectional study was used to identify predictors of depression among a sample of 240 adult Omani women in Wilayat (i.e. provenance) of Rustaq. The BDI-II score,

which reflects level of depression and is based on DSM-IV criteria, was identified as the outcome dependent variable. The study will included a convenience sample of 240 adult women who are 18 years and older from rural and urban villages in Wilayat of Rustaq, Oman. The conceptual framework used in the study (rSDH) was a modified version of WHO (2010) SDH model, and it guided the process of assessing the predictors of depression among adult Omani women in Wilayat of Rustaq.

**Significance to Nursing Science and Practice**

The identification of predictors of depression is crucial for strengthening prevention strategies in a community that, like other countries, is challenged with high rates among women (Al-Busaidi et al., 2011). Identifying the risk factors of developing depression will make it possible to intervene before the persistence of disease symptoms, and will eventually decrease the physical, emotional, and social burden of the disease on the individual as well as decrease the economical and resource burden on the community.

Focusing on Omani adult women is also important. This particular population is underrepresented in the limited existing studies, which primarily explore the risk factors of depression among school children, adolescents, and college students. While current Omani studies have included adults and older women who have been limited to only clinic-based or inpatient samples, it is clear that women who do not regularly attend primary health care centers or were not hospitalized are not well-assessed for the prevalence of subclinical and undiagnosed depressive symptoms. The study will assist in providing an estimation of the prevalence of the disease in adult women within selected communities, will draw more attention to the

determinants of the disease, and highlight measures that could be useful in detecting depression at an early phase.

Little is known about the predictors of depression and depressive disorder among Arab adult women due to the sensitivity of some predictors and predisposing factors, as well as the stigma of the disease in Arab societies (Hamdan, 2009). The majority of the identified predictors have been explored in Western literature and then simply applied to other communities, including Arab communities (Okasha, 2003). Exploring whether these predictors are relevant to Arab women, as well as the extent of their applicability, is essential in developing assessment tools and interventions that are socially and culturally sensitive. The study will assist in designing future studies that investigates appropriate and sensible approaches to tackle and modify the predictors and risk factors of major depression in Omani women, as well as Arab women in general. Moreover, it will assist in identifying the functional coping strategies that have been employed by these women, which may guide the integration of these strategies into the therapeutic plan for others suffering from the disease.

For best of our knowledge, this is the first study that utilizes the SDH framework to investigate the predictors of depression in Arab women, and the direction of the association between certain predictors and depression in the same population. This will be important in determining mediators that may strengthening or weakening the association between specific factors and depression in Arab women, which eventually enhance the development of appropriate management plan for the disease.

## Chapter 2: Conceptual Framework

Over the years, an increasing number of researchers have investigated the role of social factors, including socioeconomic status on shaping health outcomes (Bryant et al., 2011; Lai & Surood, 2008; Liang et al., 2012; Myer, Stein, Grimsrud, Seedat, & Williams, 2008). This is a critical area of research as unequal distribution of social and socioeconomic status has been shown to result in health inequities (Bryant et al., 2011; Lai & Surood, 2008; Liang et al., 2012; Myer et al., 2008).

The current study, designed to assess predictors of depression in Omani adult women, is guided by the World Health Organization's social determinants of Health (SDH) conceptual framework (World Health Organization [WHO], 2008a; 2010a). The utilization of the SDH model to examine predictors of depression promises several advantages. First, the model emphasizes the need to assess multiple determinants, or factors, that lead to health outcomes (Ashcroft, 2010; WHO, 2008a; 2010a); all of which can greatly enhance the strength of the study. Second, the multiple causality factors that are proposed in the model can assist in the recognition of direct and mediating relationship between depression and determinants (predictors). Third, the model provides a holistic and comprehensive view on causes of a health disorder by stressing the need to consider various determinants, including socioeconomic status, material environment, behavioral factors, psychosocial factors, biological factors, and the health care system (WHO, 2008a; 2010a).

The next section of this chapter provides detailed information about the concept and perspectives of SDH, examples of mental health studies that used SDH model, the World Health

Organization (WHO) SDH framework, the proposed SDH model for current study, and finally the conceptual and operational definitions of variables in the proposed model.

**Social Determinants of Health (SDH)**

SDH are defined as the economic and social factors that have an impact on the health of individuals and societies (WHO, 2008a). SDH are the circumstances in which individuals are born into, live, grow, be educated in, work, and age (Liang et al., 2012; WHO, 2008a). The perspectives of SDH guide attention on the social factors that shape individuals' and societal health (Graham, 2004; Ashcroft, 2010; Moniz, 2010). Differences in social factors, including homes, education, neighborhood, working, and living conditions enhance the social inequities among individuals and groups, which consequently impact their physical and psychological health (Liang et al., 2012).

In addition to social factors, the SDH perspective considers the effects of public policy, environmental, and economic factors on individuals' health outcomes (Ashcroft, 2010; Graham, 2004). Accordingly, health takes into consideration not only physiological status, but also a person's social, environmental, political and economic status (Ashcroft, 2010). Bryant (2009) as cited in Ashcroft (2010) extends the factors that affect individuals' well-being including " social class, income level, employment security, quality of working conditions, adequacy of housing, levels of education, access to nutritious food, and availability of health and social services, among others"(pp.251).

Based on the SDH perspective, poverty is commonly considered the main determinant or factor of health disorders, as it has been linked to multiple health problems (Ashcroft, 2010; Bloch et al., 2008). For example, in terms of mental health, prevalence of depression is 60%

greater in Canadians with low income levels than Canadians with average income levels (Bloch et al., 2008). However, societies that are considered rich still may not have the healthiest populations (Moniz, 2010). For example, the United States (US) ranks among the wealthiest nations in the world and is ranked highest in terms of healthcare expenditure per capita (Moniz, 2010). However, the US has populations in the poorest health populations relative to 20 other developed countries. This is due to significant health disparities, typically by income level, within the country (Moniz, 2010).

**Social Determinants of Health Perspective and Mental Disorders in the Literature**

The SDH perspective has been used to examine the impact of various social determinants on mental health disorders, including depression. Using the data from 4,351 South African adults, of which 53.7% were female; Myer and colleagues (2008) examined the social determinants of psychological distress in South African adults. Myer et al. (2008) revealed that psychological distress, measured with a Kessler K-10 scale, is negatively associated with socioeconomic characteristics (years of education, household income, employment status). South African adults with low socioeconomic status (SES) were at risk of psychological distress nearly three times higher than South African adults with high SES (OR= 2.99, 95% CI = 2.01-4.44, $P < 0.001$) (Myer et al., 2008). With adjustment for demographic characteristics, social constructs, and life events, individuals with low SES remain at much greater risk for psychological distress than individuals with high SES (OR= 2.11, 95% CI= 1.36-3,29) (Myer et al., 2008).

Positive association was also observed between age and psychological distress, wherein an increase in age (over 30 years old) was associated with increased psychological distress (Myer et al., 2008). However, the association was not statistically significant ($P = 0.324$) (Myer et al.,

2008). Gender, notably being female, was significantly associated with an increase in psychological distress (OR= 1.64, 95% CI = 1.19-2.26, P= 0.003) (Myer et al., 2008). Social support was not associated with psychological distress among South Africans, adjusting for SES and social capital (Myer et al., 2008).

Using the SDH framework, Lai and Surood (2008) investigated the predictors of depression from data involving 220 South Asians in Canada, 55-93 years of age, of which 44.5% were female. Sociodemographic factors (age, gender, education, marital status, income, financial adequacy, social support), physical health, and cultural factors (acculturation variables, cultural values) were the social determinants measured in the study (Lai & Surood, 2008). Gender was found to be the sole sociodemographic factor significantly associated with depression. South Asian Canadian women were found to be at higher risk for depression than South Asian Canadian men (r [male] = -1.33, OR= 0.26, 95% CI= 0.11- 0.61, P < 0.01) (Lai & Surood, 2008). With the addition of a self-reported health and Physical Component Summary (PCS) in the analysis, a higher level of self-reported health was found to be negatively associated with being depressed (r = -1.21, OR = 0.30, 95% CI = 0.16-0.55, P < 0.001) (Lai & Surood, 2008). Similarly, a negative association was reported between PCS score and depression (r = -0.07, OR = 0.93, 95% CI = 0.89-0.98, P < 0.001) (Lai & Surood, 2008). Cultural values were significantly associated with depression, wherein participants more attached to South Asian cultural values were at a 2.9 times greater risk of depression (r = 1.07, 95% CI= 1.02-8.29, P < 0.05) (Lai & Surood, 2008), than those less attached to South Asian cultural values.

Liang and colleagues (2012) investigated the SDH and depression in 3,738 adults, 18-92 years old, from rural China. Women accounted for 60% of total participants. Liang and

colleagues (2012) examined three variables of SDH: SES (based on years of education, family financial status), social cohesion, and traumatic life events. Findings revealed that depression was negatively associated with years of education ($X^2 = 69.7$, $P < 0.0001$), financial status ($X^2 = 237.41$, $P < 0.0001$), and social cohesion ($X^2 = 56.44$, $P < 0.0001$), and positively with traumatic life events ($X^2 = 723.56$, $P < 0.0001$). By conducting a multivariate analysis, and with adjustment for demographic characteristics, the association between depression and all determinants remained statistically significant (Liang et al., 2012). Only the years of education showed non-significant association with depression in multivariate analysis (Liang et al., 2012).

**The SDH Framework of the World Health Organization (WHO)**.

To understand the SDH and health inequities, and to collect evidence on proper solutions to overcome health disparities, the WHO established a Commission on Social Determinants of Health in 2005 (WHO, 2008a; 2010a**)**. In order to guide action towards achieving their aims, the Commission presented an action-oriented conceptual framework for action on SDH.

The SDH framework of WHO was driven from several theoretical perspectives, including social ecological theory of health, Eco-social theory, theory of power, theory of social causation, and life course models of health (WHO, 2008a; 2010a). In general, the framework aims to detect the SDH and inequities in health, to highlight how determinants are related, to elucidate how social determinants cause health inequities, to provide a model for assessing and addressing the most vital SDH, and to plan levels of interventions (WHO, 2010a). The SDH framework is also beneficial in clarifying how people experience variations in exposure and risk to health conditions based on their social status or hierarchy, which is shaped by social, economic, and political context (WHO, 2010a). According to the framework, social and economic status applies

its influence on individuals' health both directly and indirectly throughout intermediate social determinants (WHO, 2010a).

The SDH framework encompasses three core components: "socioeconomic and political context, structural determinants of health, and intermediary determinants of health" (WHO, 2010a; pp. 9) (**Figure 1**).

The **socioeconomic and political context** refers to social and political mechanisms, which create, form, and maintains social hierarchies (WHO. 2010a). This includes societal factors that have powerful effects on patterns of social stratification and consequently have an impact on the health of individuals. These factors include governance, macroeconomic policies (e.g. labor market structure), social policies (e.g. policies of housing and lands), public policies (e.g. policies related to education and health), and culture/societal values (WHO, 2010a).

The **structural determinants of health** indicate factors that create or support social position and stratification, and define people's socioeconomic status (WHO, 2010a). These factors shape the health opportunities of individuals based on their position within the hierarchies of "power, prestige, and access to resources" (WHO, 2010a; pp. 30). These factors include income, specifically household income, education, occupation, social class, gender, and race/ethnicity (WHO, 2010a). Discrimination and social stratifications that are based on these factors are the primary causes of health inequities (WHO, 2010a).

It is impossible to evaluate the influence of structural determinants of health without including the elements of socioeconomic and political context (WHO, 2010a). Social policies and educational systems, for example, can modify the effect of SES on individuals' health

outcomes (WHO, 2010a). Therefore, it is appropriate to link the socioeconomic and political context with the structural determinants of health (WHO, 2010a).

The **intermediary determinants of heath** are factors through which structural factors operate. These are factors that mediate the health effects of structural determinants, and cause differences in individual experiences and vulnerability to diseases (WHO, 2010a). The WHO framework on SDH identified several categories of intermediary determinants or factors, including material circumstances (e.g. quality of housing and neighborhood environment, living and working conditions, food security), psychosocial factors (e.g. stressors, stressful events, presence or absence of social support, coping strategies), behavioral factors (e.g. physical activity, smoking, alcohol consumption, obesity), biological factors (e.g. genetic compositions, age), and health system (e.g. access to health care) (WHO, 2010a). In addition to the core or major components, the framework proposed social cohesion and social capital as other determinants that shape individuals' health (WHO, 2010a). The WHO Commission of Social Determinants of Health (CSDH) presented several perspectives and meanings of social capital and social cohesion; however, the CSDH clearly states that it is difficult to place them under only one of social determinant categories, i.e. structural determinants and intermediary determinants (WHO, 2010a). It has been more appropriate to present social capital and social cohesion as crosscutting components of the two categories (WHO, 2010a).

## The Proposed Conceptual Framework for Depression in Omani Women

Taking into consideration the WHO conceptual framework of SDH, a revised SDH framework (rSDH) was developed to assess the predictors of depression in Omani adult women

(**Figure 2**). To develop this framework, extensive literature review took place to identify the social determinants of depression in women globally, and the causal influence (direct or indirect relationship) between those determinants and depression. The validation of the developed framework was examined through empirical analysis of the study data. Based on the findings, the framework was refined.

Some of the factors proposed in the rSDH framework for the current study are different than those factors stated in the structural and intermediary social determinants of health and health inequities of the WHO SDH framework. The associations among constructs in the current model are based on the direction of association proposed in WHO SDH framework as well as findings of studies. The predictive role of social determinants on depression is the only direction that will be assessed in this study; in other words, the study does not aim to assess the influence of depression (outcome) on social determinants.

The revised SDH framework (rSDH) will be assessed for its ability to clarify how people experience variations in exposure and risk to health conditions based on their social status or hierarchy, which is shaped by social, economic, and political context (WHO, 2010a). According to the framework, social and economic status applies its influence on individuals' health both directly and indirectly throughout intermediate social determinants (WHO, 2010a). As can be seen in Figure 2, the rSDH framework encompasses three core components: structural determinants of depression, intermediary determinants of depression, and health outcome (which is depression in this case) and further delineated in the figure.

**Structural Determinants.** Social position is the key factor that creates or reinforces stratification in a community; several socioeconomic indicators suggested in the WHO SDH

model are indicators of social position (WHO, 2008a; 2010a). These indicators are educational level, occupation (employment status), and household income (Graham, 2004; WHO, 2008a; 2010a)**.** Because the current study is limited to Omani women, gender and race are not tested in the current model. Lai and Surood (2008) included marital status as sociodemographic factors when assessing the predictors of depression of South Asians in Canada. On the other hand, Liang et al. (2012) included marital status as confounding variable when examined the association between SDH and depression in rural China. Therefore, marital status is included in the model under this category. As the current study plans to address the social determinants of a health problem in a small sample of Omani women, and not determinants of health inequities among this entire population, and as the current study is applying only part of WHO SDH model, the political context of the WHO SDH framework, which are governance, macroeconomic policies, social policies, public policies, and cultural and societal values, are not included (WHO, 2010a).

**Intermediary Determinants.** Categories similar to those stated in the intermediary determinants of the WHO SDH framework are used in the current model. In reference to material circumstances, the living arrangements, which indicate the type of living condition the women are encountering, is included in the current model. The quality of living conditions can either promote or jeopardize an individual's health (Graham, 2004; WHO, 2010a).

Similarly, particular behaviors can enhance individuals' health, such as physical activity, while other behaviors can endanger their health, such as obesity (Graham, 2004; WHO, 2010a). Therefore, the current model will assess physical activity and BMI as behavioral factors. History of chronic illness and history of depressed mood during pregnancy will be examined as

biological factors. Both behavioral and biological factors will be tested in the current model under the category of bio-behavioral factors.

Age is another intermediary factor that will be assessed in the current model. Age was the main factor that showed inconsistent findings in Arab literature in relation to its significance as a direct predictor of depression; therefore, age is placed as a moderator between socioeconomic status and depression in the study model.

With respect to psychosocial factors, the WHO CSDH identifies several factors that are relevant to this category, including religiosity, stressors, stressful life events, social support, and coping strategies (WHO, 2008a; 2010a). Holdcroft (2006) clarified that religiosity consists of multiple dimensions including, "subjective, cognitive, behavioral, social, and cultural dimensions" (pp.91). Because social and culture are important concepts of religiosity (Holdcroft, 2006), religiosity is placed under psychosocial factors category.

History of domestic violence will be the stressor variable that is included in this model. Similar to the WHO model, social support and coping strategies will be under this category as well. Perception of body image has been linked to cultural and societal perspectives and opinion about ideal and preferred body weight (Madanat, Hawk, & Angeles, 2011; Winstanley & Dives, 2005); therefore, it is placed under psychosocial factors. Access to health care system will be assessed in the model as an indicator of health care system (WHO, 2010a).

**Conceptual and Operational Definitions**

There are different operational definitions for each concept or variable within the conceptual model. However, the following definitions of these variables are used in this study.

## 1. Dependent Variable: Depression

**Depression:** In this study, the dependent variable is depression, assessed by examining the presence and severity of depressive symptoms in the studied sample. The symptoms of depression, as stated in the fifth edition of Diagnostic and Statistical Manual of Mental disorder (APA, 2013), are used to define and identify depression in this study. The primary symptoms are depressed mood and/or lack of interest or pleasure. At least five other symptoms must accompany depressed mood or/and lack of interest or pleasure for at least two weeks. Possible symptoms are: 1) weight change, 2) sleep disturbance, 3) low energy or fatigue, 4) feeling of guilt or worthlessness, 5) lack of concentration or indecisiveness, 6) agitation, and 7) recurrent suicidal thoughts or attempts (APA, 2013).

The Arabic version of the Beck Depression Inventory Scale (BDI), 2nd edition, is used as a tool to detect the symptoms of depression in this study. The BDI scale is designed to measure the symptoms and characteristics of depression stated in the Diagnostic Statistical Manual (DSM).

## 2. Independent Variables: Social Determinants

### 2.1. Structural Determinants

#### 2.1.1. Socioeconomic factors

Socio-economic factors (education, marital status, employment, and family income) are major socio-economic determinants that are linked to various health risks including depression. The operational definitions of these factors are stated below.

**Education:** In general, education refers to "the process of receiving or giving systematic instruction, especially at a school or university" (Oxford University Press: Oxford Online Dictionary, 2017a). In this study, the participants have to state their highest level of education.

**Marital status:** Status of marriage is self-reported when the initial assessment is administered. Participants select from the following categories: single, married, divorced, and widowed.

**Employment:** Employment is defined as "a state of having paid working" (Oxford University Press: Oxford Online Dictionary, 2017b). Participants in the study must select either employed or unemployed at the time of assessment.

**Family Income:** Family income is calculated based on self-reported monthly family income. The woman selects from multiple categories of monthly income ranges that are listed in the assessment to indicate which aligns best with the monthly income of her family.

### 2.2. Intermediary Determinants

#### 2.2.1. Material Circumstances

**Living arrangements:** For the purpose of this study, family structure (living alone, living only with a spouse, living in a nuclear family, or living in an extended family), number of children, and place of residence (rural Vs. Urban residence) are the living arrangement determinants for assessment.

### 2.2.2. Bio-behavioral Factors

Two biological and two behavioral factors are included in the current SDH framework, which are history of chronic illness, history of depressed mood during pregnancy, physical activity, and BMI. The theoretical and operational definitions of physical activity, BMI, and religiosity are stated below.

**History of chronic disease:** chronic disease refers to disease characterized by prolonged duration, slow progression, and complex etiologies (Martin, 2007; WHO, 2017b). Chronic diseases include both non-communicable diseases such as diabetes, cancer, and hypertension, and communicable diseases such as AIDS (Martin, 2007). In this study, self-reporting of past or current history of chronic diseases is administered.

**History of depressed mood during pregnancy:** For the purpose of this study, history of depressed mood during pregnancy indicates the experience of any episodes of excessive sadness, hopelessness, or depressed mood during a previous pregnancy.

**Physical activity:** Theoretically, physical activity is defined as "a bodily movement produced by skeletal muscles that result in energy expenditure that can be measured in kilocalories" (Caspersen, Powell, & Christenson, 1985). Exercise is a subcategory of physical activity that aims to maintain or improve physical fitness and encompasses structured bodily movements (Caspersen et al., 1985).

As mentioned in Global Recommendations on Physical Activity for Health (WHO, 2010b) and the 2008 Physical Activity Guidelines for Americans (Centers for Disease Control and Prevention [CDC], 2017), an adult, aged 18-64 years, needs a minimum of 150 minutes of

moderate-intensity aerobic activity (e.g. brisk walking) or 75 minutes of vigorous-intensity aerobic activity (e.g. running) per week. The individual has the choice to divide activity time during the day or across a week (CDC, 2017; WHO, 2010b).

For this study, participants are asked to record the frequency of their engagement in a moderate-intensity aerobic activity of at least 30 minutes or in a vigorous-intensity aerobic activity of at least 20 minutes in the past seven days. The assessment includes a list of frequency options for the participants. Physical activities at home or training facilities such as a gym are considered.

**Body Mass Index (BMI):** BMI is calculated by dividing the individual's weight by the square of the individual's height, where weight is measured in kilograms and height in meters ($kg/m^2$) (Carpenter, Hasin, Allison, & Faith 2000). Based on BMI, the weight is classified as follows: 1) underweight (BMI<18.5), 2) normal weight (18.5≤ BMI <25), 3) overweight (25≤ BMI <30), and 4) obese (BMI ≥30) (WHO, 2017c). BMI is recommended by WHO as a weight index because it adequately assesses both sexes and all adult ages (WHO, 2017c). The WHO categorization of BMI is used in the majority of international weight studies, including this study.

### 2.2.3. Psychosocial Factors

Several psychosocial factors are evaluated in the developed SDH framework. The following section lists these factors and their theoretical and operational definitions.

**Religiosity:** is defined as one's personal relationship with a specified faith or doctrine and the related practices (Abdel-Khalek, 2012b). In this study, the participants' attitudes towards Islam will be assessed.

**Domestic violence:** Violence against women encompasses verbal, physical, emotional, and sexual abuse that influences women's dignity and self-esteem (Alhabib et al., 2010). In this study, domestic violence refers to physical abuse demonstrated by the woman's husband, next of kin, or any family member.

**Perception of body image:** is the woman's evaluation of her own body size and the ideal body size. The Stunkard's body silhouettes will be used in this study to evaluate women's perception of their current and ideal body sizes. The Stunkard's body silhouettes (Stunkard et al., 1983), a nine-figure tool that illustrates female body sizes ranging from very thin to highly obese, is used to measure a woman's perception of her body size and her beliefs regarding ideal body size.

**Social support:** is defined as the "structural characteristics of a social network and perceived availability of resources" (Choenarom, Williams, & Hagerty, 2005, p. 20). Operationally, social support refers to the perceived benefits of social networking, which is measured by the acuity or quantity of perceived social support.

**Coping:** Refers to the efforts of an individual to reduce the adverse effects of stressors or stressful situations both, cognitively and behaviorally (Donnellan, Hevey, Hickey, & O'Neill, 2006). When responding to stressors, the individual may implement adaptive strategies of coping, i.e. problem-solving strategies and emotion-focused strategies or maladaptive strategies, i.e. dysfunctional coping strategies or/and avoidant coping strategies (Donnellan et al., 2006).

### 2.2.4. Health Care System

**Access to health care:** In the US, access to health care indicates whether or not an individual is insured (Goddard & Smith, 2001). In Europe, where health services are free, access to health care indicates "the ability of citizens to secure specified range of services, at a specified level of quality, subject to a specified maximum level of personal inconvenience and cost, whilst in possession of a specified level of information" (Goddard & Smith, 2001, pg.1151). Differences in access of citizens to health care depend upon four factors: availability of specified health services, quality of offered services, costs of accessing these services, and information about the availability of certain health services (Goddard & Smith, 2001).

Similar to the European system, access to health services offered through governmental health institutions is free for Omani citizens. However, the inclusion of access to health care as predictor of depression in Omani women is limited to the concept of availability. The availability of mental health clinics, psychologists, and/or psychiatrists in the living area of the participants will be assessed.

Participant willingness to disclose psychological problems and seeking professional help will also be assessed as an additional factor using three questions that adopted from Diala et al. (2001) and Mojtabi (2007) who assessed the attitudes of African Americans and Americans, respectively, towards seeking mental health services. This assessment will give an indication of a woman's attitude towards seeking professional help, which is an indicator of her willingness to access health care services when professional help is needed.

### 2.2.5. Age

**Age:** According to the Oxford University Press (Oxford online dictionary, 2017c), age is "the length of time that a person has lived." In this study, participants identify and report their age in years at the beginning of the data collection process.

# Chapter 3: Literature Review

## Introduction

This literature review discusses the findings of published studies on the factors that predict depression among the Arab population, specifically adult women in Oman. Due to the absence or insufficiency of scientific evidence and data from Oman, data from the countries of the United Arab Emirates (UAE), Bahrain, Qatar, Kuwait, and the Kingdom of Saudi Arabia (KSA), which are collectively known as Gulf Co-Operation Council Countries (GCC), will be reported. Unlike other Arab countries, GCC countries commonly share a similar religion, local language, culture, traditional values, social lifestyle, health care system, political system, and income level (At-Twaijri & Al-Muhaiza, 1996). Additionally, these countries share similar rates of urbanization (Alkhamis, Hassan, & Cosgrove, 2014), health expenditures, health financing, and health challenges in the process and delivery of health care services (Alkhamis et al., 2014). These countries thus tend to be similar in the types of health disorders that are prevalent among their populations, as well as the predictors and impact of these diseases on the general health of the populations. For these reasons, the evidence and data from these countries will be considered in this section. In the absence of relevant studies from GCC, data from other Arab countries will also be utilized. The findings from the Arab literature will also be compared to the findings from Western literature to highlight the commonalities and differences across groups.

The literature review consists of five sections: 1) the definition, etiologies, theories, and consequences of depression; 2) depression in women, which includes theories of depression in women; 3) prevalence of depression in GCC countries; 4) predictors of depression in Arab women in particular, with emphasis on GCC women; and 5) summary of the chapter.

**Definition of Depression**

Major depressive disorder (major depression) is the most common type of depression experienced globally (NIMH, 2015a). Other forms of depression either develops under special conditions, such as postpartum depression, seasonal affective disorder, and posttraumatic depressive disorder (PTSD); lasts for a long period of time, such as persistent depressive disorder (dysthymic disorder), or are present with additional forms of behavioral disturbance, such as psychotic depression (Diagnostic and Statistical Manual of Mental Disorder-5th edition (DSM-5): American Psychiatric Association (APA), 2013; NIMH, 2015a; 2015b; WHO, 2012). Depression is defined based on the symptoms that distinguish affected individuals from unaffected individuals (DSM-5: APA, 2013; NIMH, 2015a; 2015b). Symptoms are thus used as diagnostic criteria for depression, as well as for severity of depression (DSM-5: APA, 2013).

Historically, Beck and colleagues (1979) identified different categories of depressive symptoms. These included affective, motivational, cognitive, behavioral, and physiological depressive symptoms (Cohen, 2008). The symptoms of these categories were reviewed, modified, and applied to the items of the Beck Depression Inventory Scale (2nd edition), used to detect depression and its severity (Cohen, 2008). At same time, these symptoms represent the APA diagnostic symptoms of depression stated in the fourth-revised edition (Cohen, 2008). The current DSM (5th edition) has no changes in the diagnostic symptoms of depression. However, the APA (2013) specified certain conditions to diagnose major depressive disorder. For example, APA (2013) asserts that major depressive disorder in adults manifests itself in five or more symptoms that present for at least two weeks, in which one of these symptoms must be depressed

mood or a loss of pleasure. Additionally, these symptoms are not attributed to other medical or mental diseases, such as substance abuse (DSM-5 [APA], 2013).

Although the symptoms of depression are well defined and tested in the literature, it was evidenced that these symptoms may vary due to variations in physiological, behavioral, cognitive and environmental factors, as well as personality traits of people (Schwartz & Schwartz, 1993).

## Etiologies of Depression

The definite etiology of depression is not well identified and is commonly debated in the literature. However, it has been agreed that there are internal and external factors that function as etiologies of depression (National Institute of Mental Health [NIMH], 2015b; Schwartz & Schwartz, 1993). The internal-related explanations of depression depend on biological theories of the disease, whereas, the external-related explanations that focus on the environmental factors, depend on behavioral, cognitive, and sociocultural theories of depression (Schwartz & Schwartz, 1993). There is a common agreement in the literature that depression is a result of an interaction between biological and environmental factors (NIMH, 2015b; Schwartz & Schwartz, 1993; Sullivan, Neale, & Kendler, 2000), and the etiology of depression can be bidirectional (Schwartz & Schwartz, 1993). To better understand depression, it is important to consider different perspectives on the etiologies of depression. The next section provides a brief overview of the most well-known theories of depression with respect to biological, behavioral, cognitive, and sociocultural perspectives.

**Biological Perspectives.** The biological perspective focus on the effect of genes and endocrinal hormones as the etiology of depression. Several scholars present evidence on the influence of genes (Caspi et al., 2003; Middeldorp et al., 2009; Sullivan et al., 2000) and the

endocrine system (Barden, 2004; Rubin, Phillips, Sadow, & McCracken et al., 1995) on development of depression and depressive symptoms. To validate the influence of biological factors, scholars studied the prevalence and incidence of depression in families.

Sullivan et al. (2000) reported a 31% - 42% of people inherit risk of major depression. Caspi et al. (2003) demonstrated that individuals with one or more copies of the short allele of the serotonin transporter gene-linked polymorphic region (5-HTTLPR) reported more depressive symptoms, and were more frequently diagnosed with major depressive disorder that is relevant to stressful events than those with long allele of the gene. Middeldorp et al. (2009) suggested a linkage of certain chromosomes to the vulnerability of lifetime major depressive disorder and found a suggestive linkage between chromosomes 2, 8, and 17, and vulnerability to major depressive disorder. In contrast to Caspi et al. (2003), Middeldorp et al. (2009) reported no evidence of the influence of 5-HTTLPR on the risk of developing major depressive disorder. However, Caspi et al. (2003) stressed that the importance of gene-environment interaction has a great impact on increasing the risk of depression.

Another biological explanation relates the vulnerability of depression to the influence of the endocrine system (Barden, 2004; Rubin et al., 1995). It has been documented that abnormalities of pituitary and endocrinal hormones, specifically the increase of the volume of the hypothalamopituitary-adrenocortical (HPA) axis, were observed in major depressive patients (Barden, 2004; Rubin et al., 1995). Moreover, the mean volume of adrenal gland significantly was lowered, i.e., by 70%, in major depressive patients after successful treatment (Rubin et al., 1995).

**Behavioral Perspectives.** The central theme of the behavioral perspective of depression is that a lack of, or little experience of positive reinforcement is a critical antecedent for the onset of depression (Lewinsohn, Hoberman, & Clarke, 1989; Lewinsohn, Hoberman, & Rosenbaum, 1988). Lewinsohn, Biglan, and Zeiss (1976) suggest that a balance of positive and harmful experiences is a necessity for normal and stable mood. However, low rates of pleasant events also increase individuals' vulnerability to depression (Lewinsohn et al., 1989; Lewinsohn et al., 1988).

Another behavioral perspective that has been identified as a prominent theory of depression was developed by Wolpe (1982) (Schwartz & Schwartz, 1993). Wolpe identified three categories of depression, namely, situational depression, biological depression, and neurotic depression. Situational depression is the type of depression that is commonly experienced by everyone as a reaction to failure or deprivation (Schwartz & Schwartz, 1993). On the other hand, biological depression differs in severity and occurs as a consequence of drugs or physical diseases, and therefore is treated biologically (Schwartz & Schwartz, 1993). Neurotic depression is due to external stimuli, such as anxiety and stress. Wolpe's behavioral theory of depression classified neurotic depression into four classifications, with specific causes and treatment methodologies for each (Schwartz & Schwartz, 1993). Regardless of the classification, behavioral treatment is the appropriate approach for patients with neurotic depression (Schwartz & Schwartz, 1993).

**Cognitive Perspective.** Beck's Cognitive Theory of Depression is one of the main cognitive perspectives that explain depression. Beck's theory suggests that dramatic life events that an individual experiences turn into negative thinking about self, i.e., maladaptive thinking

(Schwartz & Schwartz, 1993). As a result, feelings of hopelessness, helplessness, and worthlessness emerge that may lead to suicidal possibilities (Schwartz & Schwartz, 1993). Beck called this cognitive process a depression cognitive triad (Haaga, Dyck, & Ernst, 1991; Schwartz & Schwartz, 1993). The cognitive triad that encompasses the automatic negative thoughts, i.e., unconscious, repetitive, and uncontrolled negative feelings of self and future, was observed in depressed patients (Haaga et al., 1991; Schwartz & Schwartz, 1993). According to Haaga et al. (1991), several aspects of Beck's Cognitive Theory of Depression have been confirmed empirically, including feelings of negativity and helplessness. However, the hypothesis of causality between cognitive triad and depression require more clarification and evidence (Haaga et al., 1991). Based on cognitive theory, Beck adopted the cognitive-behavioral model of treating depression (Schwartz & Schwartz, 1993).

**Sociocultural Perspective.** Supporters of this perspective emphasize the great impact of an individual's own social environment and context in increasing or decreasing his/her likelihood of depression. It is known that depression is related to a reaction to a substantial loss in interpersonal relationships, social status, or rewards (Kirmayer, 2001).

According to Kleinman (2004), culture has a great impact on risk factors and protective factors of depression. Therefore, scholars discouraged stereotyping and generalizing those factors to all ethnicities (Kleinman, 2004). The effects of culture, ethnicity, and social systems appear in the disparate prevalence rates of depression and symptoms of depression among races (Kleinman, 2004). Cultural and social factors influence the effects of stressors, experienced depressive symptoms, coping strategies, and the desire for help-seeking (Kirmayer, 2001).

Moreover, culture influences the diagnosis of depression, the utilization of antidepressant drugs, and forms of resilience (Kleinman, 2004).

Culture shapes the internal and external presentation of a behavior, as well as the ways that people define and understand reality (Marsella, 2003). As the experience of depression differs across cultures, depression must be explained within each cultural context (Marsella, 2003). The concept of selfhood versus collectivism, and personal control are two of the major cultural determinants of depression (Marsella, 2003).

In collectivistic cultures, wherein social bonding is encouraged, the symptoms linked with depression that are commonly reported in Western cultures, such as loneliness and isolation, are less evident (Marsella, 2003). The loss of personal control has been linked to the experience of depression and its symptoms, including helplessness and detachment in many Western cultures (Marsella, 2003). However, in other cultures, such as Asian cultures, the impact of losing personal control is not similar to its effect on Western populations due to the lower value placed on personal control relative to family bonding and collectiveness (Marsella, 2003).

**Consequences of Depression**

According to Vos et al. (2012)'s Global Burden of Disease Study (2010), mental disorders were found to be the major cause of disability in adults, in terms of the total healthy years lost due to disability. The contribution of mental disorders to disability reached 36% for the age group of 20-29 years old. Major depressive disorder contributed 8.1% of total years lost due to disability for all ages, following low back pain (Vos et al., 2012). Depression is known as one of the most prevalent and pervasive mental disorders in the world (WHO, 2012). Indeed, it is

documented that depression has the greatest adverse impact and poorer health outcomes in comparison to other chronic diseases, such as diabetes and angina (Moussavi et al., 2007).

**Economic Consequences.** Depression has a substantial impact on financial and other resource expenditures in societies due to the high rate of prevalence, high incidence of comorbidity, and its influence on individual function and working productivity (Donohue & Pincus, 2007). The burden of depression in terms of total financial expenditures, direct and indirect costs in the U.S. alone was $83.1 billion in 2000, compared to $43.7 billion in 1990 (Greenberg et al., 2003). The direct medical costs, which indicate the amount of money used for treating depression, account for 31% of the total expenditures in 2000 (Greenberg et al., 2003). The majority of expenditures were for indirect costs (Donohue & Pincus, 2007; Greenberg et al., 2003), including suicide-related costs that accounted for 7%, and work-related costs that accounted for 62% of total expenditures in the same year (Greenberg et al., 2003). The high expenditures due to depression were also reported in 28 European countries, with a total estimation of € 118 billion in 2004 (Ladin, 2008).

**Health Consequences.** In addition to the psychological effects, depression is a chronic disease with a group of signs and symptoms that have a great impact on individuals' normal lifestyles and abilities, including sleeping, eating, working, and participating in pleasurable activities (DSM-V [APA], 2013). In general, depression has a greater negative impact on quality-of- life in comparison to other diseases, including cardiovascular diseases and metabolic syndromes (Reed et al., 2009). Reed et al. (2009) found that the frequency, duration, and severity of depressive episodes in 3,468 clinically depressed European adult patients, including women, were negatively associated with health-related quality-of-life ($p < 0.001$). The participants of the

study showed improvement in health-related quality-of-life outcomes with antidepressant treatment, which was significant in the first three months of treatment (Reed et al., 2009).

Depression, on the other hand, affects the prognosis and outcomes of other diseases, and increases the morbidity and mortality in various medical conditions such as diabetes (Golden et al., 2008; Knol et al., 2006; Mezuk et al., 2008; Young et al., 2010), coronary heart disease (Barth, Schumacher, & Herrmann-Lingen, 2004; Whang et al. 2009), and stroke (Pan, Sun, Okereke, Rexrode, & Hu, 2011). Knol et al. (2006) reported that adults with depression or with high levels of depressive symptoms showed a 37% increase in the risk of type II diabetes than non-depressed individuals with low depressive symptoms. Alternatively, Mezuk et al. (2008) reported a 60% increase in the risk of developing type II diabetes in depressed individuals. In a longitudinal cohort study, Golden et al. (2008) reported 1.10 times higher risk of type II diabetes for each five units increase in depression score in adults, 45-84 years old. In a longitudinal prospective cohort study of 4,128 diabetic subjects with fifth stage chronic kidney disease, patients with comorbid depression showed a nearly three-fold higher risk for death than non-depressed patients (HR= 2.95, 95% CI = 1.24-7.02) (Young et al., 2010).

The Nurses' Health study cohort of 121,482 female registered nurses, aged 30-55 years old, and without baseline coronary heart disease, revealed that depressive symptoms at baseline are significantly associated with the risk of fatal coronary heart diseases, excluding biological factors (Whang et al. 2009). A meta-analysis of 20 prospective cohort studies published between 1988 and 2003 from the U.S. and Europe was conducted to evaluate the effect of depression on overall mortality and mortality due to cardiac diseases (Barth et al., 2004). Adjusting for cardiac risk factors, depressive symptoms showed a significant effect on mortality (Adjusted Hazard

Ratio [aHR] = 1.76; 95% CI, 1.27-2.43). Unlike non-depressed patients, clinically depressed cardiac patients showed a two-fold higher risk of death two years after initial assessment of coronary heart disease (Odds Ratio [OR] = 2.24, 95% CI = 1.37-3.60) (Barth et al., 2004). Barth et al. (2004) found a significant effect of clinical depression on mortality in studies with longer follow-up periods. These findings contradict the existing hypothesis that the effect of depression lessens over time.

A meta-analysis and systematic review analyzed 28 global prospective cohort studies (*N* = 317540) and revealed that among 8,478 stroke cases, depression was a risk factor in 188 cases of fatal and non-fatal stroke (Pan et al., 2011). According to Pan et al. (2011), 14 studies showed a statistically significant effect of depression as a risk factor for stroke in terms of morbidity and mortality (HR= 1.45; 95% CI, 1.29-1.63).

**Suicide.** In addition to chronic diseases, the lifetime risk of suicidal ideation and suicide attempts increased with major depression (Holma et al., 2010; Donohue & Pincus, 2007). According to Holma et al. (2010), the incidence of suicide attempts was greater among women than men with major depressive disorder in Finland. Women accounted for 77.8% of total suicidal attempts cases in 249 studied cases (Holma et al., 2010). In general, Holma et al. (2010) reported that the incidence rate of suicide attempts increased 21-fold during the episode of depression, and the greatest rate of increase occurred during major depressive episodes. Bolton, Pagura, Enns, Grant, and Sareen (2010) similarly found that the incidence of suicide attempts was higher among participants with major depressive disorder in a longitudinal three-year study of 34,653 American participants aged 18 years and older, with women accounting for 65.7% of the entire sample. The reported incidence among depressive participants over the three-year

study was 1.2% (Bolton et al., 2010). The risk for suicide attempts increased with the existence of comorbid diseases in major depressive patients, such as anxiety and substance abuse, adjusting for sociodemographic factors (Adjusted Odds Ratio [aOR]= 2.20; 95% CI, 1.27-3.83) (Bolton et al., 2010).

## Women and Depression

The prevalence and causes of depression in women are extensively studied and documented. The literature consistently reports higher rates of depression in women than in men (Burt & Stein, 2002; Kessler, 2003; Nolen-Hoeksema, 2001). In fact, it is reported that women experience depression two times more than men (Nolen-Hoeksema, 2001). This difference in prevalence rate is seen with diagnosed depression and subclinical symptoms, and across ethnicities and cultures (Nolen-Hoeksema, 2001). The difference in the prevalence of depression between the two genders begins at the age of puberty (Burt & Stein, 2002; Kessler, 2003; Nolen-Hoeksema, 2001; Patton et al., 2008) and increases at childbearing age (Kessler, 2003; Patton et al., 2008).

Several explanations were proposed to rationalize the difference in prevalence and incidence of depression in women than men. However, no single explanation is counted as the definitive cause of the variation (Nolen-Hoeksema, 2001). According to a biological explanation, it is been proposed that hormonal changes during puberty, menstruation, postpartum, and menopause transition are linked to the increased risks for depression (NIMH, 2015b). The fluctuation in ovarian hormones during these periods was significantly associated with developing depression (Cohen et al., 2006; Freeman et al., 2006). In support of this argument, Cohen et al. (2006) reported that women with no history of major depression and in the

transitional period of menopause are two times more likely to suffer from depressive symptoms than premenopausal women with no history of major depression. Freeman et al. (2006) reported a four times higher risk among women in transition of menopause of developing depressive symptoms than premenopausal women (OR= 4.19, 95% CI = 2.39-7.72, $p < 0.001$). The likelihood of diagnosing women with depressive disorder is two and half times higher in the transitional period of menopause than in the premenopausal period (OR= 2.50, 95% CI= 1.25-5.02, p= 0.01) (Freeman et al., 2006).

It has been documented that the HPA axis has an effect on the secretion of cortisol that in turn, affects the biochemistry in the brain that controls moods and emotions (Barden, 2004; Nolen-Hoeksema, 2001; Rubin et al., 1995). Women are known to have more deregulated HPA during stressful events than men, which may explain the increases of their vulnerability to depression (Nolen-Hoeksema, 2001).

Another explanation focused on the effect of the social role of women and its linkage to depression. According to the supporters of this view, the traditional role and social status of women contribute to the differences in the rate of depression between the two genders (Kessler, 2003; Nolen-Hoeksema, 2001). The unequal treatment and discrimination that women commonly experience due to the low social status of women increase their vulnerability to mental health disorders (Kessler, Mickelson, & Williams, 1999). The unequal status that women experience decreases their sense of power and increases their sense of hopelessness and low-self esteem, which makes them more vulnerable to psychological problems (Hamdan, 2009). There are additional social-related factors that may contribute to the higher prevalence of depression in women, such as domestic violence and abuse (Nolen-Hoeksema, 2001; Tjaden & Thoennes,

2000) and the dual roles and responsibilities of women as housewives and employees (Nolen-Hoeksema, 2001).

The difference in personality traits between men and women, in terms of their response to stressors, is another explanation for the higher rate of depression in women. According to Maciejewski, Prigerson, and Mazure (2001), women are three times more likely to develop major depression due to stressors than are men. Stressful events that are related to interpersonal losses contribute to this higher risk of developing depression in women than in men (Maciejewski et al., 2001). Furthermore, although men and women may be threatened by similar stressors, their biological responses and coping styles in reaction to theses stressors tend to differ to these stressors differ (Nolen-Hoeksema, 2001). Women are more likely to ruminate when challenged with stressors, which inhibits them from acting to solve problems and ultimately lead to developing depression over time (Kessler, 2003; Nolen-Hoeksema, 2001).

Dependency as a personality trait in women was also linked to the tendency of increased occurrence of depressive symptoms in women than men (Widiger & Anderson, 2003). It has been proven that dependency increases a person's weakness, maladaptive problems, and increases vulnerability to mood disorders, including depression (Widiger & Anderson, 2003).

The difference in personality traits between depressed women and men is also observed in the symptoms reported by both genders (Kessler, 2003; Kornstein et al., 2000; Perugi et al., 1990; Young et al., 1990). Women experience more chronic and greater numbers of depressive symptoms than men (Kornstein et al., 2000). The difference in reporting symptoms also includes the frequency of symptoms reported. Women tend to report more frequency of anxiety and somatization (Kornstein et al., 2000; Perugi et al., 1990), sleep changes and psychomotor

retardation (Kornstein et al., 2000), and changes in appetite and weight than men do (Young et al., 1990). Unlike these findings, Bogner and Gallo (2004) reported no difference in the experienced depressive symptoms by gender in terms of pattern and rates. However, Bogner and Gallo (2004) admitted that this finding is subject to the study's limitations, including recall bias and lost participants. Kessler (2003) argued that the difference in prevalence of depression by gender can be explained by the fact that depressed men are more likely to manifest depression with irritability rather than typical symptoms, which results in underestimation of its prevalence in men.

## Prevalence of Depression in GCC Women

The prevalence of depression among the GCC population, in general, was assessed in various countries of the region. Depression in Al-Ain City, UAE, reached 10.3% in women compared to 2.8% in men (Daradkeh et al., 2002). However, in another study of the same population, the results showed no gender difference in relation to the frequency of depressive symptoms, and the difference was only observed in the intensity of depression, which was higher in women (Daradkeh et al., 2005). In another Emirati city, Sharjah, 18% of 224 Arab women were severely depressed, and 14.7% were moderately depressed (Hamdan et al., 2008). In Kuwait, 21.7% of women who attend primary health care facilities were found to be depressed in comparison to 15.3% of men (Al-Otaibi et al., 2007). In the Saudi population, the rate of depression reached 20%, and 67% of the depressed population were women (Becker, 2004). A recent study in Saudi Arabia revealed that depression is significantly associated with gender (i.e. being a female) ($p= 0.04$); however, the exact prevalence rate among female participants was not reported (Al-Qadhi et al., 2014). A study of the prevalence of depressive symptoms in Qatar

found a prevalence of 30.1% in women in comparison to 26.6% in men (p= 0.219) (Bener et al., 2012). Except for Daradkeh et al. (2002), all other investigators assessed the prevalence of depression in samples attending primary health care centers (Al-Otaibi et al., 2007; Becker, 2004; Bener et al., 2012; Daradkeh et al., 2005; Hamdan et al., 2008). Daradkeh et al. (2002) examined a community sample from the city of Al Ain.

In assessing the prevalence of depression in the studies presented below, various screening tools were utilized to detect the depression rate in these studies including the Beck Depression Inventory Scale (BDI) (Al-Otaibi et al., 2007, Hamdan et al., 2008), Patient Health Questionnaire (PHQ) (Al-Busaidi et al., 2011; Al-Salmani et al., 2015; Al-Qadhi et al., 2014; Becker, 2004; Daradkeh et al., 2005), modified version of the Composite International Diagnostic Interview (CIDI) (Daradkeh et al., 2002), and Hospital Anxiety and Depression Scale (HADS) (Bener et al., 2012).

**Prevalence of Depression in Omani Women.** In Oman, to the best of our knowledge, there are only three studies that reported the prevalence of depression in Omanis, wherein adult women were included. A recent study used PHQ-9 questionnaire reported that overall prevalence of depression among Omani adults aged 18 years and more in Muscat governorate, female participants were 61.8%, was 8.1% (Al-Salmani et al., 2015). Al-Salmani et al. (2015) revealed that 67.3% of depressed participants were female, and being a female is a significant contributor of depression among Omani adults (P= 0.03, OR= 1.34, 95%CI=1.12-3.82). Another recent study reported that 59% of referred patients for psychotherapy services were adult women and 22% of the referred patients, of both genders, were diagnosed with depression (Al-Sharbati, Hallas, Al-Zadjali, & Al-Sharabati, 2012). An earlier study conducted to assess the prevalence of

depression among college students in Oman, with a mean age of 20.8 years (SD = 1.66 years), showed an overall prevalence of depression at 27.7% (Al-Busaidi et al., 2011). The prevalence of depression in female subjects (N= 238) was 30.7% (Al-Busaidi et al., 2011). According to these authors, 8% of female participants had severe depression as measured by the Patient Health Questionnaire (PHQ-Arabic version) scores of 20 and more. Moderate depression, PHQ score of 16-19, was reported as most prevalent (12.2%) among female Omani college students (Al-Busaidi et al., 2011).

## Predictors of Depression in Women

There are multiple risk factors that either increase or minimize the vulnerability of depression in women. Socioeconomic status (SES) including education (Akhtar-Danesh & Landeen, 2007; Laden, 2008; Ross & Mirowsky, 2006;Velde, Bracke, & Levecque, 2010), marital status (Akhtar-Danesh & Landeen, 2007; Velde et al., 2010), employment (Camino et al., 2000; Mossakowski, 2009), and income level (Wang, Schmitz, & Dewa, 2010) have been linked to depression. Material circumstances such as living arrangements have been also correlated with depression (Mowbray et al., 2005). Biological and behavioral risk factors, such as history of chronic illness (Egede & Ellis, 2010; Moussavi et al., 2007), physical activity (Simon et al., 2010; Zhao et al., 2009; Galper et al., 2006; Harris et al., 2006; Jacka et al., 2011), and body mass index [BMI] (Pan et al., 2012; Simon et al., 2010; Zhao et al., 2009) have likewise been named. Psychosocial factors linked to depression have included religiosity (Smith et al., 2003), stressors such as domestic violence (Evans-Campbell et al., 2006; Dienemann et al., 2000), perception of body image (Kim & Lee, 2010; Winstanley & Dives, 2005), social support (Aranda et al., 2001; Dalgard et al., 2006; Kendler et al., 2005) and coping (Kelly et al., 2008;

Matud, 2004). Access to health care is an important indicator of health system that has been linked to depression too (Nasir & Al-Qutob, 2005; Okasha, 2003). Age was also linked to depression in different societies (Al-Otaibi et al., 2007; Al-Salmani et al., 2015; Kessler et al., 2010a; 2010b; Patten et al., 2006),

Several of these predictors have been examined with various ethnicities. However, there are limited empirical studies have explored the predictors or contributing factors of depression in Arab women (Hamid et al., 2004), and those studies focused primarily on SES as predictors of depression. Studies on the influence of the other predictors, such as behavioral factors, access to health care, domestic violence, perceived body image or weight, history of chronic illness, social support, and coping style are either scarce or non-existent. As the impact of social and culture values may influence depression in Arab women differently than among women of other cultures, it is important that this study be conducted. Indeed, Hamdan (2009) stressed that there is a large diversity within the Arab countries itself; therefore, the mental health findings and risk factors should not be generalized to all Arab populations.

**Socioeconomic Factors**

**Education.** Education has frequently been recognized as a significant factor in elucidating variability in the prevalence of depression. Everson et al. (2002) noted that the prevalence of depression in the U.S. is higher in individuals with less than a high school education than individuals with a high school education or more, i.e., 21% and 12%, respectively. Likewise, data from a large European cross-sectional study assessed the predictive effect of education on late-life depression among women (N = 22,777); findings revealed that the prevalence of depression in women was 15% higher in adults with low education than adults

with high education (Ladin, 2008). Men and women with less than a high school education were almost two times more at risk of developing depression late in the life relative to people with a high school education or higher ($p < 0.001$) (Ladin, 2008). Education likewise persists as a significant and independent predictor of depression in late life in adult men and women in 10 European countries as well (Ladin, 2008).

In contrast, Akhtar-Danesh and Landeen (2007) reported a higher prevalence of lifetime depression among Canadians (N= 12,376), of whom 54.3% were women, among those with post-secondary education than individuals with less than secondary school education (OR= 1.54, 95% CI = 1.22-1.93). The association between educational level and 12-month depression was not significant (OR= 1.35, 95% CI= 0.97-1.86) (Akhtar-Danesh & Landeen, 2007).

In a large epidemiological study of 25 European countries (N= 36,725), the influence of education on development of depression was stronger in women than men ($p < 0.001$) (Velde et al., 2010). Similarly, the effect of interaction between education and sex on the development of depression was seen in the U.S. population (N= 2,592) (Ross & Mirowsky, 2006). According to Ross and Mirowsky (2006), a significant negative association was found between education and depression ($t = - 2.895$, $p < 0.01$), which indicated that higher prevalence of depression was observed in adults with lower educational level; this association was nearly two times higher in women than men. However, the gap in depression between men and women is reduced and becomes insignificant with degree level of education or higher (Ross & Mirowsky, 2006). The reduction in the gap is explained by the effect of higher education in increasing the sense of control in women and increasing work creativity; both of which contribute to better emotional well-being (Ross & Mirowsky, 2006).

The evidence from GCC countries shows inconsistent findings from one country to another, and with Western findings, with respect to the association between education and depression. While Bener et al. (2012), Daradkeh et al. (2002), and Hamdan et al. (2008) found that education is not a significant predictor of depression in Qatari and Emirati women (p= 0.882, p= 0.479, p= 0.55, respectively), Al-Otaibi et al. (2007) and Al-Salmani et al. (2015) reported that education was a significant predictor of depression in the Kuwaiti and the Omani and populations, including women. Al-Otaibi et al. (2007) studied the prevalence of depression among 2,320 adult Kuwaitis attending primary health care centers as well as the impact of SES on depression. The age of participants ranged from 21 to 64 years of age and women comprised 53.2% of the total sample (Al-Otaibi et al., 2007). Al-Otaibi et al. (2007) reported a higher prevalence of depression among Kuwaitis with university or higher degrees, and lowest prevalence of depression among Kuwaitis with less than a high school education (16.6% vs. 8.3%, p= 0.0001, respectively). Al-Otaibi et al. (2007) suggest a possible reason for this variation in the finding from Western literature result from high societal demands and expectations being placed on highly educated Arab individuals, which may result in great frustration among this population. Al-Salmani et al. (2015) studied 2005 adult Omani from Muscat governorate, 18 years of age and older and who attended primary health care clinics, using PHQ-9 questionnaire and reported that graduated Omani participants or those attending higher education classes exhibited greater risk of depression (OR=1.40, 95% CI= 1.03-2.66, p=0.04).

In Jordan, Daradkeh et al. (2006) conducted a cross-sectional study with 2,000 Jordanian women attending primary health care centers in the city of Irbid. Their findings revealed a significant association between illiteracy and psychiatric disorders, including depressive disorder (p= 0.0001) (Daradkeh et al., 2006). The highest prevalence rate of depression was reported

among illiterate women (47.3%), while the lowest prevalence rate was among women with 13 years of education or more (27.7%)(Daradkeh et al., 2006). This finding was supported by the finding of Moselhy et al. (2012) who examined depression in 1,224 adults (623 were women) from two Emirati cities, Al-Ain and Abu-Dhabi and reported a higher prevalence of depression in Emirati adults with lower educational attainment, and the lowest prevalence was among Emirati adults with a university educational level (p=0.001).

**Marital Status.** Marital status is another factor that can act as a predictor or protective factor for depression. The lowest prevalence of depression is commonly reported in married people in comparison to people in post-marital status, i.e. divorced, separated, or widowed (Akhtar-Danesh & Landeen, 2007; Bromet et al., 2011). Separated Canadians showed nearly a three-fold higher risk of lifetime depression than married Canadians (OR= 2.65, 95% CI= 1.91-3.67) (Akhtar-Danesh & Landeen, 2007). Similarly, divorced Canadians had a three-fold greater risk of lifetime depression than married Canadians (OR= 3.33, 95% CI= 2.46-4.50), while widowers were 1.30 times more at risk of lifetime depression than married Canadians (95% CI= 0.89-1.90) (Akhtar-Danesh & Landeen, 2007). The significant association between depression and being divorced or separated ($p < 0.01$), being widowed ($p < 0.001$), and being single ($p < 0.001$) was seen in 25 European countries (Velde et al., 2010). Living with a partner was reported as a significant factor to decrease the risk of depression for both men and women (Velde et al., 2010).

Patten et al. (2006) reported that the effect of marital status on major depression differs by age. According to Patten and colleagues (2006), both being single (Wald statistic 12.030, $p = 0.00052$) and post-married, i.e. divorced, widowed, or separated (Wald Statistic 8.503, p =

0.0035) were associated with a higher prevalence of major depression in both genders from Canada. However, the effect of being single increased with age, and the effect of post-marital status decreased with age (Patten et al., 2006).

Another large epidemiological study (N= 89,037) estimated the prevalence of major depressive episodes for 18 countries; findings revealed that the influence of marital status on major depressive episodes varied significantly with income level ($X^2_3 = 124.4$, $p < 0.001$) (Bromet et al., 2011). Being divorced or widowed was reported as a stronger contributor to major depressive episodes in low-middle income countries, while being separated or never married were contributors in high-income countries (Bromet et al., 2011). Thus, the effect of marital status on depression might be moderated by other factors such as income level.

Generally, the positive effect of marriage on general health is linked to greater financial resources, greater social networking and support, and life enjoyment as compared with unmarried or post-married women (Williams & Umberson, 2004). However, Williams and Umberson (2004) stressed that the protective effect of marriage from poor health is greater for men than women. For women, the protective benefits of marriage are more notable for those without jobs than those with part-time or full-time jobs (Waldron, Hughes, & Brooks, 1996). However, Waldron et al. (1996) emphasized the role of family income level in strengthening the interaction between marital status and better health in women.

The findings of Western studies in regards to the impact of marital status on depression were consistent with two Emirati studies (Daradkeh et al., 2002; Hamdan et al., 2008). In a cross-sectional survey of 1,394 adults from Al Ain City, UAE, Daradkeh et al. (2002) reported that post-marital (divorced, widows, separated) status was linked to higher rates of lifetime

depression in women (11.6%). Unlike single and married women, the confidence interval of depression in post-marital women was not reported in the study. Similarly, Hamdan et al. (2008) found that single and post-marital status linked to higher scores of depression among woman in the UAE ($p < 0.05$).

On the other hand, Al-Salmani et al. (2015), Al-Otaibi et al. (2007), and Bener et al. (2012) reported different findings. Al-Salmani et al (2015) found a significant association between marital status and depression in Oman ($p=0.02$) and those married participants are more likely to be depressed compared to single participants (OR= 1.91, 95% CI= 1.11-3.30). However, Al-Salmani et al. (2015) did not specify the impact of gender difference in regards to the association between marital status and depression. Among Kuwaitis, the lowest reported depression rate was among divorced individuals (4.5%), and the highest was among married individuals (22.5%), with a significant association between marital status and depression ($X^2 = 58.81$, $p = 0.0001$) (Al-Otaibi et al., 2007). Al-Otaibi et al. (2007) assert that dysfunctional marital relationship or marital responsibilities would be the explanation of the finding. Likewise, Bener et al. (2012) examined 1,660 patients, 893 were females, attending primary health care centers in Qatar and found that among the depressed Qatari women (N=119) the highest prevalence of depression was among married women (85.7%, $p = 0.035$).

**Employment.** Employment status is an undeniable contributor of depression**.** A cross-sectional study of 2665 Australian adults, 55% of whom were women attending general practice clinics, revealed that unemployed participants were 2.7 times more at risk to experience symptoms of depression than employed participants (95% CI= 2.1-3.6) (Camino et al., 2000). The risk of being diagnosed with depression and receiving treatment was doubled in unemployed

participants compared to those who were employed (15.7%; 95% CI= 14.2-17.2%, $X^2$ = 34.2, df = 1, $p < 0.001$) (Camino et al., 2000). In another cross-sectional study of young American men and women (n= 8290), unemployment status was independently and significantly associated with depressive symptoms ($p < 0.001$) (Mossakowski, 2009).

Another area of inconsistent of findings between Arabs in GCC countries and Western populations were those relevant to working status and depression. For example, Al-Otaibi (2007) reported a higher prevalence of depression among working than non-working Kuwaitis of both genders (26.9% vs. 5.3%, $p < 0.05$, respectively). In Oman, the employed adults showed higher risk for depression, and those working in private sectors reported greater depression risks than those working in public sectors (OR= 1.72, 95% CI= 1.08-2.75, p= 0.02) (Al-Salmani et al., 2015). Similarly, Hamdan et al. (2008) reported that employment (full- time or part-time) among women was significantly correlated with depressive symptoms ($p < 0.05$). According to Hamdan et al. (2008), Arab women may not have a similar level of interest in being an employee as women in other cultures. Furthermore, familial responsibilities and workplace-related difficulties may motivate this finding among Arab women (Hamdan et al., 2008). Bener et al. (2012) examined the prevalence of depression by type of employment, and found that a higher prevalence of depression was found among Qatari women with professional jobs (44.5%) followed by housewives and non-working women (41.2%).

**Income.** The influence of personal annual income and household annual income and depression has not been well studied (Wang et al., 2010). Personal income and household income have been combined with other SES indicators such as working status, when assessing their relationship with mental disorders in most studies (Wang et al., 2010). Wang et al. (2010)

reported that Canadians with lower annual income are at a higher risk of developing major depressive episodes than those with higher annual income. However, the difference was not statistically significant when tested by gender (Wang et al., 2010). The significant relationship between personal annual income, household income, and major depressive episode was reported in Canadian men, and those who did not have a job in the past year (Wang et al., 2010).

Weich, Lewis, and Jenkins (2001) found that in British regions with greater income inequalities, the risk of being diagnosed with common mental disorders ranged between 60% to 110% in populations with low income. In a meta-analysis of 60 studies conducted in different countries, including the U.S., Lorant et al. (2003) reported that a 1% increase in the relative ranking of income results in 0.74% reduction in the odds ratio of developing depression. Sixty percent of the populations included in the meta-analysis were women with an average age of 42 years (Lorant et al., 2003). In addition to its direct influence, it has been documented that income level mediates the association between depression and other SES factors such as marital status (Waldron et al., 1996).

To best of our knowledge, the studies of Bener et al. (2012) and Hamdan et al. (2008) are the only studies that investigated the correlation of income with depression in the GCC region. Hamdan et al. (2008) classified the participants, based on family monthly income level, into three categories: 1) < 1,360; 2) $1,360-$4,084; and 3) > $4,084. Hamdan et al. (2008) reported a significant correlation of family income level and depression ($p < 0.5$), and the highest prevalence of depression was among women with family incomes of less than $1,360 (< AED 5000). Surprisingly, Bener et al. (2012) found that the highest prevalence of depression in Qatar was among women with household incomes of more than QR 15,000/month (40.3%). Qatari men in

the same rank of household income reported the lowest prevalence rate of depression (21.0%)(Bener et al., 2012). The association between household income per month and depression was significant (p = 0.002) (Bener et al., 2012).

**Material Circumstances**

**Living Arrangements.** In current study, family structure (living alone, living only with a spouse, living in a nuclear family, or living in an extended family) number of children, and place of residence (rural vs. urban residence) were investigated in relation to their influence in predicting depression in Omani women.

Family structure is one component of living arrangement that has been investigated in Western populations in regards to its relationship to mental health in non-Arab populations. Hughes and Waite (2002) reported that married American women who were living with others were 37% more at risk for depressive symptoms than married American women who were living only with their husbands. Joutsenniemi et al. (2006) assessed the contribution of living arrangements in developing psychiatric disorders including depressive symptoms, among people in Finland. These authors analyzed data from 4,685 individuals and found that people living with other than their partner were nearly at a two-fold greater risk to experience depressive symptoms than married individuals. However, a stronger correlation was observed in men than women (OR= 1.94, 95% CI= 1.25-3.00 vs. 1.76, 95% CI= 1.21-2.55; respectively) (Joutsenniemi et al., 2006).

Living with an extended family was also linked to more positive outcomes in women with mental illness (Mowbray et al., 2005). Mowbray et al. (2005) suggested that positive outcomes were due to the social support that mentally ill women attained from family members.

However, this was observed in African American women but not with Caucasian and Hispanic American women (Mowbray et al., 2005).

In regards to number of children, Daradkeh et al. (2002) assessed the prevalence of depression by number of children, and found that prevalence is lower in women with three of less children. However, the association between the number of children and depression was not statistically significant ($p= 0.943$). Similarly, Hamdan et al. (2008) reported no significant association between number of children and depression score ($p= 0.211$). Alternatively, having more than three children was significantly associated with higher depression scores among Kuwaitis, in comparison to parents with less than three children or those without children (Al-Otaibi et al., 2007).

In terms of place of residence, to best of our knowledge there is no study to assess the differences between rural and urban residences in respect to the prevalence of mental illness in GCC and Arab region. Internationally, studies reported a significant association between the geographical location of individuals and the risk of mental illness, including depression (Peen et al., 2010; Romans et al., 2011). Peen et al. (2010) conducted a meta-analysis of 110 studies from developed countries to assess the difference between urban and rural population in terms of the prevalence of psychiatric disorders, including mood disorders, anxiety, and substance use. The subjects' age was 18 years and above (Peen et al., 2010). The total number of subjects and their gender was not reported. Major depressive episodes were used to assess the prevalence of mood disorders if reported (Peen et al., 2010). Peen et al. (2010) analysis revealed that pooled urban prevalence rate of mood disorders was 39% higher than pooled rural prevalence rate of rural

areas. A significant pooled adjusted OR for mood disorders was reported (OR= 1.28, 95% CI= 1.13-1.44, $p < .001$) (Peen et al., 2010).

Findings of a Canadian study involving 31,321 participants (15-69 years old), 53% of whom were women, showed that the prevalence rate of depression in urban areas was higher in compare to the prevalence rate in rural areas (5.4% and 3.8%, respectively) (Romans et al., 2011). The logistic regression analysis revealed that subjects from rural area were less likely to be depressed than those from urban areas, adjusting of SES and other variables (OR= 0.76, 95%CI= 0.59-0.98) (Romans et al., 2011). Romans et al. (2011) reported that the findings of logistic regression was significant, however, the p-value of was not reported.

In contrast to above studies, an earlier Canadian study revealed that the difference between urban and rural areas in terms of depression is not significant (Wang, 2004). Wang (2004) assessed the prevalence of major depressive episodes among 17,224 subjects, 12 years old and above, from rural and urban areas in Canada. Women accounted 50.9% of urban participants and 48.5% of rural participants (Wang, 2004). Wang (2004) used the data from the 1998-1999 National Population Health Survey (NPHS) for analysis. The findings showed that individuals from rural areas had less prevalence rate of major depressive episodes than those from urban areas (3.8% versus 4.6%)(Wang, 2004). However, with controlling of important factors, including marital status, employment, race, and immigration status, the difference between urban and rural areas was not significant. The significant difference between urban and rural areas in relation to major depressive episodes was observed only among white subjects who are 55 years old and above (rural= 1.7, urban = 3.3%; $p < .005$) and among non-immigrants subjects who are 55 years old and above (rural= 1.3, urban = 3.3%; $p < .005$) (Wang, 2004).

## Bio-behavioral Factors

**History of Chronic Illness.** The comorbidity of depression with different chronic diseases, such as diabetes, cardiovascular disease, and cancer, is well documented in several communities (Gunn et al., 2012; Khuwaja et al., 2010; Li et al., 2008; Moussavi et al., 2007; Patten et al., 2005; Pouwer et al., 2010). When considering diabetes, the prevalence of depressive disorder in Dutch women with type-2 diabetes was 21% (Pouwer et al., 2010). Moreover, the prevalence of depressive effect, measured by World Health Organization-5 Well Being Index (WHO-5), in diabetic Dutch women was 30% and 38% for type 1 diabetes and type 2 diabetes, respectively (Pouwer et al., 2010).

Findings of a large study involving 18,814 diabetic Americans, 58% of which were women, revealed that diabetic women had higher rates of major depression than diabetic men ($p < 0.001$) (Li et al., 2008). The prevalence of major depression was higher in participants with type 2 diabetes who used insulin in comparison to type 1 diabetic patients ($p=0.0009$) and type 2 diabetic patients who were not using insulin ($p= 0.01$) (Li et al., 2008). Being female was independently associated with depression in Pakistani adults with type-2 diabetes (aOR= 6.91, 95% CI= 4.90-9.76) (Khuwaja et al., 2010). Factors such as poor adherence to treatment, lower quality of life, disease-related complications and death, increased medical costs, and functional disabilities were found to increase the development of depression in diabetic patients (Egede & Ellis, 2010).

Other studies have suggested that the risk of depression increases with the presence of multiple chronic diseases (Gunn et al., 2012, Patten et al., 2005). A recent study has evaluated the relationship between numbers of chronic diseases, type of chronic diseases, and depressive

symptoms in 7,620 adult Australians attending primary care facilities. Sixty-six percent were women, and 12 medical diseases were included in the assessment (Gunn et al., 2010). The highest prevalence of probable depression was reported in participants who had suffered a stroke (36%) and the lowest prevalence was identified in hypertensive participants (24%). Ten of the chronic diseases showed strong associations with depressive symptoms ($p < 0.001$) (Gunn et al., 2012). In respect to the number of chronic diseases, participants with five or more diseases were four times more at risk for depression than participants with no chronic disease. After adjusting several confounding factors including sex, the association between the number of chronic diseases and depressive symptoms remained strong ($p < 0.001$) (aOR [1 disease]= 1.23, 95% CI= 1.37-1.83; aOR [2 diseases]= 1.56, 95% CI=1.83-2.64; aOR [3 diseases]= 1.62, 95% CI= 2.12-4.09; aOR [4 diseases]=1.54, 95% CI= 2.12-4.09, aOR [5+ diseases]= 2.25, 95% CI= 2.87-5.99) (Gunn et al., 2012). Gunn et al. (2012) stressed that functional disability and self-rated health mediate the association between chronic diseases and depressive symptoms.

The variation in strength of association between depression and chronic disease was also reported earlier in a prospective study with a sample of 115, 071 adult Canadians (Patten et al., 2005). The number of women participants was not specified. Patten and colleagues (2005) found that Canadians with chronic fatigue syndrome (OR= 7.2, 95% CI= 5.9-8.8) had the highest risk for major depression followed by fibromyalgia (OR= 3.4, 95% CI= 2.9-4.0). The lowest association was reported in Canadians with hypertension (OR= 1.2, 95% CI= 1.1-1.3) followed by Canadians with diabetes and heart diseases (OR= 1.4, 95% CI= 1.2-1.6) (Patten et al., 2005). For female Canadians, the risk for major depression was very similar in all types of chronic diseases and was nearly two times higher than for Canadians women with no chronic diseases (Patten et al., 2002; table 2.). In general, the prevalence of major depression in Canadians with

one or more chronic diseases was 9.2% versus 4.0% in Canadians with no chronic disease (Patten et al., 2005).

With respect to Arabs in GCC countries, examining the predictive effect of chronic disease for depression in adults was limited to diabetes. For example, a cross-sectional study of 347 diabetic patients, 83% Emirati and 65.4% women, showed significant association between diabetes complications, specifically eye-related complications, vascular complications, and poor mental health status (combined depression and anxiety) (Sulaiman, Hamdan, Tamim, Mahmood, & Young, 2010). Another cross-sectional study of 143 type 2 diabetic Bahraini, 74 of which were women, and 132 matched non-diabetic Bahraini, 76 of which were women, found that patients with type 2 diabetes were five times more at risk for depression than non-diabetic patients (OR= 5.19, 95% CI= 1.40-19.27) (Almawi et al., 2008). A positive association was observed between depression and glycated hemoglobin ($HbA_{1c}$) level in type 2 diabetic women ($r^2$=0.200, p=0.002) (Almawi et al., 2008). With control of several covariates, depression was also found predictive for glycemic control in women (Almawi et al., 2008). Surprisingly, Nasser and colleagues (2009) found no significant association between duration of diabetes, diabetes complication, and depression score (BDI score) among adult Bahraini, including women.

In exception to the above studies, Al-Salmani et al. (2015) tested the effect of different chronic disease on the prevalence of depression among adult Omani population. Al-Salmani et al. (2015) found that the presence of chronic diseases including diabetes, hypertension, asthma, cardiac diseases, endocrinal diseases, and renal disease significantly increase the prevalence of depression among Omani adults (p= 0.01, OR= 1.82, 95% CI= 1.03-3.51).

The literature lacks evidence on the roles of other chronic diseases in predicting depression in the GCC population, including women. Moreover, there have been no attempts to examine the effect of multiple chronic diseases on increasing the onset of depression or depressive symptoms in both men and women in these communities. The cost of healthcare is one major factor that has been identified as a mediator of the association between chronic disease and depression (Egede & Ellis, 2010). In many countries, including GCC countries, healthcare and health services including screening, diagnosing, and provision of treatment is free for patients with long-term chronic diseases; thus, the association may not be significant.

**History of Depressed Mood during Pregnancy.** There is no study in Arab region that assessed the possible association between antenatal depression and later life depressive disorder. The existing studies mainly focused on assessing the association between history of depressive or psychiatric disorder and postpartum depression, and the risk factors of postpartum depression. To the best of our knowledge, only two studies in Middle-Eastern and Arab countries identified a linkage between depression in antenatal period and postpartum depression (Chaaya et al., 2002; Hamdan & Tamim, 2011).

Chaaya et al. (2002) interviewed 396 Lebanese women from Beirut and the Beka'a Valley, a rural area in Lebanon, at 24 hours of delivery and 3-5 months postpartum to determine the prevalence of postpartum depression in those women and the contributing risk factors. The mean age of women from Beirut and the Beka'a was 28.7 (SD= 5.7) and 27.4 (SD=6.1), respectively (Chaaya et al., 2002). Chaaya et al. (2002) reported that 21% of women experienced postpartum depression, and 12% of postpartum depressed women experienced depression during pregnancy. The prevalence of postpartum depression was significantly greater in women from

rural area, the Beka'a valley in compare to women from Beirut (p= 0.016). Chaaya et al. (2002) found a significant association between depression during pregnancy and postnatal depression among women from both areas (p=0.000, OR= 6.66, 95% CI= 3.47-12.78). Low social support is another factor that had been found as a significant contributor to postnatal depression in women from both areas (p= 0.000, OR=0.66, 95%CI= 0.35-1.26) (Chaaya et al., 2002).

Hamdan and Tamim (2011) conducted a prospective study to assess the risk and protective factors of postpartum depression among 137 Arab and non-Arab pregnant women, aged 18 years and more, who attended the maternal and child health clinics in city of Sharjah, UAE. Nearly 38% of the participants were at age range of 18-29 years and nearly 71% of them had a college or university education (Hamdan & Tamim, 2011). Hamdan and Tamim (2011) interviewed the participants during the second and third trimesters of their pregnancy using the BDI-II scale to assess depressive symptoms, and then re-interviewed at second and fourth months postpartum period using Edinburgh Postnatal Depression Scale (EPDS) and Mini International Neuropsychiatric Interview (MINI) to assess depressive symptoms. A mean BDI-II score of 16.1 was reported for second and third trimester (SD= 7.5 & 6.3, respectively) (Hamdan & Tamim, 2011). In respect to postpartum period, a mean EPDS score of 5.9 (SD=4.9) was reported at 2-months and a prevalence of 10.1% (Hamdan & Tamim, 2011). The MINI was significantly associated with BDI-II scores at second trimester ($p< 0.01$) and third trimester of pregnancy ($p<0.002$) (Hamdan & Tamim, 2011).

In respect to Oman, and to best of our knowledge, there is only one study that assesses the prevalence of antenatal depression and its associated factors (Al-Azri et al., 2016). However, the study did not assess the association of antenatal depression and postpartum depression or

later life depressive disorder. Al-Azri et al. (2016) conducted a descriptive cross-sectional study with a total of 959 pregnant Omani women, at 32 gestational weeks and more, who attended primary health care centers in the Governorate of Muscat, Oman. Al-Azri et al. (2016) excluded women who were non-Omani, receiving depression treatment, or diagnosed with gestational diabetes, hypertension, or pregnancy-induced hypertension. The age range of participants was 17-43 years and nearly 46% had a university degree (Al-Azri et al., 2016). With utilization of Arabic EPDS questionnaire, Al-Azri et al. (2016) revealed antenatal depression prevalence of 24.3%. A statistically significant association was reported between antenatal depression and unplanned pregnancy (p= 0.010, OR=1.37, 95%CI=1.02-1.86), and marital conflict (p=0.001, OR=13.83, 95%CI=2.99-63.93).

**Physical Activity.** The impact of physical activity on depression is now widely accepted. Although debate exists about the mechanism and theoretical explanation of the impact of physical activity on mental well-being, it has been agreed that physical activity enhances the positive sense of physical self-worth and identity within the individual (Fox, 1999). Positive perceptions about self were linked to improvement in emotional stability and self-esteem (Fox, 1999). While sufficient evidence on the association of physical activity and self-esteem is still lacking (Fox, 1999), another view about the role of physical activity on subjective well-being focused on the notion that exercise improves cognitive functions and mental responsiveness of individuals, specifically among older adults (Fox, 1999).

Worldwide, evidence suggests that women who are physically active are less prone to clinical depression than women with a sedentary lifestyle (Brown et al., 2005; Galper et al., 2006). A longitudinal study of the relationship between physical activity and mental health in

6,728 Americans, aged 20-88 years old, was conducted, wherein women accounted for 19% of the sample (Galper et al., 2006). The findings suggest an inverse relationship between physical activity and scores of depressive symptoms in female participants ($F= 11.80$, $p < 0.0001$) (Galper et al., 2006). The inactive women showed higher depressive symptoms than the women who performed insufficient physical activity ($p < 0.0001$); at same time, highly active women showed lower depressive symptoms than women with insufficient physical activity ($p < 0.0001$) (Galper et al., 2006).

The negative association between physical activity and depressive symptoms was observed earlier in a longitudinal study of Australian adult women (N= 9207), aged 18-75 years (Brown et al., 2005). Brown et al. (2005) argued that increasing intensity of physical activity resulted in greater reduction in depressive symptoms among women. Moreover, a recent Australian study of 141 women and 169 men revealed that low physical activity in childhood increases the risk of depression in adulthood, controlling for age and sex (OR = 1.50, 95% CI = 1.16-1.93, p= 0.002) (Jacka et al., 2011). The risk of self-reported depression increased by 35% among participants that reported a low level of physical activity during their childhood (Jacka et al., 2011).

Physical activity level in Arab women was also studied, and the tendency of Arab women towards inactivity and a sedentary lifestyle have been confirmed. However, these studies were conducted to explore the prevalence of a sedentary lifestyle in Arab women, but not its relationship with depression (Al-Hazzaa, 2006; Al-Kaabi et al., 2009; Ali et al., 2009). Al-Hazzaa (2006) found that 87.7% of the Saudi adult women living in Al Riyadh city and aged 15-78 years, were not involved in any vigorous type of exercise that lasted for a minimum of 10

minutes on any day per week. Al-Hazzaa (2006) reported that only 5.6% of the studied women participated in a moderate-intense activity for at least 10 minutes per week. In the UAE, Al-Kaabi et al. (2009) studied type 2 diabetic patients and the obstacles that they faced to engage in physical activity. Al-Kaabi et al. (2009) found that, among the 241 studied women, only 30% engaged in 30 minutes of regular walking at least three times per week.

To the best of our knowledge, only one study has investigated the effect of the level of physical activity and depression among Arab populations. Moselhy et al. (2012) found that Emirati adults with a sedentary lifestyle were nearly at a two-fold higher risk for depression in comparison to highly active Emirati adults (OR= 1.69, 95% CI = 0.99-2.88, p = 0.020), controlling for age and sex. This study failed to report the impact of physical activity on depression by sex; however, these investigators did not consider variation in activity level and exercise habits between Arab men and women due to cultural, traditional, social, and logistic constraints (Ali et al., 2009).

**Body Mass Index (BMI).** Some researchers have reported a significant association between depression and abnormal BMI. Individuals with abnormal BMI have been observed to be at increased risk of developing depression and experiencing depressive symptoms (de Wit, Straten, Herten, Penkninx, & Cuijpers, 2009; Pan et al., 2012; Zhao et al., 2009).

A recent cohort study of 65,955 women showed that obesity (BMI $\geq$ 30 kg/m$^{-2}$), independently increased the risk of depression (OR= 1.28, 95% CI= 1.22-1.35) (Pan et al., 2012). Zhao et al. (2009) studied 177,074 adult Americans to assess the correlation of BMI with depression and anxiety, and reported that being a female was statistically significant for depression in overweight and obese women ($p < 0.001$). The BMI level was linked with current

depression and lifetime diagnosed depression, as well ($p < 0.01$) (Zhao et al., 2009). Unlike Zhao et al. (2009), Pan et al. (2012) reported that risk of later life depression was observed with obesity, but not with being overweight (OR= 1.10, 95% CI= 1.02-1.20) vs. (OR= 1.00, 95% CI= 0.94-1.07), respectively.

Moreover, reduction in BMI was found to be associated with a decrease in the risk of depression in women who were overweight or obese (Simon et al., 2010). Simon et al. (2010) conducted a weight-loss intervention study to measure changes in depression level in 203 adult American-obese women. The measurement of weight loss and depression score was carried out at baseline, 6 months, 12 months, and 24 months (Simon et al., 2010). These authors reported a statistically significant association between weight reduction and decrease of depression during the first 6 months of the intervention (OR = 2.20, 95% CI = 1.09-4.44, $p = 0.01$).

The majority of studies focused on the association of higher BMI and depression, with less attention paid to the correlates of lower BMI (underweight) (de Wit et al., 2009). The correlation between depression and BMI was examined through the variation of obese and non-obese individuals (de Wit et al., 2009). These studies examined either the obesity or underweight association with depression, but not both at the same time (de Wit et al., 2009). In this cross-sectional study of 43,534 adults from the Netherlands, de Wit et al. (2009) categorized the level of BMI into the categories of underweight, normal weight, overweight, and obese. The study revealed that while controlling for covariates, a positive significant U-shape association between BMI categories and depression ($B= 0.430$, $p \leq 0.001$), with a contrast estimate of 2.78 (de Wit et al., 2009). Thus depression was associated with abnormally high and low BMI (de Wit et al., 2009). The linear association between BMI and depression was not observed ($B= - 0.004$, $p =$

0.514) (de Wit et al., 2009). These findings highlight the need to examine the association of depression with the different BMI categories, instead of focusing only on one or two categories (de Wit et al., 2009).

To the best of our knowledge, only two studies examined the association of BMI and depression in Arab women in general, one in the UAE (Moselhy et al., 2012) and the other one in Aleppo, Syria (Fouad, Rastam, Ward, & Maziak, 2006). Both studies revealed that BMI was not significantly associated with depression (Fouad et al., 2006; Moselhy et al., 2012). Moselhy et al. (2012) reported no significant difference between different BMI categories (OR= 0.999, 95% CI = 0.969-1.029, p = 0.921), controlling for age and sex. However, these authors failed to report the impact of BMI on depression rate by sex. Fouad et al. (2006) failed to report the statistical data of the p-value in female participants. These findings oppose the findings of the literature from Western countries (de Wit et al., 2009; Pan et al., 2012; Zhao et al., 2009).

**Psychosocial Factors**

**Religiosity.** Searching relevant databases reveals a lack of studies on religiosity and depression among Arab adult women and men. The existing studies either focus on religiosity and overall subjective health, such as happiness, quality-of-life, life satisfaction, and general mental health (Abdel-Khalek, 2006; 2010; 2012a; 2012b), or limit the examination of the association between religiosity and depression to younger age groups, such as school children and adolescents (Abdel-Khalek, 2009). To the best of our knowledge, only one study included a younger adult group, i.e., college students, from an Arab country wherein the link between religiosity and depression were assessed. This study aimed to investigate differences in the level of religiosity, anxiety, depression, and subjective well-being in college students from two

different cultures, i.e., Kuwait and the U.S, and the association between religiosity and variables of subjective well-being (Abdel-Khalek & Lester, 2010).

Abdel-Khalek and Lester (2010) surveyed 192 and 158 college students from Kuwait and the U.S., respectively. The Kuwaiti participants were Muslims, with a mean age of 20.9 years (± 1.5 years), with females accounting for 75.5% of the total Kuwaiti participants (Abdel-Khalek & Lester, 2010). The American participants were 45 male and 113 female, with a mean age of 21.6 years (± 3.8 years). In comparison to American students, Kuwaiti students scored higher on religiosity ($t = 7.23$, $P < 0.0001$) and depression ($t = 2.29$, $P < 0.02$) (Abdel-Khalek & Lester, 2010). American participants scored higher on happiness ($t = 10.93$, $P < 0.0001$) and love of life ($t = 2.63$, $P < 0.01$) (Abdel-Khalek & Lester, 2010). A significant negative association was reported between religiosity and depression for Kuwaitis ($r = - 0.227$, $P < 0.001$) (Abdel-Khalek & Lester, 2010). A negative association between religiosity and depression was also reported in American sample but was not significant (Abdel-Khalek & Lester, 2010). Generally, religiosity was positively associated with subjective well-being variables and negatively with depression and anxiety in both samples (Abdel-Khalek & Lester, 2010).

Vasegh and Mohammadi (2007) investigated the association between religiosity, anxiety, and depression in 285 medical students, 20-31 years old, from a non-Arab Muslim country, i.e., Iran. The study's sample included 134 female students (47%), and 97% of the participants identified themselves as Muslims (Vasegh & Mohammadi, 2007). With respect to religiosity, Vasegh and Mohammadi (2007) assessed religious beliefs, religious emotions, and religious behavior as the main dimensions. A small negative association between religiosity, anxiety, and depression scores was observed ($r < 0.20$) (Vasegh & Mohammadi, 2007). The regression

analysis for depression score indicated no significant correlation between religiosity and depression score; however, a significant negative association was reported between religion-related questions and the depression score (Vasegh & Mohammadi, 2007). The question of practicing the five daily prayer sessions and the timing of doing the five daily prayers were two religious-related questions that predicted depression among the participants ($r = -0.779$ & $-0.541$, $p < 0.05$, respectively) (Vasegh & Mohammadi, 2007).

**Domestic Violence.** Domestic violence is a universal social problem that women face globally regardless of their age, socioeconomic status, religious, ethnicity, or cultural background. In Europe, it is estimated that lifetime prevalence of intimate partner violence against women ranged from 10% to 36% (Flury, Nyberg, & Riecher-Rossler, 2010). In the U.S., Tjaden and Thoennes (2000) reported a 25% prevalence rate of lifetime intimate partner violence against women, which encompasses physical and sexual abuse. These authors contend more than one million U.S. women experience physical or/and sexual abuse by an intimate partner annually. Kramer, Lorenzon, and Mueller (2004) reported that 50-75% of adult American women who had participated in the study (N=1,268) experienced physical and/or emotional abuse. Moreover, 44% of physically abused women in the study had experienced sexual abuse in their lifetime (Kramer et al., 2004).

To the best of our knowledge, there are no studies that have explored the incidence and prevalence of domestic violence against women in a GCC country. However, data from other Arabic countries revealed a high rate of violence against women within their population. In a cross-sectional study of 500 adult Egyptian women, the prevalence of domestic violence against women was 62.2% (Fahmy & Abd El Rahman, 2008). Seventy-four percent of the Egyptian

women had experienced psychological abuse, and over 22% reported the experience of physical abuse (Fahmy & Abd El Rahman, 2008). Haj-Yahia (2000a; 2000b) surveyed a total of 3,744 Palestinian Arab women in the Gaza Strip, as a two waves study, and reported that 52% and 54% of participants experienced physical violence from their spouse at least once during the year prior to the study, in the first and second surveys, respectively. Nearly 35% of the women reported the experience of severe psychological abuse in the first survey and 34% in the second survey (Haj-Yahia, 2000a; 2000b).

Another study showed that that 19% of Palestinian women in a refugee camp in Jordan had been beaten by their spouses in the 12 months prior to the study (Khawaja & Barazi, 2005). Almosaed (2004) documented that 47% of Yemeni women were physically abused by their immediate male relative. However, only 3.4% of these abuse cases were reported to the relevant legal authority (Almosaed, 2004). In Aleppo, Syria, physical abuse was reported in 23.1% of 411 women, aged 13-61 years (Maziak & Asfar, 2003). The prevalence of physical abuse among married women was 26.2%, and 87.4% of the abuse was imposed by husbands (Maziak & Asfar, 2003).

According to Lutenbacher (2002), history of abuse increases the experience of stress of the abused individuals. The experience of everyday stress increases the chances of low self-esteem, which eventually predicts depressive symptoms in abused individuals (Lutenbacher, 2002). Domestic violence against women is positively linked to depression across several ethnicities (Campbell, Belknap, & Templin, 1997; Dienemann et al., 2000; Evans-Campbell et al., 2006; Hegarty et al., 2004). For example, Evans-Campbell et al. (2006) investigated different forms of interpersonal violence experience in 112 American Indian/Alaska native women, 18-77

years old, and the resultant mental health effects. Campbell et al. (2006) reported that women with the experience of domestic violence were at a 1.85-fold higher risk of depression (95% CI = 0.75-4.60) than women who were not victims of domestic violence. Dienemann et al. (2000) investigated the history of domestic violence in 82 adult American women with clinical depression. These authors reported a prevalence of 61% of lifetime domestic violence among the depressed women. Moreover, a positive correlation was found between severity of depression and severity of abuse ($r = 0.537$, $p < 0.01$) (Dienemann et al., 2000).

To the best of our knowledge, there is only one study that included abuse as a correlate of depressive symptoms in women in a GCC population. Hamdan et al. (2008) included physical and emotional abuse as stressful life events in correlates of depressive symptoms in Emirati adult women. Findings revealed a significant correlation between physical abuse, emotional abuse, and depressive symptoms ($p < 0.001$, $p < 0.01$, respectively). Hamdan et al. (2008) cautioned that some data cells of stressful life events, including physical and emotional abuse in the analysis of cross-tabulation were small; thus, the observed association may in fact not be present.

The positive association between domestic violence against women and depression was reported from Arab countries, such as Palestine and Egypt. Fahmy and Abd El Rahman (2008) reported a depression prevalence of 52.2% in abused Egyptian women. A significant association was reported between physical abuse ($X^2 = 16.7$, $p = 0.000$), psychological abuse ($X^2 = 24.19$, $P = 0.000$), sexual abuse ($X^2 = 18.6$, $p = 0.000$), social abuse $X^2 = 8.4$, $p = 0.004$), and depression (Fahmy & Abd El Rahman, 2008). The association between overall exposure history to abuse and depression was also significant ($X^2 = 45.81$, $p = 0.000$). Haj-Yahia (2000b) found a significant association between different forms of abuse against Palestinian women and

depression, and the fact that severity of depression increased with increasing levels of abuse in the relationship, regardless of the form of abuse ($p < 0.0001$).

In addition to the limited evidence that supports the association between domestic violence and depression in Arab women, the findings from an Arabic country should be interpreted and generalized with caution to other GCC countries in the region. There are some factors that may affect the association between the experience of domestic violence and depression, such as financial security, legal authority that women have to report violence, and perception of domestic violence from social and cultural perspectives. For example, Haj-Yahia (2000b) reported that 5.8% of variance in depression in abused Palestinian women is attributed to the sociodemographic characteristics of the women ($R^2 = 0.58$, F (9,895) = 6.126, sig. F = 0.00), and 32.7% of variance in depression is attributed to type of abuse. The highest significant positive association between depression and sociodemographic characteristics in abused Palestinian women has been reported with education level ($\beta = - 0.066$, $P < 0.0001$) and the highest significant negative association was with years of marriage ($\beta = -0.138$, $P < 0.002$) (Haj-Yahia, 2000a). In addition to sociodemographic factors, social and cultural perspectives of domestic violence may also contribute to variance in the extent of its influence on mental health of women. For example, Haj-Yahia (2002) reported that 33.4% of 356 Jordanian women agreed that wife-beating is reasonable under specific conditions, and 41.8% strongly agreed that the wife is to blame for the violence that her husband commits against her. The different sociocultural views about domestic violence against women may impact its predictive role of depression, taking into consideration the variation in defining and describing domestic violence across cultures, religions, and social systems.

**Perception of Body Image.** Understanding the perception of body image and its influence on individual's psychological well-being and self-esteem has captured the attention of many researchers (Atlantis & Ball, 2008; Furnham & Baguma, 1994). Negative body image, i.e., body dissatisfaction, was linked to psychological disorders, including depression (Atlantis & Ball, 2008; Kim & Lee, 2010; Winstanley & Dives, 2005).

Winstanley and Dives (2005) argued that there was a significant association between weight perception and depression. These authors found that women who believed that they were obese or overweight experienced greater depression and anxiety than women who perceive their weight as normal. Winstanley and Dives (2005) conducted an experimental study of 92 female undergraduate students in UK, aged 18-35 years, who were divided into two groups (control and intervention). The participants in the control group were weighed by an accurate weight scale, while the participants in the intervention group were weighed by an altered scale that added 3.18 kg to the actual weight (Winstanley & Dives, 2005). A greater depression score was reported among the group that used the altered scale ($p = 0.001$) (Winstanley & Davis, 2005).

Kim and Lee (2010) examined 532 female university students in Korea and found that 64.1% of the students overestimated their actual weight. Students who overestimated their actual weight showed significantly greater depression scores than students with normal perceptions of their actual weight (OR= 0.31and 0.17, respectively, $p = 0.018$) (Kim & Lee, 2010).

It is well known that culture plays a vital role in self-perception of body image and its linkage with depression (Winstanley & Dives, 2005); however, only a few studies investigated this association in populations other than Western countries (Furnham & Baguma, 1994). Beauty norms, including perceptions of body image, differ by culture (Furnham & Baguma, 1994). The

Arab culture and societal context affects women's perception of body image and the ideal body weight. Existing studies about the perception of body image by Arab women are limited to its relevance to the desire for weight reduction, and the desired body image (Al-Sendi, Shetty, & Musaiger, 2004; Madanat, Hawk, & Angeles, 2011; Musaiger, Shahbeek, & Al-Mannai, 2004; Niskar, Baron-Epel, Garty-Sandalon, & Keinan-Boker, 2009; Rguibi & Belahsen, 2006). For example, Madanat et al. (2011) reported that 45% of overweight adult women and 26.5% of obese adult women from Jordon desired to lose weight. Madanat et al. (2011) reported that the preferred weight figure was 5, which indicates an overweight figure. According to Musaiger et al. (2004), 47.9% adult women from Qatar selected figure 3 and 30.1% selected figure 4 as the preferred body image. The literature about Arabs lacks evidence of association between body image perception or body dissatisfaction and psychological disorders in women, specifically depression.

**Social Support.** Social support has been defined as "*the perception or experience that one is loved and cared for, esteemed and valued, and part of a social network of mutual assistance and obligations*" (Taylor et al., 2004: 354). Social support may come from relatives, partners, friends, coworkers, and/or community networks (Kim, Sherman, & Taylor, 2008). Social support refers to different types of resources, including tangible resources or instrumental resources, emotional resources, and informational resources (Kim et al., 2008; Taylor et al., 2004). Moreover, appraisal is another important type of social support that occurs by providing positive feedback and encouragement (Kim et al., 2008).

Social support reduces the likelihood of psychological disorders during stressful life event (Kim et al., 2008). In support of this claim, studies have reported that social support is an

important predictor for depression, in terms of symptoms' onset and course, in both men and women (Aranda et al., 2001; Dalgard et al., 2006; Kendler et al., 2005). However, social support is considerably more effective in preventing depression in women than in men (Dalgard et al., 2006; Kendler et al., 2005).

Focusing on women, research has found that insufficient social support is strongly correlated with depression, specifically in the presence of negative life events or crises (Aranda et al., 2001; Broadhead, Abas, Sakutukwa, Chigwanda, Garura, 2001; Dalgard et al., 2006). Aranda et al. (2001) found that marital-partner relationship is one of the major stressors for Mexican American women of low socioeconomic status, and lack or insufficient social support from spouse or partner correlated with depressive symptoms ($p = 0.02$). Broadhead et al. (2001) tested the hypothesis that having social support at the time of life crisis reduces vulnerability to depression in 79 Zimbabwean women who experienced one or more severe life crises one year before the interview. Women who expressed having support during crisis events showed lower risk for onset of depression than those without support (OR= 0.13, 95% CI= 0.02-0.67, $p = 0.001$) (Broadhead et al., 2001).

Additionally, it appears that sources of support for women vary from one woman to another, and from one society to another. Broadhead et al. (2001) found that the support received from family members during crisis was significantly correlated to onset of depression, in comparison to support from partners or friends in Zimbabwean women (OR= 0.20, 95% CI= 0.06-0.67, P= 0.003). Pines and Zaidman (2003) examined the effect of culture and gender in utilization of social support in 869 Israeli Arabs and Jews, of which 53% of the participants were women. The assessment of social support utilization included a question about seeking support

and help when feeling depressed and wanting to talk (Pines & Zaidman, 2003). Pines and Zaidman (2003) reported no difference between Israeli Arabs and Jews in terms of approaching people for support when depressed; spouses were the first source for social support followed by close friends and then the mothers. With regards to the quality of social relationships and in comparison to Israeli Jews, Israeli Arabs reported stronger social relationships that included their relationships with fathers ($F [1,471]= 13.52$, $p = < 0.0001$), mothers ($F [1,471]= 18.10$, $p = < 0.0001$), spouses ($F [1,471]= 4.34$, $p = < 0.05$), siblings ($F [1,471]= 20.88$, $p = < 0.0001$), relatives ($F [1,471]= 4.82$, $p = < 0.01$), and neighbors ($F [1,471]= 4.80$, $p = < 0.0001$) (Pines & Zaidman, 2003). The findings of these studies indicate that supportive sources are not similarly valuable for all women across different cultural backgrounds, and it is important for women to have various support sources and larger social networks.

To our best of knowledge, there is no study that investigates sources of social support and their effect on either the onset or the course of depression in Arab women from the GCC region. Additionally, the available evidence regarding association of social support and depression in Arab women from other regions of Middle East, such as Israel, is scarce and needs further examination. Generally, the studies about social support in Arab culture show that Arab families emphasize collectivism over the individualistic life style, and social ties with nuclear and extended family members are highly valued (Al-Krenawi & Graham, 2000; Okasha, 2003), Therefore, interdependency within family is commonly seen when considering social support (El-Islam, 2008).

**Coping.** Findings from studies have concluded that women and men respond differently to stress (Kelly et al., 2008; Matud, 2004), and women are more likely to use emotional and/or

avoidant coping mechanism than men (Matud, 2004). In a study of 2,816 adults (18-65 years old) in Spain, 1566 of whom were female, differences in stress and coping mechanisms were assessed by gender, Matud (2004) reported significant difference in stress between men and women ($F(8,2623)= 15.2$, $P < 0.001$, $\eta^2 =0.044$). Women showed higher rates in chronic stress ($P < 0.01$) and minor daily stressors ($P < 0.001$) in comparison to men. Women were also more likely to use emotional and avoidant coping style than men (Matud, 2004) and showed less adaptation of rational and detachment coping styles, and emotional inhibition (Matud, 2004). The difference in coping styles between women and men was significant in women than men ($F(6,2729) = 63.3$, $P < 0.001$, $\eta^2 =0.122$) (Matud, 2004).

In another study, Garnefski, Teerds, Kraaij, Legerstee, and Kommer (2004) examined gender difference in using cognitive emotion coping strategies in 603 adults (18-71 years old) from the Netherlands, 60.2% were females; several maladaptive cognitive emotion strategies were utilized including rumination, self-blame, and catastrophizing, i.e., "thoughts of explicitly emphasizing the terror of what you have experienced" (pp. 270), as well as adaptive cognitive emotion strategies, such as positive reappraisal and positive refocusing. Significant differences between men and women in the type of cognitive emotion coping strategies used during stressful life events was reported, controlling covariates (Wilks $\lambda = 0.94$, $F(9,566) = 3.61$, $P = 0.000$) (Garnefski et al., 2004). Women were more likely to use rumination ($P < 0.01$), catastrophizing ($P < 0.01$), and positive refocusing ($P < 0.05$) than men (Garnefski et al., 2004).

Most studies that assessed coping and depression proposed that individuals using adaptive coping strategies to overcome stressors were less likely to be depressed than individuals who were using emotion-focused coping or avoidant-coping strategies (Garnefski et al., 2004;

Kelly et al., 2008; Thompson et al., 2010). Focusing on women, Garnefski et al. (2004) reported that women who use rumination, catastrophizing, and self-blame as coping strategies experienced more depressive symptoms, with variance of 47.1%. Thompson and colleagues (2010) conducted a cross-sectional study on three samples of women, including 149 never-depressed female adolescents (9-14 years old), 41 never-depressed women (18-45 years old), and 39 depressed women (18-40 years old), to assess the influence of interacted adaptive styles (problem-solving coping, cognitive restructuring) and maladaptive styles of coping (rumination) in predicting depressive symptoms. Thompson and colleagues (2010) found that a strong association of maladaptive coping with depressive symptoms appears with the existence of lower level of adaptive coping strategies. This finding supports an earlier report of Kelly et al. (2008) who found that American adult women (n= 65) who used high positive reframing during stressors and anxiety experienced less depressive symptoms than women who used low positive reframing style.

Despite the consistent findings on the types of coping strategies and their effects on depression, it is not clear if these findings can be generalized to different cultures. According to Bardi and Guerra (2011), cultural values are essential predictors of coping along with personality traits. Bardi and Guerra (2011) conducted a study in England, one of three studies, of 163 international students, 66% of whom were females, to explore the association between cultural values and coping. The mean age of the participants was 21 years (± 6.59). Bardi and Guerra (2011) assessed four coping strategies, which were coping by religion, emotion-focused/avoidant coping, seeking social support, and problem-focused coping strategies. Cultural dimensions of embeddedness versus autonomy, hierarchy versus egalitarianism, and mastery versus harmony, and their relevance to coping strategies were observed (Bardi & Guerra, 2011). Findings showed

a positive association between the cultural dimension of hierarchy versus egalitarianism ($r = 0.17$, $P < 0.05$) and coping by religion, and emotion-focus/avoidant coping ($r = 0.21$, $P < 0.05$) (Bardi & Guerra, 2011). Embeddedness versus autonomy was positively associated with coping by religion ($r = 0.36$, $P < 0.01$) and emotion-focused/avoidant coping ($r = 0.14$, $P < 0.10$), and negatively with seeking social support ($r = -0.20$, $P < 0.05$) (Bardi & Guerra, 2011). There was no significant association between problem-focused coping and cultural values (Bardi & Guerra, 2011).

The findings of Bardi and Guerra (2011) support the notion that the assessment of preferred coping strategies in stressful events and the determination of effective coping strategies must be appraised based on cultural and social perspectives and norms. The preferred coping strategies and their effectiveness in predicting depression in Arab women, specifically those living in high-income regions, such as GCC countries, are not yet adequately clear. To the best of our knowledge, there is no study that examines the preferred coping style and its association with depression in this population.

## Health Care System

**Access to Health Care.** The literature about Arab women accessing health care services does not specifically refer to depression, though it does present issues surrounding accessing health care and seeking professional help in the case of mental health in general. Mental illness is a highly stigmatized health problem, which reflects on attitudes surrounding accessing mental health services for professional help, particularly from women (Okasha, 2003). By seeking professional help for a mental disorder, the Arab woman jeopardizes her marital life and relationship with her nuclear and extended family (Al-Krenawi & Graham, 2000; Okasha, 2003).

According to Al-Krenawi and Graham (2000), utilizing mental health services by the woman may result in divorce. The divorced woman in Arab communities encounters profound emotional problems and social deprivation (Hamdan, 2009; Al-Krenawi & Graham, 2000).

Seeking professional help is negatively perceived among single Arab women as well. Al-Krenawi, Graham, Dean, and Eltaiba (2004) compared attitudes of seeking professional help in 262 female Muslim-Arab university students from UAE, Jordan, and Israel, and factors that influenced those attitudes. Single women and younger women reported less positive attitudes towards seeking professional help with psychological problem than did married and older women (Al-Krenawi et al., 2004). Disclosure of mental diseases for single women was perceived as greatly affecting their prospects for marriage (Nasir & Al-Qutob, 2005).

The concepts of collectivism and interdependency within the family also have great impact on women's attitude towards accessing health care and seeking professional help for emotional or mental problems (El-Islam, 2008). The decision to seek the help of a psychologist or other mental health professional was highly dependent on the family's attitude toward help-seeking (Hamdan, 2009; El-Islam, 2008). It is uncommon for a woman to attend a psychiatric clinic without being accompanied by a family member, usually a male (El-Islam, 2008). Admission to a mental health hospital was also a joint decision that was made by the health professional in collaboration with the woman and family member(s) (El-Islam, 2008). El-Islam (2008) found that admission of a mentally ill woman in Kuwait and Qatar, for example, can occur only after securing the approval from an immediate family member.

Seeking help from a specialist consultant occurs only when the mental disorder becomes more evident and cannot be concealed from the public (Hamdan, 2009). Karam et al. (2006)

found that only 10.9% of mentally ill Lebanese obtain medical treatment, including women. Karam et al. (2006) argued that the stigma of mental illness was the main cause of this low rate, in addition to financial barriers and lack of awareness about mental health.

Arab beliefs about the etiology of mental illness are another factor that affects women's attitudes towards approaching health service for professional help. Arabs have a strong belief that a mentally ill individual is possessed by a supernatural power that controls his/her behavior (Bener & Ghuloum, 2011). Linking of mental illness with spirits or evil eye is a common belief in Arab culture (Bener & Ghuloum, 2011). Bener and Ghuloum (2011) found that 42.3% of Arab Qatari prefer traditional healers to psychiatrists because of their belief that mental diseases were caused by evil spirits. Al-Adawi et al. (2002) surveyed 468 Omani medical students, the general public and relatives of mentally-ill patients, of which nearly 52% were women, to assess their attitudes towards mentally-ill people and social factors that influence those attitudes. The majority of students (42.2%) and the public (45.9%) believed that spirits caused mental diseases, while only 23.5% of patients' relatives believed the same (Al-Adawi et al., 2002).

Somatization of mental health disorders is another factor that limits Arab women from accessing and utilizing mental health services for professional help. According to Becker (2004), it is difficult to detect and diagnose mental disorders in the Saudi population due to somatization and the conversion of the symptoms of mental disorder into physical symptoms. Somatization for Arab people, particularly women, is a way to hide the psychological and emotional disorder to avoid the social stigma of the disorder (Becker, 2004). Arab mental patients expect to be treated the same way one would treat a patient with physical symptoms, which has a negative

impact on the progress of the disease as well as the efficacy of the therapy (Al-Krenawi & Graham, 2000).

The availability of mental health services is another major factor that influences women's decision to seek professional help. Looking at Oman specifically, mental health services are not available in all areas within the country, and often people in those areas can access mental services only in neighboring regions (WHO, 2008b). There is only one hospital in the country with a mental health specialization, located in the capital, Muscat (WHO, 2011; WHO, 2008b). The total bed rate of the hospital is 2.88 beds per 100,000 population (WHO, 2011). Regional hospitals provide in-patient care for mentally ill patients in regions other than the capital, with a total of 26 beds for all regional hospitals. There are no community residential facilities or day care treatment for mentally ill patients (WHO, 2011; WHO, 2008b). With respect to outpatient facilities, there are 26 outpatient clinics available in primary health care centers. For better management of mental disorder cases, a referral system was established between different levels of care, i.e. primary health level, secondary level (regional hospitals), and territory level (the mental hospital) (WHO, 2011).

The majority of health care professionals, including nurses and doctors, in primary health care facilities are locals, which may impact women's attitudes towards accessing these facilities for professional help. Nasir and Al-Qutob (2005) interviewed 50 Arab Jordanian primary health care providers to explore their beliefs about the cultural barriers of diagnosing and treating depression. Health care providers asserted that community inquisitiveness was a major barrier for depressed women to consider seeking help; depressed women avoided accessing help at health centers where others would know them, including health care providers or attendants

(Nasir & Al-Qutob, 2005). Depressed Arab women preferred to be cared and treated by health care providers from distant villages due to the stigma of the disease (Nasir & Al-Qutob, 2005).

All of these factors may inhibit depressed women from accessing health care facilities for diagnosis and treatment. However, not all of these factors have been investigated in GCC communities to explore their existence as hindrances for diagnosing depression in women. Additionally, it is important to know the degree of effect of factors relevant to accessing healthcare as it relates to the prevalence of depression among adult women in GCC countries.

**Age**

Hamdan et al. (2008) examined the prevalence of and factors, which correlate with depressive symptoms among 224 adult Arab women in UAE. Hamdan et al. (2008) found that age is not a significant correlate of depressive symptoms among studied women ($p= 0.792$). This finding is consistent with the finding of Kessler and colleagues (2010b), who studied the prevalence of major depressive episodes by age in 89,750 men and women, 18 years old and more, from ten developed countries and seven developing countries including Lebanon from Middle East. A limitation of this study was that Kessler et al. (2010b) failed to report the percentage of women sample. For analysis purposes, Kessler et al. (2010b) classified age into four groups: 18-34 years, 35-49 years, 50-64 years, and 65 years and older. In majority of developed countries (7 out of 10), the association between age and 12-month DSM-IV/CIDI major depressive episode was significant ($X23 = 150.2$, $p < 0.001$); the highest prevalence of the disease was observed among participants aged 18-34 years and the lowest prevalence was reported in the age group of 65 years old and older (Kessler et al., 2010b). In developing countries, the association between age and 12-month DSM-IV/CICI major depressive episodes

was not significant in the majority of these countries (four out of 7) including Lebanon (X23 = 3.0-6.3, p = 0.10-0.39) (Kessler et al., 2010b).

Al-Salmani et al. (2015) reported that prevalence of depression among 2005 adult Omani (18 years old and more) attending primary health care facilities in Muscat governorate was less in age group over 50 years (OR= 2.23, 95% CI= 1.07-4.22, p= 0.04). Likewise, Al-Otaibi et al. (2007) found a significant association between age and depression ($p < 0.05$); the prevalence of depression was higher among younger age group (21-44 years old) than older age group (45 years and older) (28% vs. 9.1%, respectively). Similar finding was reported in Bener et al. (2012) and Daradkeh et al. (2002). Bener et al. (2012) revealed that among depressed females (N= 119), the highest prevalence of depression was found in the age group of 25-44 years. The peak of depression rate in females was reported in the age group of 25-34 years (37.8%) and the lowest prevalence rate in women was seen in the age group of 65 years or older (1.6%) (Bener et al., 2012).

Daradkeh et al. (2002) found that depression rate dropped for Emirati adults who are more than 55 years old. Among women, the variance in prevalence between both age groups (< 55 years and > 55 years old) was 5.2% in comparison to 2.4% in men (Daradkeh et al., 2002).

Patten and colleagues (2006) reported similar findings among Canadian men and women, in regards to age and its correlation with depression. According to Patten et al. (2006), the highest prevalence of lifetime major depressive disorder in a sample of 36,984 Canadians, aged 15 years and older, was seen in the age group of 46-64 years (12.4%, 95% CI= 11.5-13.3), followed by the age group of 26-45 years (12.2%, 95% CI = 11.3-13.0). The lowest prevalence of lifetime major depressive disorder was reported in the age group of 65 years and older (6.4%,

95% CI = 5.7-7.2) (Patten et al., 2006). The highest prevalence of annual major depressive disorder was seen in the age group of 15-25 years (5.0%, 95% CI = 4.2-5.7) and declined with increases in age (Patten et al., 2006). Although Patten and colleagues (2006) reported a higher prevalence of major depressive disorder in women than men, they failed to report the total participants of women.

Contrary to previous studies, Moselhy et al. (2012) found that depression was more prevalent in older age groups. The highest rate of prevalence was reported in the age group of 75 years and over (55.6%, 95% CI= 39.4-71.8), followed by the age group of 60-74 years old (36.7%, 95% CI= 27.7-45.7) (Moselhy et al., 2012). The association between age and depression was significant (p= 0.001) (Moselhy et al., 2012). Daradkeh et al. (2002) reported one possible explanation of their finding that older participants were affected by culture, in which elderly are less likely to admit depression.

In addition to the opposing findings of studies conducted in the region with respect to age and its correlate with depression, there are some weaknesses observed in the analytical methodologies used to assess the correlation. For example, Al-Salmani et al. (2015) classified the age groups into three categories only (<25 years, 25-50 years, >50 years old). Al-Otaibi et al. (2007) classified the age groups into two categories only, i.e., 21-44 years and ≥ 45 years old. Al-Otaibi et al. (2007) stated that by dividing ages to more groups and analyzing these age groups, prevalence of depression was lower among younger participants than older participants. Daradkeh et al. (2002) questioned whether the drop in prevalence was related to less reporting of depressive symptoms among people in this age group in Arabic culture. Moreover, the prevalence of depression by severity across age groups was not investigated.

Across age groups, the prevalence of depression by severity may significantly differ (Kessler et al., 2010a). In support of this notion, Kessler et al. (2010a) reported that although clinically severe depressive episodes of depression were more evident among the younger age group in American adults, the mild clinical depressive episodes were more observed in the older age group (≥ 65 years). Similarly, Kessler et al. (2010b) reported an inverse relationship between severity of 12-month major depressive episodes and age in developed countries ($X^2_3 = 115.2$, p = 0.002), in which clinically severe major depressive episodes were less prevalent in oldest age group (65+) than in younger age groups (18-34, 35-49, 50-64 years old). In developing countries, the association between severity of episodes and age was not significant ($X^2_3 = 3.7$, p = 0.296), which indicates that episodes severity did not vary by age in adults from developing countries including Lebanon (Kessler et al., 2010b).

## Summary

Several studies have reported an increase in the prevalence of depression in GCC population, and the prevalence is higher in women than in men (Al-Busaidi et al., 2011; Al-Otaibi et al., 2007; Al-Salmani et al., 2015; Becker, 2004; Bener et al., 2012; Daradkeh et al., 2002; Hamdan et al., 2008). However, studies that examine the factors associated with a higher prevalence of depression in GCC women were limited, and none of these factors were examined as predictors of depression in Omani adult women. Additionally, the majority of available GCC studies were not designed specifically for women, and there is no theoretical model that explains the occurrence of depression in this population.

Overall, several significant predictors have been reported in various scientific literature and within different races and ethnicities. By employing the revised model of the Social

Determinants of Health (rSDH) conceptual framework, the following factors were identified as strong predictors of depression in women: socioeconomic factors (education, marital status, employment, and income), material circumstances (living arrangements), bio-behavioral factors (history of chronic illness, history of depressed mood in pregnancy, physical activity, and BMI), psychosocial factors (religiosity, domestic violence, perception of body image, social support, and coping), health system (access to health care), and age. Few of these predictors were examined in GCC women, and the findings of some of these predictors were not consistent with findings in Western women, specifically marital status (Al-Otaibi et al., 2007; Bener et al., 2012), education (Al-Otaibi et al., 2007) and employment status (Al-Otaibi et al., 2007; Hamdan et al., 2008).

Findings were also not always consistent across countries within GCC region itself. For example, education was significantly associated with depression in Kuwaiti women (Al-Otaibi et al., 2007), but not with Emirati and Qatari women (Bener et al., 2012; Daradkeh et al., 2002; Hamdan et al., 2008). Another difference in findings was observed in the predictive effect of marital status on depression, whereby married Kuwaiti and Qatari women (Al-Otaibi et al., 2007; Bener et al., 2012) reported a higher prevalence of depression while post-marital and single women had the highest prevalence of depression in United Arab Emirates (Hamdan et al., 2008). These differences indicate the need for more research across GCC countries to provide greater evidence on the predictive effects of these factors on depression in women.

Several studies from Western countries stressed the idea that these factors may have a stronger predictive effect on depression in women when factors interact. For example, Aranda and colleagues (2001) suggested that social support might have significant influence on the type

of coping strategies that women select during stressful events, which impacts the occurrence of depression in them. Patten et al. (2006) also reported that age influences the effect of marital status.

## Chapter 4: Methods

In this chapter, a detailed description of study methods, including research design, sample, setting, procedure, instruments and their psychometric properties, data analysis, and protection procedure for human subjects are discussed. Using the revised Social Determinants of Health (rSDH) model as a conceptual guide, a cross-sectional study designed was conducted to explore the predictors of depression among adult Omani women in Wilayat of Rustaq. Based on the rSDH model (WHO, 2010a), factors associated with depression in women, globally, include socioeconomic, material circumstances, bio-behavioral factors, psychosocial factors, access to health care, and age were assessed.

Socioeconomic factors including educational level (Daradkeh et al., 2006;Velde et al., 2010), marital status (Akhtar-Danesh & Landeen, 2007; Daradkeh et al., 2002; Hamdan et al., 2008), employment (Al-Otaibi et al., 2007; Camino et al., 2000; Hamdan et al., 2008; Mossakowski, 2009), and family income level (Bener et al., 2012; Hamdan et al., 2008; Lorant et al., 2003) have been identified, globally, as indicators of depression. Living arrangement, as an indicator of material circumstances, has been also linked to depression among women (Al-Otaibi et al., 2007; Daradkeh et al., 2002). In terms of bio-behavioral factors, history of chronic illness (Egede & Ellis, 2010; Golden et al., 2008; Moussavi et al., 2007), history of depressed mood in pregnancy (Chaaya et al., 2002; Hamdan & Tamim, 2011), physical activity (Brown et al., 2005; Galper et al., 2006; Harris et al., 2006; Jacka et al., 2011), and body mass index (BMI) (Pan et al., 2012; Simon et al., 2010; Zhao et al., 2009) have been found to be related to depression among women.

Psychosocial factors have been found to be important in depression among women, and include stressors, which are represented in the variables of religiosity (Smith et al., 2003), domestic violence (Alhabib et al., 2010; Almosaed, 2004; Douki et al., 2003; Haj-Yahia, 2000; Hegarty et al., 2004), perceived body image (Kim & Lee, 2010; Winstanley & Dives, 2005), social support (Kendler et al., 2005), and coping (Kelly et al., 2008). Finally, Health care system factors are likewise correlates of depression. In particular, access to health care (Nasir & Al-Qutob, 2005) has been documented. Age was also reported as an important factor in determining the vulnerability of depression in women (Al-Otaibi et al., 2007; Kessler et al., 2010; Patten et al., 2006).

**Specific Aims of the study are as follows:**

***Specific Aim 1***. To describe the prevalence of depression among targeted population.

***Specific Aim 2.*** To describe socioeconomic status (SES) (education, marital status, employment status, and family income level); material circumstances (family structure, number of children, and place of residence); bio-behavioral (history of chronic illness, history of depressed mood during pregnancy, physical activity, and BMI); psychosocial (religiosity, domestic violence, perceived body image [perception of body image, perception of ideal body image], social support, coping); health care system (attitudes towards seeking professional help [willingness of seeking professional help, comfort level of talking to a health care professional, and stigma around seeking professional help], availability of psychiatric clinic) characteristics, and age among adult Omani women, 18 years and older, those experiencing depression and those not experiencing depression.

***Specific Aim 3.*** To assess the association among the socioeconomic, material circumstances, bio-behavioral, psychosocial, health care system (access to health care), and age variables in relation to the dependent variable of depression in adult Omani women.

***Specific Aim 4.*** To examine the utility of the rSDH conceptual framework in assessing the predictors of depression in the targeted population

**Research Design**

A descriptive, cross-sectional, correlational study was designed to assess the predictors of selected socioeconomic factors, material circumstances, bio-behavioral factors, psychosocial factors, access to health care factors, and age on depression in Omani adult women in Wilayat of Rustaq, and the utility of the rSDH conceptual framework on predicting depression in Omani women.

**Study Participants**

Urban and rural villages that are served by four health centers in Wilayat of Rustaq were selected to identify and recruit a total of 240 adult women. The health centers which were selected were Rustaq extended health center (polyclinic), which served urban villages; and Al Hoqain health center, Al Razi health center, and Wadi Al Sahtan health center, which represent all served various rural villages in Wilayat of Rustaq. One hundred and twenty women were recruited from urban areas and similar number of participants was recruited from rural areas.

The total number of participants was determined by using two approaches of calculating the sample size for Structural Equation Modeling (SEM) analysis. The first approach was by implementing the 10 times rule of thumb in calculating sample size in Partial Least Squares

Structural Equation Modeling (PLS-SEM). According to 10 times rule of thumb, the sample size should be either a 10 times per the largest number of paths (arrowheads) directed towards a latent variable in the model or 10 times per the maximum number of formative indicators of a latent variable (Hair et al., 2013; Marcoulides & Chin, 2013). Based on this rule and considering the largest number of arrowheads in the model (six arrowheads directed towards the dependent variable) and also the largest number of indicators per a variable (six indicators for psychological variable), the minimum sample size required for this study was 60 participants. It was also suggested that for a research with maximum number of six arrowheads directed towards a latent variable in its' structural model and with a significance level of 5% (i.e. confidence interval of 95%), a statistical power of 80%, and $R^2$ values of at least 0.25, the minimum sample size required is 75 (Hair et al., 2013; Wong, 2013). Although the 10 times rule of thumb is widely used, Hair et al. (2013) recommended to use statistical power analysis software (G*Power) as an additional alternative to 10 times rule of thumb.

Based on this suggestion, G*POWER software version 3.1 was used to estimate an appropriate sample size as the second approach. According to G*POWER analysis, for multiple regression analysis of 22 predictors, a sample of 106 women will be required to detect an effect size value ($f^2$) of 0.25, with alpha of 0.05 and a power of 0.80 (**Appendix 1**).

Although PLS-SEM is suitable for small sample size, researchers recommended to use a larger sample size, particularly, with complex model (Hair et al., 2013; Wong, 2013) and exploratory research that investigates the inter-relationships of low-value variables (Wong, 2013). Other factors also need to be considered in determining the appropriate sample size including characteristics of data (i.e. possibility of missing data, normality characteristics of

data) (Hair et al., 2013; Marcoulides & Chin, 2013), model's background (Hair et al., 2013; Marcoulides & Chin, 2013), and degree of variables' relationship (Marcoulides & Chin, 2013; Wong, 2013). For these reasons, a sample size of 240 women was recruited for the study. A convenience sampling technique was used to recruit adult Omani women aged 18 years and older for the study.

**Inclusion and Exclusion Criteria**. Eligibility criteria for the study include: 1) woman of Omani nationality, 2) 18 years of age and older, 3) speak Arabic, and 4) willing to participate in the study. Exclusion criteria for participants include: 1) pregnancy, 2) cognitive impairment, 3) inability to provide informed consent, and 4) use of anti-depressive medication. Pregnancy was considered an exclusion factor as hormonal changes may affect emotional status of women (Soares & Zitek, 2007). Pregnant women are at risk for anxiety and depressive disorders due to hormonal changes (Soares & Zitek, 2007), which may lead to false result in the study.

## Setting

The women in the study were recruited from four villages in Wilayat of Rustaq. This area is located in South Batinah Governorate, 160 km from the capital city, Muscat (Ministry of Heritage & Culture, 2013). According to the 2014 census, the total Omani population of Wilayat Rustaq in 2013 was 79,385 (National Center of Statistic and Information, 2014). The most recent census of the Omani female population in the Wilayat was in 2010, which indicated that the Omani female population was 35,930 and accounted for 50.2% of total Omani population in the Wilayat (Ministry of National Economy, 2010).

The mental health services including screening, diagnosing, and management of mental health disorders takes place in the psychiatric clinic of the Rustaq extended health center (Rustaq

polyclinic). Health care centers and small hospitals in rural areas in the Wilayat of Rustaq do not provide mental health care and have no mental health professionals (Ministry of Health [MOH], 2014). Although some of rural villages in the Wilayat of Rustaq are within a radius of 40-50 km (24-31 miles) from the Rustaq polyclinic, however, some of these villages are geographically difficult to access or travel from at a regular base

For this study, 120 women were recruited from urban villages that are close to and served by the Rustaq extended health center (Polyclinic) and 120 women were recruited from rural villages that are served by other health centers or small hospitals.

**Procedures**

**Study Approval.** The approval of the UCLA Institutional Review Board (IRB) review committee was attained prior to the submission of the research plan and procedure to the Research and Ethical Review & Approve Committee in the Ministry of Health (MOH), Oman for approval (**Appendix 2**). Approval form UCLA IRB and MOH Research and Ethical Review & Approve Committee was also attained for recruitment flyers.

**Recruitment.** Approved flyers stating the purpose of the study, methods of data collection, and Principal Investigator (PI) contact information were posted in the village shopping centers or markets, small shops, and health centers (**Appendix 3.1 & 3.2**). Additionally, nurses in the health centers assisted in distributing flyers to women attending these centers. Due to cultural stigma of depression, the flyers stated that the purpose of the study is to examine the effects of social, cultural, and economical factors on physical and mental health of Omani women.

Once the woman contacted the PI, a mutually agreed upon meeting place for information session was determined. Due to low response rate (less than 85% of total sample size needed over a three month period), the PI visited the health centers and Rustaq polyclinic for three months on regular basis, after attaining the permission of medical officer in-charge (the head of administrative personnel in health center/polyclinic), and recruited adult women attending general medical clinic, well child health clinic, particularly immunization clinic, and birth spacing clinic. Specialist outpatients' clinics such as medical specialist clinics (i.e. Diabetic, Cardiology, & Hypertensive patients' clinics) and surgical clinics are excluded because women attending these clinics were maybe under current stressors as a result of illness, which may increase the likelihood to report high scores of depression, and consequently lead to false findings. The risk for reporting high scores of depression with women attending general medical clinic, child immunization clinic and birth spacing clinic is less likely. The waiting time to see the physician and/or to get the laboratory investigation results was utilized to conduct the interviews with the participants who recruited directly from the health centers. Women who were interested to participate were informed about the anticipated time to complete all study procedures.

**Cultural Considerations.** Due to a cultural issue, particularly in rural villages, which encourages women to attain husband or a male's family approval before signing an official document, and to be accompanied by a male attendant when travel, the participants were given the freedom to inform their husbands or a male family member about the study's purpose and procedure. The participant who preferred to conduct the information session, eligibility screening, or survey in a place other than their homes, such as health centers were allowed to be accompanied by a male attendant or a friend. A place to wait was provided for the attendant

inside the health center while conducting study procedures. The PI provided this information to each woman during initial contact. The women who were recruited directly from the health center were allowed to contact their husbands or male caregiver for permission before accepting to carry out the interview. In exception of two women who recruited directly from health centers, all women expressed no need to get permission for participating in the study.

**Readability of Forms.** The eligibility screening form, informed consent form, and questionnaire were in Arabic. The PI red the eligibility screening and informed consent form for each woman in private.

**Initial Contact.** During the initial phone or personal contact (with women recruited directly from health centers), the PI informed women about the actual purpose of the study, which is to assess predictors of depression in adult Omani women. The PI provided basic information about the study, including data collection procedures, duration of survey, and the process of maintaining privacy and confidentiality. Additionally, the PI provided answers to women questions about the study. Each woman decided upon the place for the information session.

**Privacy and Confidentiality.** The PI was responsible to ensure privacy of the woman in the selected settings. For example, a woman who preferred to attend the session in the local health center rather than her house, the PI arranged a private room in the center, with the collaboration of health center's administration or nurse in-charge. Privacy was ensured during each study stage, i.e. information session, eligibility screening, and survey administration.

With respect to confidentiality, the PI provided detailed information about the strategy to secure participant confidentiality during the private information session. The PI informed the

participant that the initial name will only be stated on the informed consent. No name will appear on the questionnaire; rather an ID number will be assigned. Study consent form and questionnaire will be coded and be secured in a locked cabinet. The participant was also notified that the research's PI and the UCLA School of Nursing doctoral dissertation chair are the only persons who will have access to the forms and/or study data that are stored in a password-secured laptop.

**Eligibility Screening.** The eligibility screening was conducted in presence of women. The PI administered the eligibility screening form to each woman. Prior to administering the screener, the PI investigator read the eligibility screening consent form that included the details about eligibility screening test and participants' rights before and during screening (**Appendix 4.1 & 4.2**). Interested women to participate in the study were asked to sign or stamp the consent to initiate the screening procedure.

Due to cultural perspective in regards to difficulty to provide written consent without husband or male next of kin's permission, women were given the freedom to consult with their husbands or male next of kin before signing the screening consent. Participants were informed to confirm their participation and providing the signed consent within 24 hours. However, majority of women provided their signature without consulting with their husband or male next of kin. Few participants who were recruited directly from health center informed their husbands who were present with them at health centers before signing the screening forms.

After the signature of each participant was attained, the PI administered the eligibility screening. The eligibility screening form included questions about the woman's name, age, citizenship, whether she was pregnant or not, whether she was in a postnatal period, and whether

she was under anti-depressive medication or not. To assess her cognitive ability, the women were asked to state the present time (date, month, year), and name of the village in the screening form (**Appendix 5.1 & 5.2**).

The women who did not meet all of the eligibility criteria were informed that they were not eligible for the study. Only few interested women were excluded from participation due to pregnancy. All women who participated in the study showed an acceptable cognitive ability by answering questions and reporting accurate date. Many of elderly women reported the Arabic month, which PI accepted it. At the end of the study (data collection), the woman was asked if she wants to receive a copy of screening consent (signed/stamped screening form). However, no women wanted to get a copy of the screening form. A maximum of seven minutes was needed to complete the eligibility screening form, five minutes was the average time frame for completion the form. All stamped/signed eligibility-screening forms were saved in a locked cabinet.

**Information Session and Informed consent.** Eligible women attended a 15-20 minute private information session, which was held in Arabic. During the information session, the PI notified women that the University of California, Los Angeles and Ministry of Health, Oman, have approved the study. The PI read the study informed consent, which was based on the UCLA standard criteria of informed consent (**Appendix 6.1 & 6.2**)**.** The informed consent sheet included detailed information about the study, including study purpose, data collection procedures, duration of the study questionnaire, risks and benefits, and process of maintaining privacy and confidentiality. The PI answered women's questions about the study and its' procedures. The PI assured women that participation in the study was voluntarily, and she had the right to refuse answering any question and/or discontinue participation without a penalty.

All participants were asked to repeat basic consent information such as purpose of the study, duration of study survey, or anticipated risks in order to assess participants' understanding and comprehension of consent information. The PI repeated description of informed consent for participants who failed to recall basic information. The PI had to repeat basic information once for two elderly participants who failed to answer basic information about study at first time. Once assessment was completed, the participants were asked to sign or stamp the informed consent form. The PI informed each participant that she could have a copy of an unsigned informed consent if she needs it. However, no single woman asked for a copy of unsigned study informed consent. The signed informed consents, screening forms, and study questionnaires were stored in separate locked cabinets.

The participants who attended health center to complete study procedures were offered a compensation of OMR 1.00 ($2.60) ("Xe Currency Converter", 2017) for transportation or other costs incurred. However, all women who met compensation criteria refused to receive the compensation. Based on Omani culture, participants are not otherwise compensated for research participation. Women who agreed to participate in the study were given the choice to proceed with eligibility screening immediately after the session or meet on a different date. All women, though, chose to complete eligibility screening, information session, and data collection at once.

**Survey Administration**

Once the informed consent process was completed, the PI proceeded with questionnaire administration as all women requested. At the beginning, the PI asserted the importance of providing honest responses to all questions in order to attain credential data, which will assist in identifying the risk factors of depression in adult Omani women. The PI assured the participants

that sensitive data will be confidential, and intent of suicide and physical abuse will not be reported, as the regulations of Ministry of Health. The PI also reminded the participant that 45-60 minutes of time is anticipated for completion of survey. The PI then administered the questionnaire to the participant and recorded responses directly on the questionnaire form. The participants were asked to record the answers of the culturally sensitive questions by themselves, which are suicide ideation and sexual interest (BDI-II), physical abuse question, and religiosity questionnaire. The PI checked the completion of the survey for each participant when they submit the survey forms. The PI also reviewed the participant's response for suicide ideation item (item # 9 in BDI-II) before allowing the participant to leave in order to evaluate if further suicide risk assessment was needed.

For illiterate participants or those with low reading capabilities, the PI read the answers' options of each of the survey questions while pointing out the place of each option with a pen or a pencil, so the participant will know the available answers and location of the answers of each question. The participant was then asked to circle the option that reflects her answer of each question. To ensure that the participant circled the answer she intended to do, the PI read for the participant the answer she circled it. At the end of data collection, the PI measured the height and weight of the participant, with light clothing, and recorded the measurements in the survey questionnaire for later calculation of body mass index (BMI).

Several instruments, which were used in the study, have been tested in Arab populations who share similar language, educational level, and culture background with Omani populations, and have been found reliable and valid. These instruments include the Stunkard's Body Silhouettes, the Brief COPE scale, the Muslim Attitude toward Religiosity scale (MARS), and

Beck Depression Inventory (BDI-II) scale. The study also included closed-ended questions, rather than scales, that have been adopted from global studies. These variables are socioeconomic status, access to health care, physical activity, history of chronic disease, and domestic violence.

The survey questionnaire packet was organized in a way that cultural sensitive instruments and questions, such as Beck Depression Inventory scale and domestic violence question were placed in the middle or the end of the questionnaire. The survey questionnaire packet included a total of 104 questions. The next section provides detailed description of the structure, validity, and reliability of instruments, which were used in the study.

## Independent Variables

### 1. Structural Determinants

**1.1. Socioeconomic Profile.** The PI has developed a questionnaire to gather general demographic and socioeconomic information of participants (**Appendix 7.1 & 7.2**). The demographic and socioeconomic profile includes the following variables:

*Education Level*

The participants were asked to record the highest educational grade she attained. The educational level was statistically analyzed as a continuous variable for structural equation modeling analysis (i.e. path analysis). The education level was categorized as follow: no formal education/illiterate, 1-6 years/grades, 7-12 years/grades, and more than 12 years/college or university for the purpose of cross tabulation statistical analysis.

*Marital Status*

The marital status was classified into four groups as follows: single, married, divorced/separated, and widowed.

*Employment Status*

The employment status variable was assessed with a question that whether the woman has a job with salary or not. The employment status was assessed as a categorical nominal variable.

*Family Monthly Income*

The family's monthly income was used as an indicator to assess income variable. The participants were asked to select the category that reflects the family's monthly income in Omani currency. The family's monthly income was statistically analyzed as an ordinal variable.

## 2. Intermediary Determinants

### 2.1. Material Circumstances

**Living Arrangements**: Three variables were assessed under the questionnaire of living arrangements, which are family structure, number of children, and place of residence. This questionnaire consists of four questions that are relevant to these variables.

*Family Structure*. One question of living arrangement is related to family structure. The participants have to select the type of family they are living with. The answer options for this question include living alone, living with a spouse only, living in a nuclear family, or. Living

with nuclear family indicates living with parents or husband and children under same roof. Living with extended family means living with other persons in addition to nuclear family members. This variable was assessed as a categorical variable.

*Number of Children.* The second question in living arrangement questionnaire is related to the number of children. Women had to state the actual number of children, whether their own or step children. For path analysis, the answers of the women were assessed as a continuous data. For cross tabulation analysis, the participants options was categorized as follow: women with no children, women with 1-4 children, women with 5-8 children, and women with more than 8 children.

*Place of Residence.* Participants were asked to state the name of their villages to identify if they are from rural or urban villages.

**2.2. Bio-behavioral Factors**

**History of Chronic Illness**. Participants were asked if they have been diagnosed with any chronic disease, such as diabetes, hypertensive blood pressure, coronary artery or heart diseases, cancer, respiratory diseases, neurological diseases, and blood disorders. Options of "yes" and "no" were provided to answer for each of these diseases. The "yes" responses will be summed for a total score; answers were then categorized as follow: no illness, 1 illness, and more than one illness; and assessed as a categorical variable.

**History of Depressed Mood in Pregnancy.** This variable was assessed with a question that whether the woman experienced any episode of excessive sadness, hopelessness, or

depressed mood during pregnancy. The history of depressed mood variable was assessed as a categorical nominal variable.

**Physical Activity.** Physical activity questionnaire is a global measure, which is guided by Centers for Disease Control and Prevention (CDC, 2014) and World Health Organization (WHO, 2010b) recommendations for physically active adults. Accordingly, engagement in physical activity was measured by two questions. The first question is "How many times in the past 7 days have you engaged in moderate-intense exercise (e.g. brisk walking, swimming) for at least 30 minutes?" The answer options for the question are as follows: 1) never, 2) 1-4 times, 3) more than 4 times, and 5) daily. The second question is "How many times in the past 7 days have you engaged in vigorous exercise (e.g. running, extended fast walking, jogging, intense gymnastic activities, ball sports) for at least 20 minutes?" The answer options for this question are: 1) never, 2) 1-3 times, 4) more than 3 times, and 5) daily. For data analysis, the answer options 1 and 2 in both questions were categorized as "not active" and options 3 and 4 were categorized as "active".

**Body Mass Index (BMI).** BMI is calculated by dividing the individual's weight by the square of the individual's height, where weight is measured in kilograms and height in meters (kg/m2) (Carpenter et al., 2000). Based on BMI, weight is classified as follows: 1) underweight (BMI<18.5), 2) normal weight (18.5≤ BMI <25), 3) overweight (25≤ BMI <30), and 4) obese (BMI ≥30) (WHO, 2013). Participants were weighed while wearing light clothing. Body weight was measured using a digital weight scale and barefoot height will be measured using a wall-mounted stadiometer. The BMI of participants was recorded as a continuous data. The

continuous coding of BMI was used with path analysis and the BMI categorical coding (i.e. underweight, normal weight, overweight, and obese) was used for cross tabulation.

### 2.3. Psychosocial Factors

**The Muslim Attitude towards Religiosity Scale (MARS-Arabic version)**. The Muslim Attitude towards Religiosity scale (Wilde & Joseph, 1997) is a 14-item scale (Ghorbani, Watson, Ghramaleki, Morris, & Hood, 2000; Abdel-Khalek, 2013), which has been used to measure respondents' commitments to Islam (Khan, Watson, & Habib, 2005) by assessing the intrinsic and extrinsic religious orientation (Ghorbani et al., 2000). Wilde and Joseph (1997) adopted the MARS from the Attitude towards Christianity Scale by Francis and Stubbs (1987) (Abel-Khalek, 2013; Khan et al., 2005; Wilde & Joseph, 1997). The response options for each item follow a 5-point scale ranging strongly disagree (1) to strongly agree (5) (Abdel-Khalek, 2013). The final score ranges from 14 to 70, higher scores reflect more positive attitudes towards Islam (Abdel-Khalek, 2013). The original English version of the MARS, has high internal reliability, with Cronbach's alpha of 0.93 when tested on 50 university Muslim students, mean age 21 years old, in England (Wilde & Joseph, 1997).

Abdel-Khalek (2013) translated the MARS into Arabic and tested the validity and reliability of the scale on 227 undergraduates Kuwaiti Muslims, 114 were women, with ages ranged from 18 to 30 years. Abel-Khalek (2013) reported an adequate correlation between the Arabic scale and Intrinsic Religious Motivation Scale ($r = 0.67$, $N= 99$, $P < .001$). With respect to reliability, Abdel-Khalek (2013) reported a good internal consistency of the scale, with a Cronbach's alpha of 0.88. One item from Wilde & Joseph (1997) scale was omitted because it

asks women about their "daily prayers in Mosque" (Abel-Khalek, 2013). According to Islam, it is more preferable for women to pray in their houses (Abdel-Khalek, 2013).

For current study, the actual attained religiosity scores of participants were used to assess the path analysis. For cross tabulation analysis, the attained scores were categorized into two categories which are: 1) scores less than 65 and 2) scores of 65.

**Domestic Violence.** For the purpose of this study, the PI has created a single question indicating whether participants have been the victim of any physical abuse: "Have you experienced any type of physical abuse (e.g. kicking, hard pushing, threatening with a sharp object, throwing, slapping, attacking with stick and/or bell, attacking with sharp object, strangulation, hard pulling of your hair to harm you from your spouse or another close family member during the past 12 months?" Possible answers to the question were "yes" and "no.", and was statistically analyzed as categorical data. The study did not include a scale because the current Arabic scale includes questions that extend beyond the aim of this study, such as reporting to legal authority.

**The Stunkard's Body Silhouettes.** The Stunkard's body silhouettes (Stunkard, Sorensen, & Schulsinger, 1983) scale was used to assess women's perception of their actual body weight and ideal body size. The Stunkard's body silhouettes show nine figures that illustrate male and female body size ranging from very thin to highly obese (Bhulyan, Gustat, Srinlvasan, & Berenson, 2003; Lynch et al., 2009). Only the female profile was utilized in the current study. Underweight body sizes were indicated by the figures 1 and 2, normal weight by the figures 3 and 4, overweight by the figures 5 and 7, and obese body sizes by the figures 8 & 9 (Bhulyan et al., 2003; Lynch et al., 2009).

The English version of Stunkard's body silhouettes was developed by Stunkard et al. (1983) to measure the male and female perceptions of their own weight and the ideal weight. Madanat et al. (2011) conducted face validation of the tool in a focus group of five Arab Jordanian women. Findings revealed that the figures were more easily identified in frontal view than side view. The Stunkard's Body Silhouettes was used in a study involving an Arab sample from Bahrain to assess the relationship between actual body image and ideal body image of 504 Bahraini adolescents; of whom women accounted for 51% of the participants (Al-Sendi et al., 2004). The findings revealed that only 23.9% of obese girls believed they were obese, and 34.2% of overweight girls perceived that they were within normal weight ranges (Al-Sendi et al., 2004).

**The Personal Resource Questionnaire 85-Part 2 (PRQ85-II) (Arabic Version).** The PRQ85 is a two parts questionnaire, for the purpose of this study; only part 2 was used to assess social support. Brandt and Weinert (1981) developed The PRQ85-Part 2 to measure social support. The tool consists of 25 items that assess different aspects of social support including intimacy, nurturance, social integration, assistance, and worth (Fain, 2013). The response options for each item follow a 7-point scale ranging strongly agree (7) to strongly disagree (1). The total score ranges from 25 to 175; higher score indicates greater perceived social support (Fain, 2013). Five items in the scale (items # 4,6,7,10, & 24) are phrased negatively; therefore, the participants' responses were reversed to match the positive direction of other scale's items (i.e. 1=7, 2=6,3=5, 4=4, 5=3, 2=5, 7=1) (Fain, 2013)

Weinert (1987) reported a Cronbach's alpha reliability of 0.89 of the tool. The subscale internal consistency ranged from 0.61 to 0.77. Other nursing researches reported a high

reliability ranging from 0.74 to 0.92 (Walker, Cooney, & Riggs, 1999; Mahat et al., 2002; McNicholas, 2002). For this study, the PI translated the English version of PRQ85-II into Arabic after attaining the permission to use and translated tool from the author (**Appendix 8:** Permission Letter to Translate and Use PRQ85 Questionnaire). The back translation then carried out by a professional translator. The reliability of the translated tool was assessed using the data of first 40 participants in the study. The internal reliability of scale (i.e. Cronbach's alpha) was 0.70, which indicates an acceptable level in most research ("Institute of Digital Research & Education [idre]: UCLA", 2016a).

**The Brief COPE Scale (Arabic Version).** The coping strategies that participants adopted to control the effect of stressors will be assessed using a self-reported scale, the Brief COPE scale (Carver, 1997). The 28-item Brief COPE scale (Carver, 1997) is a short version of the 60-item COPE scale developed by Carver, Scheier, and Weintraub (1989). The Brief COPE Scale is composed of 14 scales, with 2 items in each scale (Al-Sowygh, 2013; Cooper, Katona, & Livingston, 2008; Carver, 1997; Ghannam, 2014). A total of 14 different coping skills are assessed in this scale (Cooper et al., 2008; Carver, 1997).

The participants are requested to respond about their general reactions to stressful situations using a 4-point Likert scale (Al-Sowygh, 2013; Carver, 1997; Ghannam, 2014). The response options ranged from 1 "I have not been doing this at all" to 4 "I have been doing this a lot" (Al-Sowygh, 2013; Carver, 1997; Ghannam, 2014). The score of each subscale ranges from 2 to 8, with higher scores indicating a tendency to adopt the stated coping style. Carver (1997) reported acceptable values of Cronbach's alpha of the instrument's subscale ranging from 0.50 (venting) and 0.82 (religion). Ghannam et al. (2014) reported a Cronbach's alpha of 0.73 for the

Arabic version of the Brief COPE Scale assessed in a study of 164 adult Jordanians with coronary heart disease (20-85 years old, of which 37.2% were women).

According to Kasi et al. (2012), the developer of the Brief COPE scale did not attempt to categorize coping skills in the scale into adaptive and maladaptive coping skills because their use depends on the nature of the stressful circumstances and pattern of relations. However, Kasi et al. (2012) suggested two categories of coping skills within the scale, which are: 1) adaptive coping skills, including active coping, instrumental support, planning, acceptance, emotional support, humor, positive reframing, and religion, and 2) maladaptive coping skills, including behavioral disengagement, denial, self-distraction, self-blame, substance use, and venting. Other researchers suggested three coping categories, which are: 1) dysfunctional coping strategies (behavioral disengagement, denial, self-distraction, self-blame, substance use, and venting), 2) emotion-focused strategies (acceptance, emotional support, humor, positive reframing, and religion), and 3) problem-focused strategies (active coping, instrumental support, and planning) (Cooper et al., 2008). For the purpose of this study, the two categories of coping strategies was followed, to attain in-depth information about most common coping strategies the adult Omani women implemented in stressful situations, and which coping strategy among the two types are more related to depression.

## 2.4. Health Care System

**Access to Health Care**. To assess access to health care, participants were asked to answer two questions about their attitudes to seek mental health care, as follows: "If you had a serious emotional or psychological health problems/concerns, would you go to see psychological

professionals?" The four response options were: definitely, probably, probably not, and definitely not (Diala et al., 2001; Mojtabi, 2007). 2) How comfortable you would feel talking to a health care professional about emotional/mental problems/concerns?" Participants were requested to choose a response from four options, which included: not comfortable at all, not very comfortable, somehow comfortable, and very comfortable (Diala et al., 2001; Mojtabi, 2007). Another question, which assessed the stigma-related concern of accessing mental health care was asked. This question was stated as follow: "How embarrassed would you be if other people in your community (village) knew you were getting professional help for your emotional or psychological problem? Participants were asked to choose from the following responses: very embarrassed, somewhat embarrassed, not very embarrassed, not at all embarrassed (Diala et al., 2001; Mojtabi, 2007).

Additionally, whether mental health clinics or services are available or not in each of the selected villages was included as a variable in the analysis. The participant was asked to answer with "yes" or "no" if mental health service is provided in the health center that served her village. This provided information about the effects of the availability of mental health care on depression in a small subsample of Omani women. The variable of access to health care was assessed as a categorical variable.

**3.Age**

Participants were asked to state their actual age. It is possible that a participant may be unable to specify her actual age. In this case, the participant was asked to estimate her age. The age was recorded as a continuous variable. Based on the actual age, age was categorized into

seven categorizes as follow: 18-25 years, 26-33 years, 34-41 years, 42-49 years, 50-57 years, 58-65 years, and more than 65 years. The categorical variable was used for cross tabulation analysis.

**4. Dependent Outcome: Depression**

**The Beck Depression Inventory (BDI-II) Scale (Arabic Version).** The BDI-II (Beck, Steer, & Brown, 1996) is a 21-item, self-administered upgraded instrument of BDI-I and BDI-IA to test the presence and severity of depressive symptoms in adolescents and adults (Beck et al., 1996; Cohen, 2008; Dozois & Covin, 2004; McDowell, 2006). The items reflect the affective, cognitive, and somatic domains of depression (Beck et al., 1996; Cohen, 2008).

In the BDI-II, each item in the instrument has four responses that are rated on a 4-point scale from 0 to 3 (Beck et al., 1996; Dozois & Covin, 2004; McDowell, 2006). The individual is asked to choose the response that best represents his or her feelings over the past two weeks, including today, for each of the listed items (Beck et al., 1996; Dozois & Covin, 2004). The severity of depression is determined based on the total score obtained after summing the scores of the 21 items (Beck et al., 1996; Dutton et al., 2004). Based on the total score, the levels of depression are classified as follows: 0-13 (minimal), 14-19 (mild), 20-28 (moderate), and 29-63 (severe) (Beck et al., 1996; Dozois & Covin, 2004; Dutton et al., 2004; McDowell, 2006).

Ghareeb (2000) translated the BDI-II to Arabic and tested the validity of the translated version on a sample of university students (*N*=145) and psychiatric patients (N=36). Thirty percent of university subjects were female while 57% of the sample of psychiatric patients was female (Ghareeb, 2000). The mean age of participants was 22.3 years (*SD* = 1.42 year). Ghareeb

(2000) reported a significant correlation between the Arabic BDI-IA and BDI-II ($r = 0.76$, $p < .001$), which supports the convergent validity of the tool. To assess the reliability of the tool and cut-off score, Ghareeb (2000) tested the instrument on three groups of Egyptian samples: high school students ($N$=638), college students ($N$=1658), and adults ($N$= 561). The college student sample included 1051 women with a mean age of 20.09 years ($SD$ = 1.94 years), and the adult sample included 243 women with a mean age of 30.37 years ($SD$ = 8.92 years) (Ghareeb, 2000). The internal consistency analysis of the Arabic BDI-II ($N$= 114) revealed a coefficient alpha of 0.83 (Ghareeb, 2000). The test-retest reliability on 55 subjects from the sample of university students revealed a coefficient alpha of 0.74 ($p < 0.001$) (Ghareeb, 2000).

AlAnsari (2006) administered the Arabic BDI-II by Ghareeb (2000) to 9,168 undergraduate students from eighteen Arabic countries, including Oman ($N$=333). Participants' age ranged from 18 to 25 years, and analysis reported coefficient alphas that ranged from 0.82 to 0.93 (AlAnsari, 2006). The coefficient alpha of the Arabic BDI-II in Omani sample was 0.86 (AlAnsari, 2006), which indicates that the instrument is highly reliable in Omani younger adults.

For analysis, continuous and categorical classifications of depression score were utilized. For description (Aim 1) and cross tabulation of BDI-II with other variables (Aim 2), a nominal categorization (depressed Vs. non-depressed), and ordinal categorization (No/minimal, mild, moderate, severe) were used. For SEM analysis (path analysis) of the conceptual model, the BDI-II score was utilized.

**Data Analysis**

The statistical analysis of the study's data was carried out using SPSS, 22.0 Statistical Package (SPSS, 2014) for Windows and Partial Least Squares Structural Equation Modeling software, 3.2.6. The PI examined the data for accurate data entering. There was no missing data possibly due to sufficient preparation that was given to each participant prior to study.

In independent variables, the categorical variables include marital status, employment status, family structure, physical activity, domestic violence, coping and access to health care. The remaining independent variables are continuous. Depression was considered both as categorical variable (Not depressed Vs. Depressed) based on BDI-II criteria in Aim 2 and as a continuous variable in Aim 3 and 4. These two approaches of measurement are used in clinical practice and in research, and may differ in how relationships with the independent variables are manifested. All transformed data, re-labeled variables, and altered data was recorded and saved in a log.

The normality of data distribution was examined. Based on the result, the assumption of normality was violated (i.e. data was not normally distributed). Procedures were carried out to maintain the assumption of normality, including omission of extreme values and outliers and transformation of data using logarithmic transformation, square root, and inverse transformation. However, the implemented procedures were unsuccessful to maintain the assumption of normality. Therefore, non-parametric statistical analysis and Partial Least Squares approach to Structural Equation Modeling (PLS-SEM) were used for statistical analysis of the data. The alpha value of all statistical tests was set at 0.05, meaning that rejection of null hypothesis occurs when alpha is less than 0.05.

**Specific Aim 1**. Descriptive statistics, including frequency, range, means, standard deviations, central tendencies, and percentage were used to describe the characteristics of the participants in relation to the independent variables. Similar statistical analyses were carried out to describe the prevalence of depression among participants.

**Specific Aim 2**. Descriptive statistics were used to characterize depressed and non-depressed women in terms of sociodemographic factors, material circumstances, bio-behavioral factors, psychosocial factors, access to health care variables, and age. Chi-Square was used to statistically examine the differences between depressed and non-depressed women in terms of independent variables.

**Specific Aim 3.** Preliminary to examining multivariable relationship in Aim 4, bivariate relationships were examined in Aim 3. Mann-Whitney test was used to examine the relationship between BDI-II score and nominal categorical independent variable including, marital status, employment, family structure, place of residence, history of depression mood during pregnancy, physical activity, domestic violence, coping, and availability of psychiatric clinic. Spearman's rho was used to examine the association between BDI-II score and ordinal independent variables including monthly family income, history of chronic illness, perception of body image, perception of ideal body image, attitude of seeking professional help, comfort level of talking to a health care professional, and perceived stigma around seeking professional help. Spearman's rho was also used to examine the association between BDI-II score and other continuous independent variables including, education, number of children, BMI, religiosity, social support, and age. For descriptive purposes, means of the depression score for the various levels of ordinal variables were assessed and presented using the same categories used for Aim 2.

**Specific Aim 4**. The rSDH model guided the assessment of the multivariable relationship between BDI-II score (depression) and independent variables. Partial Least Squares approach to Structural Equation Modeling (PLS-SEM) was used to examine this relationship and to identify the parsimonious model of the data set. In addition, the mediational analysis of parsimonious model was assessed using PLS-SEM. The mediational analysis was carried out through assessing the direct effect of SES on depression and indirect effect of SES on depression through mediators.

## Partial Least Squares Structural Equation Modeling (PLS-SEM)

Structural Equation Modeling (SEM) is a multivariate data analysis approach, which tests theories and causal models (Hair, Ringle, & Sarstedt, 2011;Wong, 2013). Through SEM, researchers can estimate and test the relationships that occur among various variables of interest (Wong, 2013). Partial Least Squares (PLS) is one major SEM approach that recently is widely applied in research. Partial Least Squares Structural Equation Modeling (PLS-SEM) is a causal modeling method to analyze the variance of the independent latent variable (Hair et al., 2011; Wong, 2013). PLS-SEM has been the preferred SEM approach for many researchers for several reasons. Contrary to other SEM approaches, i.e. Covariance-Base SEM (CB-SEM), PLS-SEM does not impose assumptions about data distribution, thus it is applicable with empirical data that are not normally distributed (Hair, Sarstedt, Ringle, & Mena, 2012;Wong, 2013). Additionally, PLS-SEM was reported to attain high statistical power regardless of small sample size; therefore, it is may be preferable with different sample size in contrast to CB-SEM, which showed statistical restrictions with relatively small sample size (Hair et al, 2012; Wong, 2013). PLS-SEM handles both reflective and formative measurements of the latent variables, which makes it

applicable to use with complex models (Hair et al., 2012). Moreover, PLS-SEM is useful in explanatory research and research with categorical as well as continuous variables (Hair et al., 2012). In comparison to CB-SEM, PLS-SEM is useful for theory development and prediction (Hair et al., 2012). Indeed, if the research aim is theory development and prediction rather than theory confirmation, then PLS-SEM is highly recommended (Hair et al., 2011; Wong, 2013). According to Wong (2013), if difficulties are encountered in specification such that the correct model cannot be ensured, then PLS-SEM is preferable CB-SEM.

Considering that in the current study distributional assumption of normality was violated; sample size was relatively small; the conceptual model testing included several latent variables and categorical variables; the study aimed to examine or predict the relationship between these latent variables rather than confirm them, and accurate specifications of current model cannot be ensured, therefore, PLS-SEM was the approach of choice for model analysis.

**Human Subject Protection**

The study followed the protocols of protecting human subjects according to the University of California, Los Angeles (UCLA) Institutional Review Board (IRB) and the Ministry of Health, Oman, Ethical and Research Review & Approve Committee. The recruitment of subjects started only after attaining the approval from UCLA IRB and MOH Research and Ethical Review & Approve Committee. The selected participants were screened for their age and other eligibility characteristics, and only eligible participants were enrolled in the study. Participation in the study was completely voluntarily and no responsive actions were taken by the PI or local health center against women who did not care to participate in the study.

The PI discussed the informed consent, which approved by IRB with detailed explanation of the study's purpose, benefits, risks, and the right to participate and withdraw.

The explanation of the procedure and study forms was provided in Arabic and the PI asked main questions to evaluate participant's comprehension of the informed consent and procedures of the study. Participants were asked to read and sign or stamp the informed consent. After the completion of the survey, there was no further contact with any of the participants from the PI regarding the study.

The study did not propose any invasive tests throughout the data collection procedure. Loss of time due to completing the questionnaire was the only risk reported from the participants as a result of participation. Additionally, no major emotional or mood disturbance was reported due to the sensitivity of some questionnaires. The PI's explanation of procedure to maintain confidentiality of the participants probably assisted in controlling this matter. No Woman reported anxiety, anger, or sadness during or as a result of the survey.

The anticipated time that will be needed to complete the survey was informed for each participant. The right to refuse to answer questions or to discontinue participation at any point during the study was provided as a choice for the participant.

It was planned that in case of any adverse psychological effect during the data collection procedure, the participant will be referred to psychiatric clinic in Rustaq Polyclinic for professional help. The PI will assess the need for referrals and provide a referral reference sheet for all requested referrals. The location of the polyclinic will be also described for the women, and the telephone numbers and working hours of the polyclinic will be provided for them. The PI is obligated to report any adverse events to the research advisor as soon as possible. However, no

adverse effect were observed or reported by any participant during and as a result of survey. Regular meetings via Internet were conducted with the research advisor as scheduled or as needed to discuss the process of the data collection as well as any adverse events.

To ensure anonymity and confidentiality of participants, the screen eligibility form, informed consent sheets, and questionnaires packet of each participant were assigned a code that were not be traceable back to the participant. Only the PI knew the codes. The PI was responsible for collecting survey questionnaires, separating the identifying information from the survey questionnaires, and secured them in locked cabinet in the PI's house.

Data was stored on a password-secured laptop. The password changed periodically to ensure security and confidentiality of the data, and was known only by the PI. The laptop had no connection with the Internet network. At the end of study and data analysis, the researcher destroyed the identifying information of the participants. The researcher will maintain participants' responses to the questionnaire for a maximum of five years.

**Suicidal Ideation and Physically Abused Cases.** Only three participants answered positively to suicidal ideation question in BDI-II (item # 9). Based on the reporting system in Oman, UCLA IRB "Guidance of Research Protocols and Risk of Suicide", and recommendations received from the MOH Ethical and Research Review & Approval Committee, the following suicidal protection measures were followed with participants who reported suicidal ideation thoughts: 1) due to lack of experience of PI in management of suicidal-risk cases, the PI carried out more assessment, following UCLA guideline, to determine the risk of imminent danger to self. Because suicide is highly stigmatized in Muslim and Arab societies, it was expected that participant might not be honest in answering the assessment questions. Additionally, the

participant might experience physical and emotional abuse by husband or family member if suicide intent is reported. Therefore, the PI encouraged the two participants to provide honest answers for the assessment questions. The PI asserted the importance of providing honest answers to protect her life and to attain proper management. The PI also ensured the participant that her answers will be reported to the local psychiatrist after her agreement only. According to the assessment, there was no imminent danger to self was observed with both participants. 2) The PI asked the participant for permission to report by phone the case to the psychiatrist on-duty at Rustaq Polyclinic. According to the recommendations provided by the MOH Ethical and Research Review & Approve Committee on the review of the study application and approval of UCLA IRB on MOH committee's recommendations, the PI will report the case only if attain permission from the participant. Both participants refused to provide permission and felt no need to report. 3) Due to participants' refusal of reporting, the PI advised both participants to visit the psychiatric clinic for assistance. Additionally, the PI encouraged the participants to talk to a trusted family member or a friend. 4) The PI documented all assessment and measures that followed with identified suicide risk participants. The carried out assessment and measures were recorded in separate sheet without participants' identification information.

The health care system in Oman limits the preliminary official referral and management of suicidal, self-harm and assaults' cases to psychologist, psychiatrist, and/or general physician. For assaults cases, the physician is obligated to fill the medico-legal form (**Appendix 9**) and to report the case to polyclinic administrative personnel for reporting of authorities. According to a psychiatrist at Rustaq Polyclinic, the reporting of physical abuse incidents or assaults to a health institution is limited to the victim, family member, and/or police authority. In this study, only

four participants reported the history of physical abuse. The PI advised these participants to report incident to authorities (i.e. police department) or closest health institution.

## Summary

This chapter provides a detailed description of the methodology of the study. The study is a cross-sectional, correlational, path analysis study of 240 adult Omani women from four villages of Wilayat Rustaq, Oman. The study's sample was recruited using convenience-sampling technique. Approval of the study was obtained from the UCLA IRB review committee and the Research and Ethical Review & Approve Committee of the Ministry of Health in Oman.

Multiple instruments and questionnaires were used with Omani women to examine the predictive role of selected variables on depression. These instruments included: 1) socioeconomic profile 2) body mass index, 3) physical activity questionnaire, 4) six single-item questions to assess age, number of children, family structure, history of chronic disease, history of episodes of sadness, hopelessness, and depressed mood during pregnancy, domestic violence, 5) three single-items questions to assess access to health care, 6) The Muslim Attitude towards Religiosity scale (Wilde & Joseph, 1997), 6) The Stunkard's Body Silhouettes (Stunkard et al., 1983) to examine perception of body image, 7) The Personal Resource Questionnaire 85-Part 2 (PRQ85-II) (Brandt & Weinert,1981), and 8) the Brief COPE Scale (Carver, 1997) to assess coping strategies adopted by women in stressful events. To measure the dependent (outcome) variable, the Beck Depression Inventory (BDI-II) scale (Beck et al. 1996) was administered with the adult Omani women. All of these instruments were administered in the Arabic language.

For data analysis, SPSS 22.0 statistical package (SPSS, 2014) and Partial Least Squares Structural Equation Modeling (PLS-SEM) software (version 3.2.6) were used. The statistical

analysis of data included descriptive statistics and bivariate correlational statistics to assess association between individual independent variable and the outcome variable. Additionally, PLS-SEM analysis was used to examine the statistical effects of multiple independent variables on the outcome variable (i.e. path analysis), and to examine the mediation relationships in the model. A significance level of $p < 0.05$ was used.

Mental health problems in women, including depression, are not well recognized in Oman as evidenced by lack of studies on the risk factors of mental diseases among women in the country and the region as well. There is a significant need to learn the predictors or risk factors of depression among women due to the severe burden of the disease on women, their families, and communities. Moreover, the risk factors of depression in women, which has been identified globally, may not have the same influence on depression rate in Arab and Omani women. This can be due to differences in cultural and societal perspectives of the disease itself and/or of the globally-identified risk factors, which may change the degree and direct of influence of these factors on depression in women. Therefore, the uniqueness of each society has to be considered when exploring the predictors of depression. This study may become a milestone for more studies that examine the phenomenon of depression in both Omani and regional Arab women from cultural and social perspectives.

## Chapter 5: Results

## Introduction

This chapter is composed of several parts, following results of normality test, these parts include: 1) main sample characteristics of independent variables (Aim 1), 2) description of the main dependent variable (depression) (Aim 1), 3) results of descriptive statistics and differences between depressed and non-depressed women (Aim 2), 4) results of bivariate analysis to address aim 3, 5) results from the Structural Equation Modeling analysis of the proposed model and refined model that address aim 4, and 6) a summary of the bivariate relationships and Structural Equation Modeling (PLS-SEM) results.

## Exploratory Data Analysis

The statistical analysis of the data was carried out using the Statistical Package (SPSS, 22.0) for Windows. For the structural equation model, Partial Least Square Structural Equation Modeling (PLS-SEM) software version (3.2.6) was used.

## Normality Tests

There were no missing data in any of the variables. The normality tests were significant for all ordinal and other continuous variables, which means non-normal distribution of these variables. Regardless of log transformations of data, assessment and exclusion of outliers, variables remained non-normally distributed. Therefore, for describing and assessing differences between depressed and non-depressed participants, variables were categorized. However, ordinal and continuous variables were used in their original metric for non-parametric correlations and the structural equation model.

## 1. Sample Characteristics

Frequency distributions were conducted to identify the sample characteristics in regard to studied variables. The scoring ranges for all instruments have been given in "Method" chapter (section: survey adminestration); in order to reduce redundency, they are not repeated in this chapter. The following are the main frequency results by each variable category:

### 1.1. Age and Socioeconomic Characteristics

The study sample contained 240 adult women, 18-72 years old ($\overline{x}$ = 37.67, SD= 13.93). As presented in **Table 1.1**, the largest proportion of participants was within the 26-33 years old age range (27.5%) and only 8 participants were over 65 years old (3.3%). The mean education level was 8.02 years (SD= 5.16). The largest percentage of participants (42.5%) had 7-12 years of schooling, followed by participants with no formal education/illiterate (21.3%), and then participants with a higher level of education (i.e. college or university level) (20.4%). Regarding marital status, 72.1% of the participants were married and 27.9% were not married at the time of data collection. Among unmarried participants, 19.2% were single. In terms of employment, only 39 participants were employed (16.3%).

In relation to family monthly income, 40.4% of the participants reported a family monthly income of less than OMR 500 (less than $1,299) and 39.6% reported a family monthly income between OMR 500-999 ($1,299-2,595) (Xe Currency Converter", 2017). Only two participants (0.8%) reported a family monthly income of more than OMR 3000 (more than $

7,792) and four participants reported a family monthly income between OMR 2500-3000 ($ 6,493-7,792) (“Xe Currency Converter”, 2017).

### 1.2. Material Circumstances

Among the 240 participants, 71.3% were living as a nuclear family, and 24.6% were living with extended family. The rest of the participants were living either with a spouse only (3.3%) or living alone (0.8%). With respect to number of children, the largest proportion of participants had 1-4 children (33.8%). The maximum number of children per participants was 15 (0.4%). The mean value of the number of children was 3.0 (SD= 3.97). Among married, divorced, and widowed participants, 33.8% had 1-4 children. Nearly 22% and 20% of those participants reported having 5-8 children and more than 8 children, respectively. Fifty percent of participants were from rural villages served by Wadi Al Sahtan Health Center, Al Razi Health Center, and Al Hoqain Health Center. The frequency results of material circumstances variables are presented in **Table 1.2**.

### 1.3. Bio-Behavioral Characteristics

In terms of history of chronic illness, 71.7% reported absence of any chronic illness, and 20.0% had one chronic illness. Few participants (8.3%) had more than one chronic illness. Participants reported hypertension (14.6%) and diabetes (13.8%) as the main chronic illnesses with which they were clinically diagnosed (**Table 1.3**). Of the 240 participants, 84.6% of them reported no history of episode of excessive sadness, hopelessness, or depressed mood during pregnancy; of note 24.6% (N= 59) were never pregnant. The majority of participants (74.6%)

were not physically active. In relation to body mass index (BMI), BMI scores ranged from 15.60 to 52.00 ($\overline{x}$= 26.68, SD= 6.10). The largest percentage (36.3%) of participants was within the normal weight range of BMI (18.5-24.9). More than 30% of participants were overweight (BMI 25.0-29.9), and 27.9% were obese (BMI 30.0 or more). The frequency results of bio-behavioral characteristics are shown in **Table 1.3**.

### 1.4. Psychosocial Characteristics

With respect to religiosity, participants' scores ranged from 51.0 to 65.0 ($X$= 63.85, SD= 1.94), and more than half of participants (56.3%) reported the maximum score of religiosity. Four participants (1.7%) reported a history of domestic violence. Of the 240 participants, 43.3% perceived their body image as overweight and 38.8% perceive their body image as normal weight. Only 2.9% perceived their body image as obese, although 27.9% of total participants were actually obese based on their BMI. More than half of the participants (57.9%) selected normal weight figures (figures 3 and 4) as an ideal body weight, and 26.3% selected overweight figures (figures 5-7) as ideal body weight. The remainder of the participants reported underweight figures (figures 1and 2) (15.4%) and obese figures 8 and 9) (0.4%) as an ideal body weight.

In terms of social support, the minimum reported score was 84 and the maximum reported score was 163 ($\overline{x}$=135.11, SD=15.98). The largest percentage of the participants (37.5%) had scores between 132-147, and slightly more than a quarter of participants (25.8%) had social support scores between 148-163. Among the 240 participants, nearly 82% reported using adaptive coping strategies (i.e. problem-focused coping or emotion-focused coping

strategies) and 44 participants (18.3%) reported using maladaptive (dysfunctional) coping strategies (**Table 1.4**).

### 1.5. Health Care System (Access to Health Care) Characteristics

In regard to the concept of seeking professional help if/when experiencing serious emotional or psychological problems, 45.4% of the participants reported that they definitely would not seek professional help. Nearly 21% of the participants were willing to seek professional help, and slightly more were probably willing to seek professional help (**Table 1.5**). Almost nineteen percent of the participants reported that they would not be comfortable at all talking to a health care professional about their emotional or psychological problems. Nearly quarter of the participants (24.6%) reported that they would be very comfortable talking to a health care professional about their emotional or psychological problems. The largest proportion of participants (39.2%) did not perceive a stigma around getting professional help for their emotional or psychological problems, and 23.3% reported a high perceived stigma around getting professional help. Fifty percent of participants reported the absence of a psychiatric clinic in the health centers or villages near their homes.

### 2. Aim 1: BDI-II (Depression)

As shown in **Table 2**, fifty-two of the participants were found to be depressed (21.7%). Of the total participants, 12.5% reported experiencing mild depressive symptoms and 6.7% reported experiencing moderate depressive symptoms. The remainder of the depressed

participants (2.5%) experienced severe depressive symptoms. The maximum BDI-II score reported was 41.0 ($\overline{x}$= 9.67, SD= 7.11, scores range= 0-41).

## 3. Aim 2: Differences between Depressed and Non-Depressed Women

Cross tabulation was conducted to determine the differences between depressed and non-depressed participants in terms of independent variables. The nominal categories of depression, non-depressed versus depressed categories, were used to perform cross tabulation with categorical independent variables. The results are presented using percentage and Chi-Square analysis, mean and standard deviation.

### 3.1. Socioeconomic Characteristics

In terms of education, more than half of depressed participants (51.9%) were those with 7-12 years of education, followed by participants with more than 12 years of education (college or university) (26.9%). Among participants who were not experiencing depressive symptoms, the majority of them were those with 7-12 years of education (39.9%), followed by participants with no formal education/illiterate (23.9%). The Chi-Square analysis indicated that there was no significant differences between depressed and non-depressed participants in terms of education level ($X^2$ = 7.331, p= .062) (**Table. 3.1**).

As shown in **Table 3.1**, married women represented participants with higher percentages in both depressed and non-depressed categories, 71.2% and 72.3%, respectively. The Chi-Square analysis indicated that there were no significant differences between non-depressed and depressed participants in terms of marital status ($X^2$ = .029, P = .866). Similarly, no significant

difference appeared between depressed and non-depressed participants in relation to employment ($X^2$ = 3.735, P = .053). The majority of depressed and non-depressed participants were those who were not employed, 75.0% and 86.2%, respectively (**Table 3.1**).

Among the 188 non-depressed participants, equal percentages were observed in participants with a monthly family income less than OMR 500 and a monthly family income of OMR 500-999 (39.9%). Of the 52 depressed participants, 42.3% were those with a family monthly income less than OMR 500. The percentage of depressed participants decreased with higher monthly family incomes. Regardless, the Chi-Square test indicated that there were no significant differences between the two groups of participants when considering family income ($X^2$ = 5.036, P = .539) (**Table 3.1**).

### 3.2. Material Circumstances

In terms of family structure, the majority of depressed and non-depressed participants were those living in a nuclear family, 73.1% and 70.7%, respectively. Participants living with extended family ranked second in both depressed (21.2%) and non-depressed (25.5%) categories. The Chi-Square suggests no significant difference between depressed and non-depressed participants in terms of family structure ($X^2$ = 1.347, P = 0.718) (**Table 3.2**).

Of the 52 depressed participants, 38.5% had 1-4 children. Similarly, the highest percentage among the 188 non-depressed participants were those with 1-4 children (32.4%). The smallest group among depressed participants and non-depressed participants was those who had more than 8 children, 13.5% and 21.8%, respectively. The Chi-Square test indicated that there were no significant differences between depressed and non-depressed participants in terms of number of children ($X^2$ = 3.471, P = .352) (**Table. 3.2**).

In the case of place of residence, the majority of depressed participants were those living in urban areas (65.4%). More than half of non-depressed participants (54.3%) lived in rural areas. The Chi-Square analysis, as shown in Table 3.2, indicated that there was a significant difference between participants living in urban areas and those living in rural areas in terms of depression ($X^2 = 6.285$, P = 0.012).

### 3.3. Bio-Behavioral Characteristics

In the case of history of chronic illness, there was no significant difference between depressed and non-depressed participants ($X^2 = 4.723$, P = .094). Among depressed participants, the majority were participants with no history of chronic illness (69.2%). Similarly, the majority of non-depressed participants had no history of illness (72.3%) (**Table 3.3**). The results also showed that there were no significant differences in percentages between depressed and non-depressed participants in terms of history of episodes of excessive sadness, hopelessness, or depressed mood during pregnancy (**Table 3.3**) ($X^2 = .000$, P = .994).

In relation to physical activity, the analysis showed that there were no significant differences between depressed and non-depressed participants ($X^2 = 0.192$, P = 0.662). Among the depressed participants, 76.9% of participants were not active. The majority of non-depressed participants were also not physically active (73.9%) (**Table 3.3**).

Participants in a normal weight range (BMI 18.5-24.9) were the largest group among the depressed group (48.1%). A quarter of depressed participants (25.0%) were obese (BMI $\geq$ 30). Underweight participants (BMI < 18.5) were the smallest group among those who were depressed (5.8%). Among the non-depressed participants, those in the normal and overweight ranges (BMI 25.0-29.9) were the largest groups, 33.0% for each weight group. The Chi-Square

indicated that there were no significant differences between depressed and non-depressed participants in relation to physical activity level ($X^2 = 4.652$, P = 0.199) (**Table 3.3**).

### 3.4. Psychosocial Characteristics

Among the 52 depressed participants, more than the half scored 65 on the religiosity scale (53.8%). Similarly, more than the half of non-depressed participants scored 65 in the religiosity scale (56.9%). The Chi-Square revealed no significant differences between depressed and non-depressed participants in terms of religiosity was noted ($X^2 = .156$, P = .693) (**Table 3.4**).

The majority of depressed and non-depressed participants were those who had no history of domestic violence, 96.2% and 98.9%, respectively. The Chi-Square showed that there was no significant differences between the two groups in relation to domestic violence ($X^2 = 1.924$, P = .165) (**Table 3.4**).

In terms of perception of body weight/image, participants who perceived their body weight as normal were the largest group among depressed participants (42.3%). The smallest group among depressed participants was those who perceived their body weight as obese (3.8%). In contrast, the largest percentage of non-depressed participants was those who perceived their weight as overweight (45.7%). Similar to depressed participants, the smallest group among non-depressed participants was those who perceived their body weight as obese (2.7%). The Chi-Square indicated that there were no significant differences between depressed and non-depressed participants in relation to perception of body weight/image ($X^2 = 2.370$, P = .499) (**Table 3.4**).

Regarding perception of ideal body weight, nearly two-thirds of depressed participants perceived the ideal body weight as normal weight (59.6%), followed by those who perceived the ideal body weight as overweight (28.8%). More than half of non-depressed participants perceived ideal body weight as normal weight (57.4%), followed by those who perceived the ideal body weight as overweight (25.5%). The results show that there were no significant differences between depressed and non-depressed participants in relation to perception of ideal body weight ($X^2 = 1.128$, P = .770) (**Table 3.4**).

As shown in **Table 3.4**, nearly half of depressed participants (48.1%) were those who scored between 116-131 on the social support scale. The group that ranked second among depressed participants was those with a social support score of 100-115 (32.7%). Among non-depressed participants, the largest proportion of participants (44.1%) was those who scored 132-147 on the scale, followed by those who scored 148-163 (33.0%). The Chi-Square analysis suggested a significant difference between depressed and non-depressed participants in terms of social support ($X^2 = 79.033$, P = < .001).

In terms of coping strategies, the majority of depressed participants were those implementing maladaptive coping strategies (i.e. dysfunctional-focused coping strategies (69.2%). On the other hand, the majority of non-depressed participants were those who reported using adaptive coping strategies (i.e. emotions-focused coping or problem-focused coping strategies) (95.7%). The Chi-Square analysis indicated that there was a significant difference between depressed and non-depressed participants in terms of coping strategies ($X^2 = 114.858$, P = < .001) (**Table 3.4**).

### 3.5. Health Care System (Access to Health Care) characteristics

In terms of attitude towards health care, specifically towards seeking professional help, more than two-thirds of depressed participants reported that they definitely would not seek professional help for their emotional or psychological problems (63.5%). Similarly, the largest group of non-depressed participants (40.4%) reported that they definitely would not seek professional help. Participants who reported that they probably would not seek professional help ranked second among depressed participants (28.8%). The Chi-Square result showed that there was a significant difference between depressed and non-depressed women in relation to attitude towards seeking professional help ($X^2 = 47.194$, P = < .001).

In terms of comfort level talking to a professional about emotional/psychological problems, the Chi-Square also suggested that there was a strong significant difference between depressed and non-depressed participants ($X^2 = 46.216$, P = < .001). The largest percentage of depressed participants either reported that they would not feel very comfortable (40.4%) or not comfortable at all (40.4%) talking to a health care professional about their emotional or psychiatric problems. In contrast, the largest percentage of non-depressed participants (40.4%) reported that they would feel somehow comfortable talking to a health care professional. A significant difference was observed between depressed and non-depressed participants in terms of comfort level of talking to a health care professional ($X^2 = 46.216$, P = < .001). In relation to perceived stigma around seeking professional help, the highest percentages of depressed participants was observed among those who reported some perceived stigma and a high-perceived stigma, 48.1% for each group. In contrast, the highest percentage of non-depressed participants was observed in the group who reported no perceived stigma around seeking

professional help (48.9%). The Chi-Square indicated that there was a strong significant difference between depressed and non-depressed participants in terms of perceived stigma ($X^2$ = 46.838, P = < .001). The results of attitude of seeking professional help are presented in **Table 3.5.**

In the case of availability of local psychiatric clinics, the participants living in villages that were served by a psychiatric clinic represented the majority of depressed participants (65.4%). In contrast, the majority of non-depressed participants (54.3%) were those living in villages not served by a psychiatric clinic. The Chi-Square indicated that there was a significant difference between depressed and non-depressed participants in terms of availability of psychiatric clinics ($X^2$ = 6.285, P = .012) (**Table.3.5**).

**3.6. Age**

Among the depressed participants, 36.5% were those between 26-33 years of age, followed by participants 18-25 years old (25.0%). Participants over age 65 were the smallest group among depressed participants (1.9%). The largest proportion of non-depressed participants (25.0%) was those 26-33 years old, followed by those ages 18-25 (22.3%). The Chi-Square analysis indicated no significant difference between depressed and non-depressed participants in relation to age ($X^2$ = 4.974, P = .547) (**Table 3.6**).

Based on the cross tabulation and Chi-Square analysis, it is clear that depressed and non-depressed participants differed significantly in relation to place of residence (living arrangement); social support and coping strategies (psychosocial characteristic); and attitudes towards seeking professional help and the availability of psychiatric clinics (access to health

care). The results suggested that the two groups were not significantly different in terms of any socioeconomic characteristics or bio-behavioral characteristics.

## 4: Aim 3. Bivariate Relationships of Independent Variables with Depression

As a preliminary step to examining multivariable relationship between independent variables and depression, bivariate relationships were examined. The BDI-II score was used in this analysis to investigate the presence or absence of an association between depressive symptoms (BDI-II score) and independent variables. Non-parametric tests including the Mann-Whitney test and Spearman's rho test were used to assess the correlative relationship with the continuous dependent variable (BDI-II score). The Mann-Whitney test was used with nominal categorical independent variables. Spearman's rho test was used to assess correlation of BDI-II score with ordinal independent variables, interval independent variables (assumed to be ordinal) ("idre; UCLA", 2016b), and with other continuous independent variables (Mathematics and Statistics Help [MASH]: The University of Sheffield", 2016). Additionally, means of dependent and independent variables were compared for further investigation of the direction of the relationship.

### 4.1. Socioeconomic Charactristics

A series of Mann-Whitney and Spearman's rho were conducted to determine if depression (BDI-II score) is associated with socioeconomic variables. Results show that depression is correlated with education level and employment status. The Spearman's rho result shows a positive significant association between actual years of education (continuous variable)

and BDI-II score (r= .274, p = < .001), which means that an increase in years of education is associated with a higher depression score (BDI-II score). The mean and mean rank of depression was the highest in participants with more than 12 years of education (college or university) (**Table 4.1**).

Unmarried participants had higher mean and mean ranks of depression in comparison to married participants; however, the Mann-Whitney test did not show a significant correlation between marital status and BDI-II score (**Table 4.1**, p = .099). The mean and mean rank of depression was higher in employed participants than non-employed participants (**Table. 4.1**, p = .036). In terms of monthly family income, results indicate that it is not correlated with depression (**Table 4.1**).

**4.2. Material Circumstances**

Number of children and place of residence were the only two variables that were found to be correlated with depression (BDI-II score) (**Table 4.2**). The results indicate a significant negative correlation between actual number of children and BDI-II score (**Table 4.2**, r= -.250, p = < 0.001). The highest mean and mean rank of depression by number of children was for participants with no children ($\overline{x}$ =12.10, SD= 9.036), and the mean and mean rank of depression decreased as the number of children increased (Table. 4.2). The mean and mean rank of depression was higher in participants from urban areas than from rural villages, and was significantly correlated with BDI-II (**Table 4.2**, p = .009). The correlation between depression (BDI-II score) and family structure was not statistically significant (**Table 4.2**, p= .779).

### 4.3. Bio-Behavioral Characteristics

None of bio-behavioral characteristics were significantly correlated with BDI-II score (**Table 4.3**). Participants with a history of more than one chronic illness showed slightly greater mean and mean rank of depression compared to participants with one chronic illness and those with no history of chronic illness (**Table 4.3**, p =.622). Participants who had a history of episodes of excessive sadness, hopelessness, or depressed mood during pregnancy showed a higher mean and mean rank of depression in comparison to those who did not experience episodes of excessive sadness, hopelessness, or depressed mood during pregnancy (**Table 4.3**, p= .283). Physically inactive participants had a higher mean and mean rank of depression than physically active participants (**Table 4.3**, p = .306). Participants in the normal weight range (BMI 18.5-24.9) had a higher mean and mean rank of depression than underweight, overweight, and obese participants, and the overweight participants had the lowest mean and mean rank of depression (**Table 4.3**).

### 4. 4. Psychosocial Characteristics

In terms of psychosocial characteristics, results indicate that depression (BDI-II) was correlated with domestic violence, social support, and coping strategies.

The Mann-Whitney test indicated a statistically significant correlation between depression and domestic violence (p = .018). Participants with a history of domestic violence showed a higher mean and mean rank of depression when compared to participants with no history of domestic violence (**Table 4.4**). Participants who reported the implementation of maladaptive coping strategies had a comparably higher mean and mean rank of depression (**Table 4.4**, p < .001).

In terms of social support, results indicated a strong negative significant correlation between social support and depression (**Table 4.4**, $r = -.601$, $p < .001$), which means that if social support score increases, depression score decreases. The highest mean of depression was reported in participants with social support scores of 100-115, followed by participants with social support scores of 84-99 (**Table 4.4**). However, the highest mean rank of depression was reported in participants with social support scores of 84-99, followed by the participants with scores of 100-115. The lowest mean and mean rank of depression was reported in participants with the greatest social support scores (i.e. 148-163).

Participants who reported using maladaptive coping strategies (i.e. dysfunctional-focused coping strategies) had a higher mean and mean rank of depression compared to those who reported using adaptive coping strategies (i.e. emotional-focused or problem-focused coping strategies) (**Table 4.4**, $p < .001$)

Religiosity was not significantly associated with depression ($p = .546$), although participants with religiosity scores less than 65 had a slightly higher mean and mean rank of depression than participants with a religiosity score of 65 (**Table 4.4**). Similarly, the correlation between depression and perception of body image variables (i.e. perception of body image and perception of ideal body image) was not statistically significant. In terms of perception of body image, participants who perceived their body images as normal had the highest mean rank of depression and those who perceived their body image as obese had the highest mean of depression (**Table 4.4**, $p = .110$). In relation to perception of ideal body image, participants who perceived their ideal body image as normal weight had the highest mean and second highest mean rank of depression (**Table 4.4**, $p = .567$).

### 4.5. Health Care System (Access to Health Care)

As presented in **Table 4.5**, participants' attitudes towards professional health care including attitude towards seeking professional help, comfort level of talking to a health care professional, and perceived stigma were significantly correlated with depression ($p < .001$). In general, participants who were not willing to seek professional help and felt uncomfortable talking to a health professional had a higher mean and mean rank than participants who were willing to seek help and felt comfortable talking with a health professional (**Table 4.5).** In terms of stigma, participants who perceived a stigma around seeking professional help had a higher mean and mean rank of depression than those who felt no stigma from seeking professional help (**Table 4.5**). As with attitudes towards seeking professional help, availability of a psychiatric clinic was significantly correlated with depression. Participants from villages that are served by a psychiatric clinic showed a higher mean and mean rank of depression (**Table 4.5**, $p = .009$).

### 4.6. Age

Participants 18-25 years of age had the highest mean rank and second highest mean of depression among participants. Participants age 26-33 had the highest mean and second highest mean rank among the participants (**Table 4.6**). Participants age 42-49 had the lowest mean of depression, while participants who over age 65 had the lowest mean rank of depression.

## 5: Aim 4. Multivariable Relationships with Depression (Structural Equation Modeling)

For more comprehensive assessment of relationships along the full continuum of possible values of ordinal and other continuous variables, continuous coding of education level, number

of children, religiosity, social support, age, and BDI-II scores were used in the analysis. Binary coding of family structure and marital status were used in analysis. Each latent variable (i.e. variables' category/factor) was represented in the model with an abbreviation as follows: Socioeconomic status (SES), material circumstances (MCS), bio-behavioral factors (BBF), psychosocial factors (PSF), and health care system [access to heath care] (HCS) (**Figure 3**).

PLS-SEM analysis or evaluation commonly follows two separate processes or steps, which are measurement model analysis and structural model analysis (Hair, Ringle, & Sarstedt, 2011; Memon & Abdul Rahman, 2014). The two processes/steps of model analysis are discussed below for the section with results of analysis of the preliminary model (i.e. proposed model of the current study) that was built on PLS-SEM software and also for the results of the analysis of the parsimonious model that was generated from the analysis of the preliminary model.

## 5.1. The Initial Model (Proposed Model) Results

### 5.1.1. Measurement Model Results

Measurement model analysis focuses on evaluating the reliability and validity of the model's indicators or variables (Hair et al., 2011; Memon & Abdul Rahman, 2014; Wong, 2013). Reliability evaluations consist of assessments of indicator reliability (i.e. indicator loadings) and internal consistency reliability (i.e. composite reliability) (Hair et al., 2011; Memon & Abdul Rahman, 2014; Wong, 2013). Validity evaluation considers the assessment of convergent validity and discriminant validity (Hair et al., 2011; Memon & Abdul Rahman, 2014; Wong, 2013).

#### 5.1.1.1. Reliability

In research, 0.4 is often suggested as the minimum acceptable loading value of an individual indicator and 0.7 is the desired loading value (Hair et al., 2011; Memon & Abdul Rahman, 2014; Wong, 2013). Accordingly, indicators with loading values less than 0.4 should be omitted and indicators with loading values between 0.4 and 0.7 should be considered for omission if this will increase composite reliability (Hair et al., 2011; Memon & Abdul Rahman, 2014).

By running a PLS algorithm on the preliminary model (i.e. proposed model of the current study) that was built on PLS-SEM software (**Figure 4**), several indicators showed poor loading values (i.e. < 0.4) including marital status (SES2), monthly family income (SES4), place of residence (MCS3), history of depressed mood during pregnancy (BBF2), physical activity (BBF3), religiosity (PSF1), domestic violence (PSF2), perception of body image and ideal body image (PSF3 & PSF4), and availability of psychiatric clinic (HCS4). Therefore, all these indicators were omitted from the model (**Figure 5**).

Regarding internal consistency reliability, a composite reliability and Cronbach's alpha are used as metrics (Hair et al., 2011; Memon & Abdul Rahman, 2014); however, composite reliability is commonly reported as preferable to Cronbach's alpha in PLS-SEM results' reporting because composite reliability does not propose that all indicators are equally reliable (Hair et al., 2011; Memon & Abdul Rahman, 2014). A composite reliability value of 0.70 is considered suitable (Hair et al., 2011; Memon & Abdul Rahman, 2014); however, in exploratory studies a composite reliability of 0.6 is acceptable (Hair et al., 2011). **Table 5.1** presents the reliability results of the indicators before (first iteration) and after omission of poor loading

values (final iteration). As seen in the **Table 5.1**, the composite reliability of all latent variables, after omission of indicators with poor loadings, were higher than 0.7, which indicates satisfactory internal consistency reliability (Hair et al., 2011).

#### 5.1.1.2. Validity

In the convergent validity assessment, the average variance extracted (AVE) is examined. In research, an AVE value of 0.5 or higher is considered satisfactory (Hair et al., 2011; Memon & Abdul Rahman, 2014; Wong, 2013). The result shows that all latent variables had AVE values higher than 0.5. Socioeconomic status (SES) variables had the lowest AVE value at 0.586 (**Figure 6**), which indicates that SES explains more than half of its variables' variance (Hair et al., 2011).

For the assessment of discriminant validity, two criteria are commonly used: the Fornell-Larcker criterion and indicators' cross loadings (Hair et al., 2011). The Fornell-Larcker criterion proposes that a latent variable has greater variance with its related indicators than with other latent variables (Hair et al., 2011). The cross loadings means that an individual indicator's loading with its latent variable should be greater than its loadings with the other latent variables in the model (Hair et al., 2013). The Fornell-Larcker criterion is used to assess the discriminant validity of the preliminary model (**Table 5.2**).

As presented in **Figure 5**, after omitting indicators with loading values < .4, all latent variables showed a significant association with depression ($p < .05$) in exception of bio-behavioral variables and the moderator (i.e. Age). The association between socioeconomic variables and psychosocial variables was not statistically significant.

### 5.1.2. Structural Model Results

The structural model analysis measures the association between exogenous variables (independent latent variables) and endogenous variables (outcomes) (Memon & Abdul Rahman, 2014). In Partial Least Squares Structural Equation Modeling (PLS-SEM), any latent variable that has a path (arrows) leading to it is considered an endogenous variable (Wong, 2013). Therefore, the latent variables of material circumstances (MCS), bio-behavioral factors (BBF), psychosocial factors (PSF), and health care system (HCS) were considered endogenous variables for socioeconomic status (SES) in PLS-SEM.

The structural model analysis focuses on two criteria, the $R^{2,}$ and path coefficient ($\beta$) (Hair et al., 2011; Memon & Abdul Rahman, 2014; Wong, 2013). $R^2$ postulates the variance of endogenous latent variables and $\beta$ explains the degree of an exogenous latent variable's effect on an endogenous latent variable (Hair et al., 2011; Memon & Abdul Rahman, 2014). For an accepted model, the $R^2$ value should be more than 0.26 (Memon & Abdul Rahman, 2014). $R^2$ values of 0.75 and higher indicate a substantial model and an $R^2$ value of 0.5 indicates a moderate model (Hair et al., 2011). When assessing the path coefficient ($\beta$), the significance of p-value and critical *t*-value are commonly reported (Hair et al., 2011). According to the literature, critical *t*-value for a two-tailed test is 1.96 if the significance level is 5% (i.e. for 95% confidence interval) (Hair et al., 2011; Memon & Abdul Rahman, 2014). The details about the structural model analysis process; i.e. $R^2$ analysis and path coefficient analysis, is described in the following section.

#### 5.1.2.1. $R^2$ Results

With the exception of depression (the main endogenous variable) and material circumstances (MCS), the remaining latent variables had $R^2$ values considerably less than 0.26 (**Table 5.3**). The $R^2$ results indicated that model had a weak degree of explaining variance of bio-behavioral (BBF), psychosocial, and health care system by SES, and a moderate degree of explaining the variance of depression by independent variables (Hair et al., 2011). However, only the $R^2$ value of depression was considered in this analysis because it was the main endogenous latent variable in the model.

#### 5.1.2.2. Path Coefficient Results

By running a bootstrapping analysis to determine the structural path significance of the model (Hair et al., 2011; Wong, 2013), the results showed that direct and moderating effect of age on depression was not significant (**Table 5.4**, **Figure 7**), nor was the SES*Age interaction effect. Additionally, path coefficient results indicated no significant path between SES and psychosocial factors (PSF), SES and depression (BDI-II), and bio-behavioral factors (BBF) and depression (**Table 5.4, Figure 7**).

#### 5.1.2.3. Model Refinement

To estimate a parsimonious structural model for the current study, a multi-step process was conducted. 1) The path coefficients were examined from the preliminary model after omission of indicators with loading values < .4 (**Figure 5, Table 5.3 and 5.4**). 2) To refine the model, paths with a weak relationship with depression ($p > .25$) were omitted in a sequential

process and the model was re-estimated for each omission. The age-related moderator relationships (Age and SES* Age interaction) with depression were dropped on the first pass. On the second pass, the socioeconomic (SES)-psychosocial (PSF) path was dropped (the only path with $p > .25$ from the preceding pass). All paths in the resulting model (including the MCS-Depression path which had not been significant in the preliminary model) had p-values $< .15$. This resulting model is labeled as the Final Model (**Figure 8, Table 5.10**).

Because the bio-behavioral and depression path was not statistically significant at $p < .05$ in the final model, an additional exploratory analysis was conducted to examine the sensitivity of the model. In this analysis, the indicator of bio-behavioral variables with lowest loading value was dropped from the final model and the model was re-estimated. This resulted in a significant path between bio-behavioral latent factor and depression with minor changes in the strength of the path coefficients of other latent variables.

In research using SEM analysis, researchers were not always strict to p-value of $< .05$, and they retained indicators or latent variables with p-value at .10 or slightly more. Therefore, the path with significant level (p-value) $> .25$ was dropped from the model, which means that path between SES and PSF was dropped ($p = 0.36$) and paths between SES and depression ($p = .06$), and BBF and depression ($p = .16$) were retained (**Table 5.10, Figure 8**).

## 5.2. The Final Model (Parsimonious Model) Results

The final model (parsimonious model) was generated from the modifications made on the preliminary model as consequences of the PLS-SEM analysis results (**Figure 8**). Similar

steps/processes that were used to evaluate the preliminary model were used to assess the parsimonious model. Additional statistical results are included to support the effectiveness of this model in explaining path analysis of depression in adult Omani women.

### 5.2.1. Measurement Model Results

#### 5.2.1.1. Reliability

**Internal Consistency Reliability:** Employment (SES3) had the lowest loading value among the model's indicators (0.478), however, it still within an acceptable loading range (**Figure 8**). As presented in **Table 5.5** and **Figure 9**, the composite reliability (CR) values of all latent variables in the final model were greater than 0.7, which indicates suitable internal consistency reliability (Hair et al., 2011).

#### 5.2.1.2. Validity

**Convergent Validity:** The AVE values remain the same as the values in preliminary model. All latent variables in the final model were satisfactory (i.e. higher than 0.5) (**Table 5.5**, **Figure 9**), which means that each latent variable explains more than half of its variable's variance (Hair et al., 2011).

**Discriminant validity:** In terms of discriminant validity, the Fornell-Larcker criterion results showed that each latent variable in the final model had higher variance with its related indicators than with another latent variable (**Table 5.6**). Similarly, the cross loadings results showed that a single indicator's loading with its latent variable is higher than its loadings with other latent variables in the model (**Table 5.7**).

#### 5.2.1.3. Collinearity

An additional evaluation measured is used to assess the collinearity of the latent variables. Variance inflation factor (VIF) is the criterion that is used for this assessment (Hair et al, 2011, Wong, 2013). For an accepted model, a VIF of 5 or lower is needed for each model's latent variable to prevent collinearity problems (Hair et al, 2011; Wong, 2013). As shown in **Table 5.8**, all VIF values of the model's latent variables were lower than 5, which indicated no existence of collinearity.

### 5.2.2. Structural Model Results

#### 5.2.2.1. $R^2$ Results

The $R^2$ value of depression in the final (parsimonious) model was 0.62, which means that 62% of the variance in depression is explained by the independent variables. The results also showed that SES explains 58% of the variance in material circumstances (MCS). However, SES only explains 23% of variance in bio-behavioral factors (**Table 5.9**, **Figure 10**). Health care system factors (HCS) had the lowest and weakest $R^2$ value among the model latent variables (**Table 5.9**, **Figure 10**). Focusing on depression as the main endogenous (outcome) latent variable in the model, the results indicated that the model had a moderate degree of explaining variance in depression by independent variables (Hair et al., 2011).

#### 5.2.2.2. Path Coefficient Results

As seen in the **Figure 8**, education (SES1) and employment (SES3) were the only two significant indicators for SES latent variable, such that higher level of SES reflected higher

educations and employment (i.e. being employed). Family structure (MCS1) and number of children (MCS2) were significant indicators of material circumstances (MCS). Higher level of material circumstances reflected type of living arrangements other than extended family and a higher number of children. In terms of bio-behavioral factors, history of chronic illness (BBF1) and BMI score (BBF) were the significant indicators. Therefore, higher level of BBF indicates higher number of chronic illness and higher score of BMI. In regards to psychosocial latent variable (PSF), social support (PSF5) and coping (PSF6) were the significant indicators. Accordingly, higher level of PSF reflected higher level of social support and coping (i.e. adaptive coping). The three variables that represent the attitude of seeking professional help (seeking professional help [HCS1], comfort level of talking to a health professional [HCS2], and stigma [HCS3]) were significant indicators of health care system (HCS). Higher level of HCS meant lower level of willingness to seek professional help, lower level of comfort of talking to a health professional about emotional or psychiatric problem, and a higher level of perceived stigma around seeking professional help.

As seen in **Table 5.10** and **Figure 8**, SES had a significant direct positive relationship with depression and health care system. This means that higher SES is related to a higher score depression and higher level of health care system. On the other hand, health care system as a latent variable had a positive significant association with depression, which means that higher health care system is associated with a higher score of depression (**Table 5.10**, **Figure 8**).

SES had a significant direct negative relationship with material circumstances and bio-behavioral latent variables, which indicates that a higher SES is associated with lower material circumstances and lower bio-behavioral characteristics (i.e. lower number of chronic illness and

lower BMI score). Material circumstances showed a significant negative association with depression, such that a higher material circumstance is related to a lower score of depression (**Table 5.10**, **Figure 8**). Bio-behavioral latent variable had a significant positive relationship with depression, which means that a higher of bio-behavioral level is related to a higher score of depression (**Table 5.10**, **Figure 8**).

As presented in **Table 5.10** and **Figure 8**, psychosocial latent variable (PSF) had a significant direct negative relationship with depression, such that an increase of psychosocial level decreases score of depression.

#### 5.2.2.3. Predictive Relevance

An additional measurement criterion for structural model evaluation measures by cross-validated redundancy (i.e. $Q^2$) for endogenous latent variables (Hair et al., 2011). For an accepted model, the $Q^2$ value should be larger than zero (Hair et al., 2011). All endogenous latent variables of SES (BBF, MCS, HCS) had $Q^2$ values higher than zero, which means that these SES show predictive relevance with these latent variables (Hair et al., 2011). Similarly, the $Q^2$ value of depression was greater than zero (0.58), which indicates that the latent variables in the final model suggest predictive relevance with depression (Hair et al, 2011). The results of construct cross-validated redundancy ($Q^2$) are presented in **Table 5.11**.

### 5.3. Further Exploration

As the path between bio-behavioral latent variable (BBF) and depression was not significant at $p < .05$, an additional step of analysis was conducted for further exploration. As an exploratory step, the BBF4 (BMI), which had the lowest loading value (0.6) for the bio-behavioral latent variable, was dropped from the model. Interestingly, the result showed a

significant path between bio-behavioral latent variable (BBF1) and depression ($\beta$ = 0.137, p = 0.012) (**Figure 11**). The paths between other latent variables and depression remained significant with little changes in significance power. This indicates the sensitivity of the model in relation to the ways the latent variables were measured.

### 5.4. Mediation Analysis

The mediation analysis was conducted into two steps. First, the direct effect of SES on depression was measured using PLS-SEM algorithmic calculation. Second, each latent variable in the final model was introduced in the model separately as a mediator between SES and depression. Accordingly, the direct relationship between SES and depression after adding each latent variable was observed. Third, the mediation effect of each latent variable was calculated in the danielsoper website (www.danielsoper.com). This free website is used for various statistical calculations including mediation model. The values of path coefficient and standard errors of the relationship between the independent variable and a mediator (single latent variable), and of the relationship between a mediator and the dependent variables were used to perform the mediation analysis. In PLS-SEM standard error is equal to standard deviation in bootstrapping (Hair, Hult, Ringle, & Sarstedt, 2014). The Sobel test statistic (t-value) of > 1.96 and significance level of p < 0.05 was used to indicate the existence of single mediational relationship (indirect effect). Fourth, for further exploration the total indirect effect of the multiple mediators (multiple latent variables) was assessed through bootstrapping findings of PLS-SEM.

#### 5.4.1. Direct Effect of SES on Depression

As presented in **Table 6.1**, the direct effect of SES and depression was 0.259. In exception to bio-behavioral factors, the direct effect of SES on depression decreased by adding

mediator in the model. For example, the direct effect of SES on depression was decreased to 0.21 by adding material circumstances as a mediator between the two latent variables (**Table 6.2**). **Tables 6.1-6.4** present the changes in the path coefficient value (direct effect values) by adding mediations in the model.

### 5.4.2. Indirect Effect of SES on Depression (Mediation Relationship)

In respect to marital circumstances (MCS), the direct relationship between SES and depression remained significant (**Table 6.2**). The mediation relationship, however, was not significant (**Table 6.5**). This indicates that marital circumstances latent variable did not mediate the relationship between SES and depression (i.e. it was not a significant mediator between SES and depression. Looking at bio-behavioral latent variable (BBF), the results indicated that indirect effect of BBF was significant (**Table 6.5**). Taking into consideration that direct effect of SES on depression was significant in the presence of BBF as mediator (**Table 6.3**); therefore, BBF had a partial mediation effect on the relationship between SES and depression. In terms of health care system (HCS), the direct and indirect relationships were not significant ($p = 0.05$) (**Table 6.4-6.5**). This means that with the presence of health care system factors there was no effect of SES on depression directly and indirectly. However, considering that in some structural equation modeling research the significance power > 0.05 was retained as significant; therefore, it is theoretically important to consider access to health care (i.e. health care system) as an important mediator that has an effect on the relationship between SES and depression.

In order to estimate the mediation effect of multiple latent variables on the relationship between SES and depression, the total indirect effect was assessed using bootstrap technique of PLS-SEM. The finding indicated that the total indirect effect of all latent variables (t-test = 1.40,

p= 0.16) in the final model was not significant, which means that these latent variables were not mediators of the relationship between SES and depression.

**6. Summary of Relationships**

The SPSS bivariate statistical results showed that depression (BDI-II) was significantly and positively correlated with education level and employment status, such that participants with a higher level of education and those who are employed had higher scores of depression. In terms of material circumstances, depression had a significant negative association with number of children, which means that participants with fewer children had higher scores of depression. Participants living in urban villages showed higher scores of depression. BMI was the only bio-behavioral factor that had a significant correlation with depression in bivariate analysis, such that participants with greater BMI score showed lower scores of depression. With respect to psychosocial factors, depression was significantly correlated with domestic violence, social support, and coping. According to bivariate results, participants with a history of domestic violence, with lower levels of social support, and using maladaptive coping strategies showed higher scores of depression. In terms of health care system factors (access to health care), bivariate results showed that participants with higher scores of depression were those who showed low or no willingness to seek professional help, who felt less comfortable or not comfortable at all talking to a health professional, who reported a high perceived stigma associated with seeking professional help, and who lived in areas served by a psychiatric clinic. A significant correlation was observed between depression and each variable of health care system.

Some of the variables that showed significant correlation with depression (BDI-II) such as place of residence (MCS), domestic violence (PSF), and availability of a psychiatric clinic (HCS) were omitted from the model in the PLS-SEM analysis because they were poorly loading indicators in their related latent variables. Variables that showed no significant bivariate correlation with depression were also omitted due to poor loading values with their related latent variables including marital status and monthly family income (SES), history of depressed mood during pregnancy, physical activity (BBF), religiosity, perception of body image, and perception of ideal body image (PSF).

Generally, the final (parsimonious) model was modest in explaining variance in depression by exogenous (independent) latent variables. The model latent variables showed a satisfactory reliability and validity. The results of the PLS-SEM analysis indicated that higher SES is associated with higher scores of depression, higher level of health care system (i.e. negative attitude towards seeking professional help), lower level of material circumstances, and lower level of bio-behavioral characteristics. The results also showed that higher scores of depression was associated with higher levels of health care system and (marginally) to bio-behavioral characteristics, and to lower levels of material circumstances and psychosocial characteristics. The results also indicated that two of latent variables in the final model, bio-behavioral factors and health care system factors, which act as endogenous latent variables for SES, partially mediated the relationship between SES and depression. However, the multiple mediation effect of latent variables was not significant.

# Chapter 6: Discussion

Although research stresses that depression is a public health issue, there are very few studies that aim to investigate the prevalence of depression and its demographic and social predictors among Arab women in the Gulf Corporation Council (GCC) countries, including Oman. A noticeable problem in existing studies targeting this demographic is that the findings have been inconsistent across GCC countries. As a result, the generated data are not generalizable to all GCC countries regardless of the similarities in social, cultural, political, and economic backgrounds.

This descriptive, cross-sectional study uses the revised social determinants of health (rSDH) model to examine several factors as possible predictors of depression among 240 adult Omani women, 18-72 years old, from urban and rural villages in Wilayat of Rustaq. The discussion chapter is composed of two main sections. In the first section, the major findings are discussed based on three main issues including the level of depression, predictors of depression, and the structural model of our study. The second section of this chapter will focus on discussing the implications of the study and findings to nursing and policymaking in Oman. It will also discuss implications for future studies, study limitations, and the conclusion.

## Level of Depression

Understanding depression among this sample of women in Oman is complicated by various factors. The daily lives of women in Oman involve different lifestyles and roles, from the role of mother and homemaker for some women to the role of independent college student for other women. These roles are likely to involve different stressors; therefore attempts to understand the results of our study must take into account this difference. Approximately 21.7%

of our sample of 240 adult Omani women screened at or over the threshold for depression using the Beck Depression Inventory scale (BDI-II). The results differ from that of other studies with women in Oman but it is difficult to identify the reasons for this. While less than one quarter of the women in our sample met the criteria for depression using the Arabic version of BDI-II (Ghareeb, 2000; Beck et al., 1996), approximately one third (30.7%) of 238 Omani female college students met criteria for depression using the Patient Health Questionnaire (PHQ-9) in a different study (Al-Busaidi et al., 2011). However, the percentage of women who met the criteria for depression in our study is comparably higher than the percentage in another Omani study wherein 8.8% of a sample of 1240 adult Omani women at selected primary care sites in the Muscat governorate met criteria for depression based on the PHQ-9 (Al-Salmani et al., 2015).

Since our study included women in various roles including college students and homemakers, it is not surprising that results from a study that only included female college students would be different. For example, it is possible that the higher level of depression among college students was affected by anxiety and stress due to the college environment and requirements for women in Oman. The university education in Oman was started by the establishment of Sultan Qaboos University in 1986 (Al'Omairi & Amzat, 2012). Since then and with the establishment of more private colleges and universities, the enrollment of Omani women in college/university-level education has profoundly increased (Al'Omairi & Amzat, 2012). With the changes in the role of Omani women from past to present, it is possible that Omani women encounter more challenges and obstacles in their path to prove their capabilities as they assume new roles in the community as highly educated and productive citizens (Goveas & Aslam, 2011). For example, the traditional belief that women are inferior to men and that men are responsible for the physical and economical security of the women in their lives (Goveas &

Aslam, 2011) remains a major challenge that demotivates highly educated women. Gender discrimination in recruitment, specifically recruitment for top managerial positions, is another example of obstacles that encounter highly educated women in Oman (Goveas & Aslam, 2011).

When comparing results from the analysis of our sample of Omani adult women to results from other studies from GCC countries other than Oman, the level of depression reported by our sample (21.7%) varied in relation to the levels in other samples. For example, 21.7% of our sample scored above threshold for depression, which was similar to the percentage of depressed Kuwaiti adult women (21.7%) that was reported in a sample of 2320 participants (53.2% were women), 21-64 years of age in a study conducted by Al-Otaibi and colleagues (2007). However, 18% of Emirati adult women (Hamdan et al., 2008) revealed depression scores using BDI scale and 30.1% of Qatari adult women scored above the threshold for depression (Bener et al., 2012) using HADS in various other studies.

**Predictors of Depression**

This section covers discussion of the results of simple bivariate relationships of individual predictor variables with depression. The second section addresses the multivariable prediction of depression, including Sturcutre Equation Modeling and the effects of mediators and moderators effects.

1. **Socioeconomic Variables**

Factors that involve life outside of the home, including education and employment, were important predictors of depression within our sample. Regarding education, having a higher level of education was related to having a higher level of depression for our sample of Omani adult women. Although prior studies conducted in Oman and other GCC countries showed mixed

results, two studies have noted that higher levels of depression are associated with higher levels of education/schooling years in adults, including among women (Al-Otaibi et al., 2007; Al-Salmani et al., 2015). In a study by Al-Salmani and colleagues (2015), male and female participants who had graduated or those attending a higher level of education classes were at a 1.40 times higher risk for depression than non-graduated participants or those in lower level education classes. In another study, Al-Otaibi and colleagues (2007) found that Kuwaitis, male and female, with university or higher degrees reported a higher level of depression in comparison to Kuwaitis with less than a high school education (16.6% and 8.3%, respectively).

The link between education and depression could be due to increasing levels of stress among women with higher education as a result of the increasing expectations from society on highly educated women (Al-Otaibi et al., 2007). It is possible that traditional stereotype of women in Arab communities, regardless of their education level and achievements (Goveas & Aslam, 2011) contributes this result. An additional possible explanation is an increase in the unemployment rate in Oman in recent years, specifically for young female citizens. According to 2015 national data, Omani females spend an average of four and a half years looking for a job while Omani men spend less than two years, on average, looking for a job ("Times of Oman,"2016). As stated earlier, gender discrimination in employment is a major obstacle facing Omani women (Goveas & Aslam, 2011), which might lead them to need to spen more time looking for a job in comparison to Omani men.

Assessment of our results related to education and depression in conjunction with studies conducted in the Western world are insightful. Most Western studies differ in their results and report that depression is more likely to be related to lower levels of education (Everson et al.,

2002; Ladin, 2008; Ross & Mirowsky, 2006). However, in at least one case, our results with Omani adult women are not dissimilar to findings from a study done with a sample of 12,376 Canadian men and women; results showed that those with post-secondary education were 1.54 times more at risk for lifetime depression than those with less than a secondary school education (Akhtar-Danesh & Landeen, 2007).

In terms of employment, our results show a significant association between depression and employment such that employed women reported higher depressive symptoms scores. It is worth noting that this finding contrasts with Western studies in which unemployed adults were at greater risk for depression than working individuals, including women (Camino et al., 2000; Mossakowski, 2009). However, our results are consistent with previous local and GCC studies that showed higher depression scores among employed adults compared to unemployed adults (Al-Otaibi et al., 2007; Al-Salmani et al., 2015; Bener et al., 2012; Hamdan et al., 2008). There is no definite explanation for this finding, but this could be due to job-related stressors. According to Al-Otaibi and colleagues (2007), a lack of job satisfaction could lead to stress, which would eventually put individuals at a greater risk for depression. Moreover, the dual obligations from both job and family responsibilities that employed women face daily may raise the level of stress in women and increase their risk of depression (Hamdan et al., 2008).

Although our results showed that unmarried women (single, divorced/separated, widowed) report higher levels of depression than married women, the association between depression and marital status was not significant. Similarly, our findings revealed that monthly family income was not a significant predictor of depression. This was similar to findings from a study done in Saudi Arabia, in which marital status and monthly income were not significantly

associated with depression (Al-Qadhi, Rahman, Ferwana, & Abdulmajeed, 2014). However, other GCC studies that assessed marital status and depression reported a significant association between the two variables (Al-Salmani et al., 2015; Al-Otaibi et al., 2007; Bener et al., 2012; Daradkeh et al., 2002; Hamdan et al., 2008). Our results were different than the results from a previous Omani study by Al-Salmani and colleagues (2015), which reported that married Omanis had higher depression scores in comparison to single Omanis. However, this study did not assess the association between depression and marital status by gender. It is possible that measuring depression by gender could reveal a significant association between depression and marital status in female participants in this study.

**2. Material Circumstances' Variables**

When examining the association between depression and selected factors related to material circumstances (e.g. family structure, number of children, and place of residence), our findings indicate that number of children and place of residence were significantly associated with depression. As the number of children decreased, the scores for depression significantly increased ($r= -.269$, $p < .001$). This finding does not conform to other GCC studies in which no significant correlation was found between depression and number of children (Daradkeh et al., 2002; Hamdan et al., 2008). In addition, other GCC studies showed a higher risk for depression among parents with a higher number of children (Al-Otaibi et al., 2007). There is no definitive explanation for the current finding, but it could be due to the effect of the higher social value that Arab culture places on women with a higher number of children in comparison to the lower social value of women with fewer or no children. This may consequently increase stress levels and depression among those with fewer or no children.

According to Kridli (2002), Arab Muslim women face three types of social and family pressure in relation to fertility and number of children: pressures due to traditions, family, and religion. Pressure due to tradition comes from the Arab value that children are to assist in family work and provide care for their parents as they age. The pressure due to the family is based on the concept of preserving the family name, which has placed great pressure on women to have more children, specifically sons. The religious pressure derives from the Muslim belief that having more children is better, as God will take care of children regardless of the financial status of the parents (Kridli, 2002).

It is possible that previous studies have not shown significant correlations like this between depression and the number of children because previous studies did not limit their samples to Arabs and included participants with different nationalities and religions who might not have placed the same social value on women with more children. For example, Hamdan and colleagues (2008) study included participants from Bangladesh, Iran, Turkey, and Greece. Although these participants accounted for a smaller number of total participants, it is possible that this demographic breakdown did have an effect on the findings. The contrary findings of Al-Otaibi and colleagues (2007) could be due to the analysis method used in the study. Al-Otaibi and colleagues did not analyze the association between depression and number of children by gender. It is possible that their findings might differ if they examined the correlation between depression scores and number of children among female participants.

In terms of place of residence, the current findings suggest that women from urban areas experienced higher depression scores than those from rural villages. This finding is not surprising because it is similar to the findings of two Western studies. In a study by Roman,

Cohen, and Forte (2011), individuals from rural Canadian areas showed lower levels of depression, adjusting for SES, health, community, and social support factors, in comparison to those from urban Canadian areas. In a meta-analysis study of 20 studies from 15 developed countries, lower levels of mood disorders and anxiety were reported in rural communities, controlling for important cofounders (Peen, Schoevers, Beekman, & Dekker, 2010). The higher levels of community belonging and attachment, and higher social support in rural areas were the two main explanations for the difference between rural and urban setting in relation to depression (Romans et al., 2011). Individuals from urban areas might experience a lower sense of belonging, less social networking and relationship opportunities, and lower levels of social support than those in rural areas, which may consequently affect an individual's mental health (Romans et al., 2011). This might also be applicable to Wilayat of Rustaq. In recent years, many families have moved from rural villages to urban areas in order to be close to their jobs, educational institutions, and/or the modernized lifestyles in urban areas (e.g. better road construction, restaurants, shopping, etc.). Moreover, due to the system of distributing land for the country's population, many families from rural villages in Wilayat of Rustaq acquired lands in urban areas, far away from their villages. This could have an effect on the social support and community attachment that participants in urban areas experienced, and might explain the association between place of residence and depression in the current study.

As presented from our findings, women living with extended family reported more depressive symptoms than those living with their nuclear family only, with a spouse only, or living alone. Previous Western studies reported similar findings, in which women living with others were at higher risk for depressive symptoms than women living with their partner only (Joutsenniemi et al., 2006), or with their spouse and children (Hughes & Waite, 2002). However,

Hughes and Waite (2002) reported that single women living with children had the highest risk of depressive symptoms in comparison to single or married women with different living arrangements.

It is possible that women in our study experienced more family stressors due to familial disharmony and conflicts among members of large families, which would consequently increase their scores of depression. Culturally and traditionally, the husband's mother and the wife of the eldest son have more familial and social power, and more control over the resources of the house than other female members in the family. Therefore, women living with extended family might experience a lack of autonomy, power, and resources, which might contribute to our current findings. In addition, married women living with others have been found to have a higher risk of mobility limitations, which leads to a higher risk of depressive symptoms (Hughes & Waite, 2002). Mobility limitation for married women living with others may reflect a long-term progression in which household demands limit the time and attention those women are able to devote to managing their own health (Hughes & Waite, 2002). This would potentially lead to poor health outcomes, such as chronic diseases, and eventually further limit the mobility of these women (Hughes & Waite, 2002). Regardless of the differences in level of depression for those living with extended family compared to those with other living arrangements, the association between depression and family structure/living arrangements is not significant in the current study.

**3. Bio-Behavioral Variables**

None of the bio-behavioral factors examined showed significant associations with depression. Our study's findings regarding history of chronic disease diverge from the findings

of various international studies, which show that the likelihood of depression is significantly increased with the presence of a chronic illness (Gunn et al., 2012, Patten et al., 2005, Pouwer et al., 2010), and that the risk increases with the number of chronic illnesses (Gunn et al., 2012, Patten et al., 2005). Indeed, other GCC studies reported a significant association between diabetes and depression among Emirati adults (Sulaiman et al., 2010) and Bahraini adults (Almawi et al., 2008). Moreover, Omani adults diagnosed with chronic illness were at a significantly higher risk of depression than those with no chronic illness (Al-Salmani et al., 2015). It has been reported that the presence of complications related to a chronic illness plays a major role in developing depression or depressive symptoms among individuals with chronic illness (Sulaiman et al., 2010). It is possible that many women in our study did not suffer from complications due to their chronic illnesses, which might have mitigated the stress caused by these illnesses. Additionally, it is conceivable that free-of-cost healthcare for chronic illnesses, including screening, diagnosis, treatment, and follow-up, is a contributing factor in reducing women's stress about chronic illness care, which might have decreased their levels of depression in our study.

The percentage of women in our sample who reported experiencing episodes of excessive sadness, hopelessness, and depressed mood during pregnancy was small (15.4%), which increased the likelihood of Type II error. This means that the number of women who positively reported the absence of depressed mood during pregnancy was not sufficient to exhibit a statistically significant level of association with depression. Therefore, further investigation is important to employ the effect of this variable on depression in adult Omani women. It would also be useful to employ another measurement tool that examines this variable in depth rather than the one close-ended question used in the current study.

It has been found in earlier regional and international studies that adults, including women, who were not physically active or were less physically active were statistically more vulnerable to depression than those who were physically active (Brown et al., 2005; Galper et al., 2006; Jacka et al., 2011; Moselhy et al., 2012). However, this was not the case in the current study. Although inactive women in the current study exhibited higher levels of depression than active women, the association between physical activity and depression was not significant.

There is no clear explanation for the contrast in results but the smaller number of active women in the current study in comparison to inactive women might lead to Type II error. Additionally, the classification of physical activity level into two categories only, i.e. physically inactive and physically active, is another possible explanation for this finding. Limiting the analysis of physical activity and its association with depression to two main categories may have limited the observation of the variations in the prevalence and severity of depression experienced with additional, differing levels of physical activity.

More detailed classification or more categories of physical activity, such as not active, relatively inactive, moderately active, and highly active might have revealed a noticeable and significant association between physical activity and depression. This is important considering that there is no known definite dose-response association between physical activity and depressive disorder (Mammen & Faulkner, 2013), so using an objective and culturally sensitive measurement scale that captures different components of physical activity (i.e. frequency, intensity, and duration) would be useful.

In terms of the percentage of women who are physically active, this finding should be analyzed in the context of the Omani social and cultural system, taking into account the attitude

and norms about female body size in this system. Similar to various areas and cities in Oman, in Wilayat of Rustaq women face challenges when attempting to exercise outside their homes for different social and cultural reasons. Social and cultural constraints that limit Omani women in their options of to exercise or even simply to walk include a lack of women's fitness clubs, a lack of well-constructed walking area or spaces, the hot climate, the need for a male companion or another female companion, a high dependency on cars, family and household responsibilities and obligations, and the need to wear traditional clothing when outdoors. Additionally, increased dependency on domestic housekeepers, especially among employed women and large families, may also contribute to the absence of physical activity or a low level of activity among adult Omani women.

Results revealed the association between depression and actual BMI was inverse for our sample, which means that an increase in the BMI score was associated with a lower depression score. However, this association was not significant. This finding opposes the Western findings that being overweight (de Wit et al., 2009; Zhao et al., 2009) and obese (de Wit et al., 2009; Pan et al, 2012; Zhao et al., 2009) are both significantly linked with depression; and reducing BMI consequently reduces depressive symptoms (Simon et al., 2010). However, this non-significant finding from our study was not surprising as two previous Arab studies in Syria and UAE showed similar findings, where a non-significant association was reported between BMI and depression (Fouad et al., 2006; Moselhy et al., 2012). The author strongly believes that Arab cultural attitudes towards women's weight were important factors in these findings. Traditionally in this culture, plumpness has been considered a preferable body characteristics, specifically among women (Musaiger, 2015; Musaiger, 2011). However, this norm about women's body size

has shifted for young Arab women due to the adoption of Western norms of body size for women (Musaiger, 2015; Musaiger, 2011).

It is possible that this variable may be perceived differently for the different age groups in this study. Middle-aged and elderly women might still hold a more traditional view about appropriate body shape, which may have led to the current finding where women with lower BMI have a higher level of depression and where there is a non-significant association between depression and BMI. Even for the younger generations, Arab women have been trapped between the influences of Western standards of body shape, which place higher value and preference on a thinner body, and the traditional norms of Arab society that favor plumpness and large women (Musaiger, 2015; Musaiger, 2011).

**4. Psychosocial Variables**

Psychosocial factors, domestic violence, social support, and coping were significantly associated with depression with our sample. Similar to the findings of Hamdan et al. (2008), women with a history of domestic violence in our study exhibited higher levels of depression than women with no history of domestic violence. However, the small number of participants who reported experiences of domestic violence might affect this positive finding, i.e. Type I error; thus, the significant association may not be accurate. Regardless, it is important to carefully consider the current finding because many international and Arab studies have found links between domestic violence and abuse against women, with different mental disorders, including depressive disorders (Dienemann et al., 2000; Evans-Campbell et al., 2006; Fahmy & Abd El Rahman, 2008; Haj-Yahia, 2000b).

Further, it is possible that more participants experienced domestic violence than reported it in our study. Factors such as taboos, self-blame (Haj-Yahia, 2002; Rose et al., 2011), and feelings of shame and embarrassment (Rose et al., 2011) might have contributed to the underreporting of domestic violence in our study.

Although examples of physical abuse were provided in the questionnaire, it is also possible that women did not realize that they experienced physical abuse and thus did not report it. Women in the current study might have believed that the abusive actions or behaviors against them, such as beating or slapping, were enforced by culture under certain conditions and so perhaps they felt that this was acceptable and could not be considered to be domestic violence against them. This interpretation is based on the findings of Haj-Yahia (2002) where 33.4% of Jordanian women in his study believed that beating as a form of spousal abuse against women was rational under certain conditions. According to Kposowa and Ezzat (2016), social conservatism has enforced abuse against women more so than religious beliefs, which has had an impact on the acceptability of abuse against women. Therefore, it is important to direct efforts towards changing social and cultural beliefs as well as norms in order to eliminate domestic violence against women in Arab communities (Kposowa & Ezzat, 2016).

With respect to social support, a significant negative association was observed between social support and depression score. This finding was expected as many international studies observed a similar direction of association between the two variables (Aranda et al., 2001; Broadhead et al., 2001; Dalgard et al., 2006; Hou, Cerulli, Wittink, Caine, & Qiu, 2015; Kendler et al, 2005). Arabian Gulf nations are social societies, where social support is an essential psychological component of life, and thus is important for the physical, social, and mental health

of individuals (Al-Kandari, 2011). In these societies, helping others is a societal value, specifically during difficult and stressful times (Al-Kandari, 2011). Kumar and colleagues (2012) reported that social support was positively associated with self-rated health across Western and non-western nations, including Arab nations (i.e., Kuwait, Qatar, UAE, KSA, Egypt, Iraq, Lebanon, and Palestine) regardless of economic levels and gender. Therefore, it was not surprising to observe that social support had a positive impact on reducing depressive symptoms in our sample.

Our findings show that adult Omani women in Wilayat of Rustaq utilized adaptive coping styles (problem-focused coping and emotion-focused coping). The findings also show that adaptive coping strategies were buffers to depression. This is consistent with previous research that showed that depressive symptoms increased as the utilization of maladaptive coping strategies increased (Garnefski et al., 2004; Kelly et al., 2008; Thompson et al., 2010). Our findings could be evidence of the same negative effect of maladaptive coping strategies on the mental health that has been observed in other parts of the world. Maladaptive coping strategies focus on immediate gratification rather than solving the problem. Unsolved problems may increase feelings of helplessness in managing life's challenges, which can lead to increased depressive symptoms.

Misperceptions about actual body size and its relation to an ideal body shape or weight is common among Arab women from GCC countries (Madanat et al., 2011; Musaiger et al., 2004; Qauhiz, 2010). On this subject, findings from the current study showed a discrepancy between participants' perceptions of their actual body image and their BMI categories. There has been a tendency for adult Omani women to underestimate their body weight, specifically among obese

women. While 27.9% of our participants were obese (BMI ≥ 30), only 2.9% of participants perceived themselves as obese. On the other hand, the percentage of women who perceived themselves as overweight was higher than the actual percentage of overweight women (BMI 25.0-29.9). Moreover, 26.3% of participants perceived overweight body shape as an ideal body image. The current analyses also showed that the association between depression and perception of one's own body image and the ideal body image was not significant.

Similar to the findings relating to BMI, our results about perception of body image could be explained by the differences in cultural definitions or perspectives on obesity and overweightness. Musaiger (1987) concluded that sexual attraction is the main factor that makes women in Arab Gulf nations prefer plumpness to slimmer body shapes. Larger Arab women are perceived as more sexually attracted than slimmer women (Musaiger et al., 2004). However, the preference for plumpness has shifted in recent years due to the impact of Western culture on idealization of body shape, as well as the role of mass media, and increased community awareness about the negative health effects of obesity (Musaiger et al., 2004; Musaiger, 2011; Musaiger, 2015). However, these changes were observed more among teenagers and young women in GCC countries (Al-Sendi et al., 2004; Musaiger et al., 2004) and have not been thoroughly investigated in middle aged and older women. Therefore, it is possible that middle aged and older women may still retain the traditional perspective of a woman's ideal body shape.

It was surprising to observe a non-significant association between religiosity and depression in the current study considering that previous studies conducted among GCC and Arab populations, across age groups and gender, showed a significant association between religiosity and subjective well-being (Abdel-Khalek, 2012a; 2012ab; Abdel-Khalek, 2010;

Abdel-Khalek & Lester, 2010; Abdel-Khalek, 2009), and a negative association between religiosity and depression (Abdel-Khalek & Eid, 2011; Abdel-Khalek & Lester, 2010; Abdel-Khalek, 2009). The findings of our study could be due to the lack of variability among scores of participants' religiosity level. A majority of participants in our study scored higher on the religiosity scale, which may have affected the findings in terms of the association between religiosity and depression.

**5. Health Care System Variables**

When examining the association between depression and selected factors related to the health care system (e.g. attitude toward seeking professional help, comfort level talking to a health care professional, perceived stigma around seeking professional help, and availability of psychiatric clinics), our findings indicated that all of these factors were significantly associated with depression. It was clear from our findings that a negative attitude towards seeking professional help and heightened perception of the stigma surrounding seekin help increased the levels of depression in our sample.

Studies have shown that depressed individuals are reluctant to seek professional help due to the associated stigma (Barney, Griffiths, Jorm, & Christensen, (2006). A number of studies have investigated the attitude of depressed people towards seeking professional help and the associated perceived stigma, and a few of these studies investigated the role of attitude towards seeking professional help and the associated perceived stigma as predictors of depression. For example, in a meta-analysis study of 45 articles Livingston and Boyed (2010) found that stigma was positively associated with the severity of psychiatric symptoms. In addition, a high level of stigma was correlated with poor self-esteem, hopelessness, and lower

empowerment (Livingstone & Boyed, 2010). Barney and colleagues (2006) concluded that self-stigma and perceived stigma were the explanation for why depressed individuals were reluctant to seek help from any health care professionals, including general practitioners, counselors, psychologists, psychiatrists, or other health practitioners. However, in another study with 2,526 university students in the United States, Eisenberg and colleagues (2007) found other factors that impacted individuals' attitudes toward seeking professional help for mental problems and willingness to access mental-related health services. These factors included unawareness of available services, uncertainty about the effectiveness of therapies, lack of perceived need, and low SES. This highlights the need for further exploration of factors that relate to negative attitudes toward seeking professional help among Omani women.

It was interesting to see that women from our sample who lived in villages served by a psychiatric clinic showed higher levels of depression. There is no clear explanation for this finding. However, it is possible that women who lived in areas with psychiatric clinic services were, as a result, less reluctant to report symptoms of depression and perceived less stigma surrounding mental problems. Perhaps these women had the opportunities to visit a psychiatric clinic for help prior to this study and as a result had less stigmatized attitudes towards reporting mental problems and depression symptoms.

**6. Age**

Similar to the findings of other studies at national and regional levels, age was significantly and negatively associated with depression scores (Al-Salmani et al., 2015; Al-Otaibi et al., 2007; Bener et al., 2012; Daradkeh et al, 2002). Specifically, our findings support those of other studies that show lower depression levels among elderly women in comparison to

younger women. Our findings revealed that women over 65 years of age had the lowest levels of depression and women aged 18-25 had the highest levels of depression. Although this aligns with results from some previous studies as stated above, the fact that the highest levels of depression were among the most productive age group raises concerns and creates a potential national burden (Bener et al., 2012). While we do not know the definitive reasons for our findings among these younger women, it is possible that factors in adolescence set young adult women up for depression. For example, Gore and colleagues (2011) found that different factors contributed to poor mental health in adolescence, including low physical activity, physical disorders such as hypertension, abnormal BMI, and tobacco or other substance use. The effect of these factors on mental health may not be apparent before adulthood (Gore et al., 2011).

**Structural Equation Modeling**

One of the purposes of this study was to test a revised version of the WHO social determinants of health (rSDH) model of multiple latent variables associated with depression in Omani adult women from Wilayat of Rustaq. Although the literature is replete with studies that identify various predictors of depression in women, especially in Western countries, the current study examined the extent to which specific socioeconomic, material, bio-behavioral, psychosocial, and health care system (access to health care) factors predicted depression in Omani women. Various international studies provided evidence to support the association between depression and the latent variables stated above. As a unique piece of our study, structural equation modeling was used to investigate both direct and indirect associations among these different sets of factors and depression in a sample of Arab women with a more multifaceted approach. Based on our results, significant paths from the five latent variables of the

model and depression were found. The path analyses indicated that incorporating multiple variables of SES, material, bio-behavioral, psychosocial, and health care system explained 62% of the variance in depression scores for our sample.

The two indicators of SES, education and employment, showed a direct significant association with depression scores although both were moderately but not significantly associated with depression categories (depressed vs. non-depressed) in aim 2. The effect of SES on depression in our study was surprising in that higher SES suggested higher levels of depression. This is in contrast to an earlier longitudinal study that used SEM to analyze the effect of SES on psychosomatic symptoms among 1,262 participants from Finland by Huurre and colleagues (2005). These authors examined the differences in psychosomatic symptoms by SES in adolescents, young adults, and adults using parental SES (parent's occupation or education) as indicators for SES in adolescence, the individual's own education as a SES indicator in young adulthood, and occupation as an indicator of SES in adulthood. The psychosomatic symptom scale included a question about experience with depression. Their SEM analysis revealed that among female participants, a significant negative path was found between parental SES and psychosomatic symptom. Similarly, significant negative paths were also found between one's own SES and psychosomatic symptoms in early adulthood and adulthood stages of life (Huurre, Rahkonen, Komulainen, & Aro, 2005). It is possible that the difference in our findings is due to the variation in cultural value placed on the importance of higher education and employment for women. Regardless of the difference in effect, our findings support those of other studies that SES is important in predicting depression among women.

Interestingly, two indicators of material circumstances (family structure and number of children) were correlated with depression scores, however, neither indicator showed a significant correlation with depression categories (depressed vs. non-depressed), and one of these two indicators (family structure) was not significantly associated with depression score when assessing individual predictors of depression. This finding underscores the interaction between different indicators of material circumstances in producing an observable effect on depression and depression level among women. The influence of material circumstances on depression in the current study may be due to the increase in stressful life experiences of women living in extended families and women with fewer children. A woman living in an extended family faces greater familial conflicts over power and control. The level of stress experienced by women living in extended family depends on one's social position and thus one's power among the family members. Similarly, as noted earlier in the discussion, the low social value placed on women with fewer or no children could explain the higher level of depression reported among this group in our study.

Consistent with the results of analysis for aim 2, indicators of two latent variables, psychosocial factors (PSF) and health care system (HCS), were significantly associated with depression scores. Social support and coping as indicators of psychosocial factors showed negative associations with depression; thus higher PSF led to lower depression. This result coincides with the findings of Greenglass and colleagues (2006) who used structural equation modeling to test the effect of social support and proactive coping on functional ability and depression among 224 elderly adults from Canada. These authors found that proactive coping and social support were negatively associated with depression. They stressed the possibility that the association between social support and depression, as well as coping and depression, were

also inverted; this would mean that increased depression led to lower social support and lower proactive coping. This highlights the need to investigate the nature of a potential bi-directional association between psychosocial resources and depression (Greenglass et al., 2006).

The findings from our model analysis regarding the association between the health care system and depression was not surprising given that similar findings were obtained from the analysis of the association of each of health care system with depression categories as well as with depression score. The findings of the model support the importance of positive attitude towards seeking professional help and reduction of stigma in controlling depressive symptoms (Livingstone & Boyed, 2010).

Bio-behavioral variables showed no significant association with categorical depression (depressed vs. not depressed) or with depression scores. Interestingly, two variables of bio-behavioral factors showed a significant association with depression in the path analysis. Higher bio-behavioral variables (i.e. higher number of chronic illnesses and higher BMI) showed higher levels of depression. A study by Chiu and colleagues (2010) reported that health behavior factors, including physical activity, body weight control, and smoking explained 13% of the association between depression and glycemic control in adult Americans using structural equation modeling. In another study also used structural equation modeling, the correlation between BMI and depression was found to be gender dependent (Dragan & Akhtar-Danesh, 2007). With male participants in the study, higher BMI was correlated with severity of depression; however, the association between BMI and depression in female participants was not significant (Dragan & Akhtar-Danesh, 2007). In our study, the significant association between bio-behavioral constructs, chronic history of disease, and BMI underscores the effect of bio-

behavioral factors on increasing levels of depression among Omani women and that this effect should not be ignored.

## Mediators and Moderator Effects

The mediators evaluated in our study showed that only bio-behavioral factors (history of chronic illnesses and BMI) were found to be a mediator between SES and depression. Previous studies suggested a mediation effect between depression and bio-behavioral factors, including BMI and history of chronic illness through several mediators (Carpenter et al., 2000; Beydoun & Wang, 2010; Preiss, Brennan, & Clarke, 2013). For example, in a recent systematic review study, SES including education attainment and income, behavioral health factors including physical activity and dieting behaviors, psychosocial factors including maladaptive coping, stigma, and body image, and physical health were all found to mediate the association between BMI and depression (Preiss et al., 2013). Our study was unique in that it revealed a different mediation path, with bio-behavioral factors as the mediator between SES and depression. This adds to the body of knowledge on the different impacts of bio-behavioral variables as buffers or as risk factors of depression for women with certain SES characteristics. This highlights a need to assess the different casual and mediation pathways between SES, bio-behavioral characteristics, and depression.

The moderation effect of age between SES and depression was not significant in this study. This indicates that changes in age did not influence the association between SES and depression in our sample. This may indicate that the direct effect of age on depression is more remarkable than its indirect effect among Omani women in our study.

## Implications

Our research findings on predictors of depression among Omani adult women have a numbers of implications for practice and policy-making. In this study, we sought to explore predictors of depression among adult Omani women living in urban and rural villages at Wilayat of Rustaq using a revised version of the WHO Social Determinants of Health framework (rSDH). Although some predictors had previously been studied separately among Arab women, these had not been examined under a structural framework. In addition, studies of these predictors among Arab adult women 18 years of age and older were scarce. This study's findings can be used by nurses, health care providers, and health policymakers who are developing and implementing strategies to improve the health care system and facilities in Oman.

### Implications for Nursing and Health Practice

Nurses, as health care providers on the front line who receive and assess clients in primary health care and community settings, need to be aware of the factors that play a role in the development of depression. Nurses should understand that the depression level among Omani women cannot be ignored. Moreover, a large number of women who visit primary health care facilities may report physical complaints that are actually somatic complaints reflecting underlying depression and anxiety disorders in women (Becker, Zaid, & Faris, 2002). Therefore, it is critical to routinely screen women for depression in order to diagnose and manage depression in its early stages. For example, raising awareness of predictors of depression and their correlates among Omani women can help nurses better identify women at higher risk and make appropriate referrals to diagnose the disease and establish appropriate therapeutic management.

This study highlights the effect of education and employment on depressive symptoms because they were significant socioeconomic predictors of depression in Omani women. Health care practitioners, including nurses working with Omani women, need to be aware that higher levels of education and employment may increase levels of depression. These findings call for further social and emotional assessment among those women with employment and a higher education level. Omani society and its composition continue to change and evolve, specifically in increasing the number of employed and highly educated women. This may contribute to increasing the numbers of depressed women. Therefore, proactive planning by nurses through promotion programs that address stressors in educational facilities and working places is an essential piece of depression prevention and management efforts. Other possible social determinants of depression that should also be considered in clinical practice include the number of children, place of residence, level of social support, coping style, attitude toward seeking professional help, availability of psychiatric clinics, and age. Findings from the independent analyses of this study demonstrated the importance of awareness of the association between these factors and depression.

The structural equation model of this study underscores the cumulative importance of social determinants of depression in Omani women. Findings of this study revealed that the level of depression and depressive symptoms might differ depending on socioeconomic, material circumstances, bio-behavioral, psychosocial, and health care system variables. Therefore, the model developed for this study can provide theoretical insight into the responses of these latent variables that are related to depression in Omani women and that act as stress-resistance resources in women's reaction to life stressors. The current model may also be useful in clarifying the patterns of social and behavioral problem-solving methodologies of clinically

depressed women. It may suggest therapeutic interventions through encouraging the modification of certain social, behavioral, and attitudinal characteristics to improve the psychological and emotional status of women.

The findings of our study highlight the need to expand mental health services to those who find difficulty when accessing the limited mental health facilities available in the Wilayat. Nurses, mental health care providers, and health administrative personnel in the Wilayat can work as representatives and liaisons who search for and allocate clinical care resources on behalf of people in different locations within the Wilayat. Nurses can actively participate in policy changes to promote the idea that mental health services should be distributed equally and sufficiently for the populations they serve.

**Implications for Future Research**

The findings from our study contribute to the body of knowledge that expands our understanding of predictors and social determinants of depression in a group of Arab women. In order to continue to investigate and explore the predictors and social determinants of depression among Omani and/or Arab women, further research efforts are important. Future research should focus on not only the social characteristics of these women, but also the context of the environment in which they live and the interactions of various environmental and culture components related to developing depression. Moreover, further research is required to guide health and programmatic policy makers about the internal and external factors that may affect the mental health of women.

The model of this study can be considered a potentially useful guide to search for more evidence of the effects of various social, economical, biological, behavioral, psychological, and

attitudinal resources in relation to depression among Omani women. Since the structural model of this study can be modified, it may be reasonable to include this model as part of a more comprehensive model for examining the changes in depressive symptoms for women over time. Further research that tests the feasibility of the current model to clarify the effects of these variables on other physical and mental health problems among the Omani population would also be useful.

A more accurate estimation of the prevalence and levels of depression among Omani adult women is another essential issue to be considered in future research. The variation in the level and prevalence rate of depression among women who participate in local research raises the need for large-scale national research that assesses the prevalence and incidence rate of depression among women in the country. This will be helpful to determine the different promotion and management programs needed to assist all women at risk for depression in different geographical locations and communities within Oman. To assess the prevalence and predictors of depression among an Arab group, a culturally tailored screening tool is preferable. Based on an extensive literature review, the depression screening tools used in research with Arab samples to date are tools that were developed in Western countries and have been translated into Arabic. According to American Psychological Association (2013), cultural issues, including cultural explanation and perceptions of etiologies of depression, cultural perception of distress, and cultural syndromes, are important to accepting or rejecting the diagnosis of disease. Therefore, developing an assessment tool that is culturally sensitive would assist in identifying Omani women who may be at risk for depression. To design a culturally sensitive and comprehensive assessment tool, other potential predictors and social determinants of depression in Omani women need to be identified, which can only be done through extensive research.

**Limitations of the Study**

One major limitation of this study was related to the recruitment of a convenience sample from rural and urban areas in a specific Wilayat (province) in Oman. The use of a convenience sample may have led to a self-selection bias, and thus participants included in the study may have differed in characteristics and depression levels from those who were not interested in participating. The researcher tried to avoid bias in the selection of participants, however, there is a possibility of sample bias because the sample was not randomly selected. Moreover, the recruitment of participants from one Wilayat of Oman limits the generalizability of findings to other Wilayats within the South Batinah region and other regions of the country. Although the sample size met the recommended sample size of Partial Least Structural Equation Modeling (PLS-SEM), a larger sample may have given different or more decisive results.

Another limitation of this study is related to research design. The study consisted of cross-sectional data, using self-report questionnaires and collecting data through interviews with each participant. It is possible that participants in this study gave false information, specifically in response to culturally sensitive questions including religiosity, domestic violence, and depression. Although cross-section is a plausible and common data collection method, causal inferences cannot be drawn with this methodology.

Along with the methodological limitations discussed above, limitations of the structural model should also be considered. Several variables or indicators were omitted due to poor loading within the latent variables. Having those omitted variables within the model may have led to different and more conclusive results. Variables such as place of residence, domestic violence, and availability of psychiatric clinics, which showed significant associations with

depression scores in bivariate analyses, unfortunately had to be omitted from the model analysis due to poor loadings. Therefore, including different screening assessments of these variables in future research may result in acceptable loading values, which could be helpful in obtaining more useful findings. Because PLS-SEM was used to analyze the model, some variables had to be analyzed using binary coding. This avoided observation of difference across different characteristics' groups, and how association with depression differs by group or level. For example, coding marital status as single, married, divorced, and widowed could lead to different results than seen with the current analyses.

Despite these limitations, this study is an addition to the literature on mental health of Omani as well as Arab women as it uses participants recruited from rural and urban living areas. Unlike previous Arab studies, which primarily investigated few predictors by using basic statistical analytic approaches, this study focused on different possible predictors and analyzed the bivariate and multi-level effect of these factors on depression. It also examined how SES is related to depression through various latent variables in order to understand protective factors that are experienced by Omani women. The consideration of factors that contributed to mental health in this study aligned with public and governmental efforts to enhance mental well-being in Omani populations.

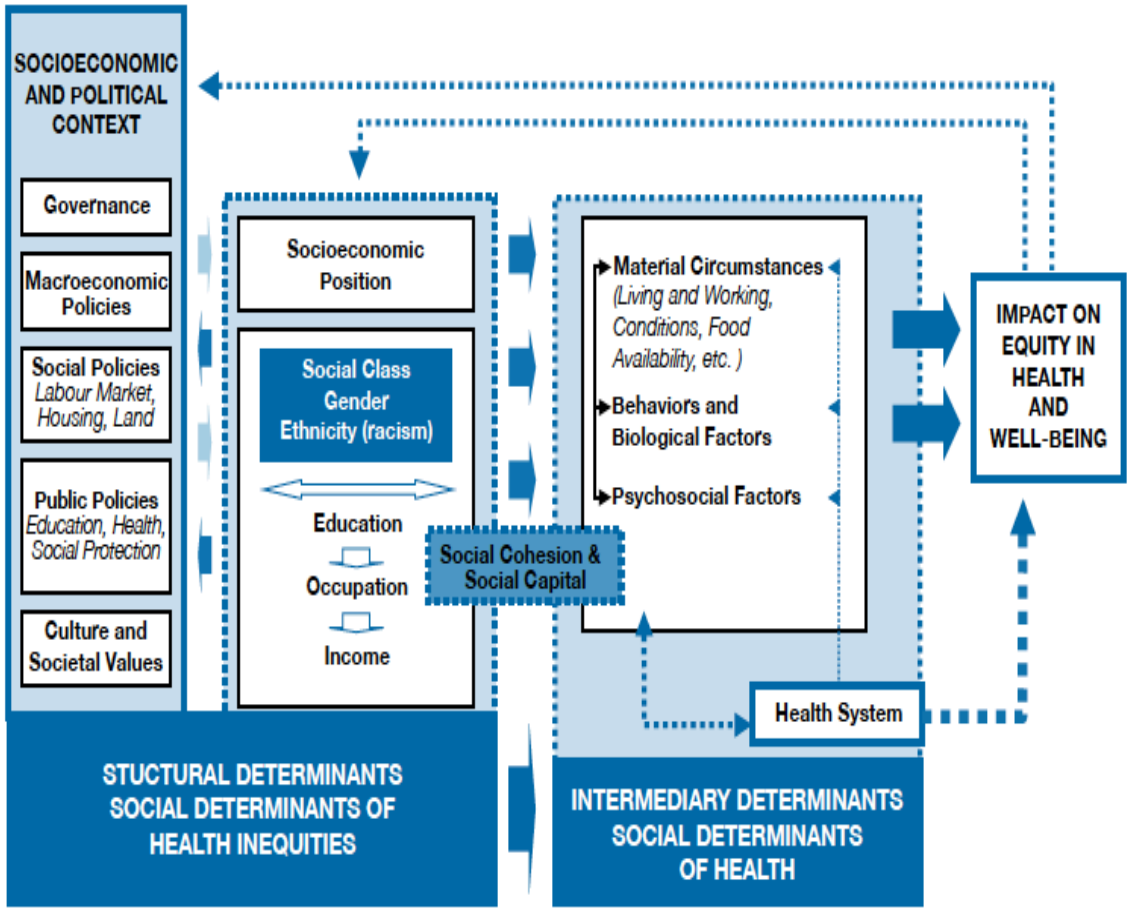
## Conclusion

As an Arab population, Omani women have unique mental health service needs. For the purpose of this dissertation, a revised version of a well-known and widely respected model by the WHO was used as the structural framework. The model was revised by the investigator of

this study and modification was guided by a review of extensive empirical literature suggesting predictors of depression among women.

The findings from this study provide a context for a better understanding of depression in women and highlighting the need for community-based promotion activities to provide appropriate mental health care for Omani women. It is possible that by better understanding the role of SES, material circumstances, bio-behavioral, psychosocial, and health care system factors that contribute to the development of, or protection from, depression in Omani women, nurse-led promotion programs and initiatives can be established to assist the public efforts to enhance mental well-being and reduce the burden of mental health problems. This study is a step towards exploring predictors of an important mental disease, and may eventually lead to using qualitative and/or mixed methods research to develop cost-effective promotion and management programs for this vulnerable population.

[1]**Figure 1.** The Commission on Social Determinants of Health (CSDH), WHO, Conceptual Framework




[1] Adopted from: World Health Organization (2010). A conceptual framework for action on the social determinants of health: Social determinants of health discussion (Paper 2)

**Figure 2.** The Proposed Conceptual Model of the Social Determinants of Depression in Adult Omani Women

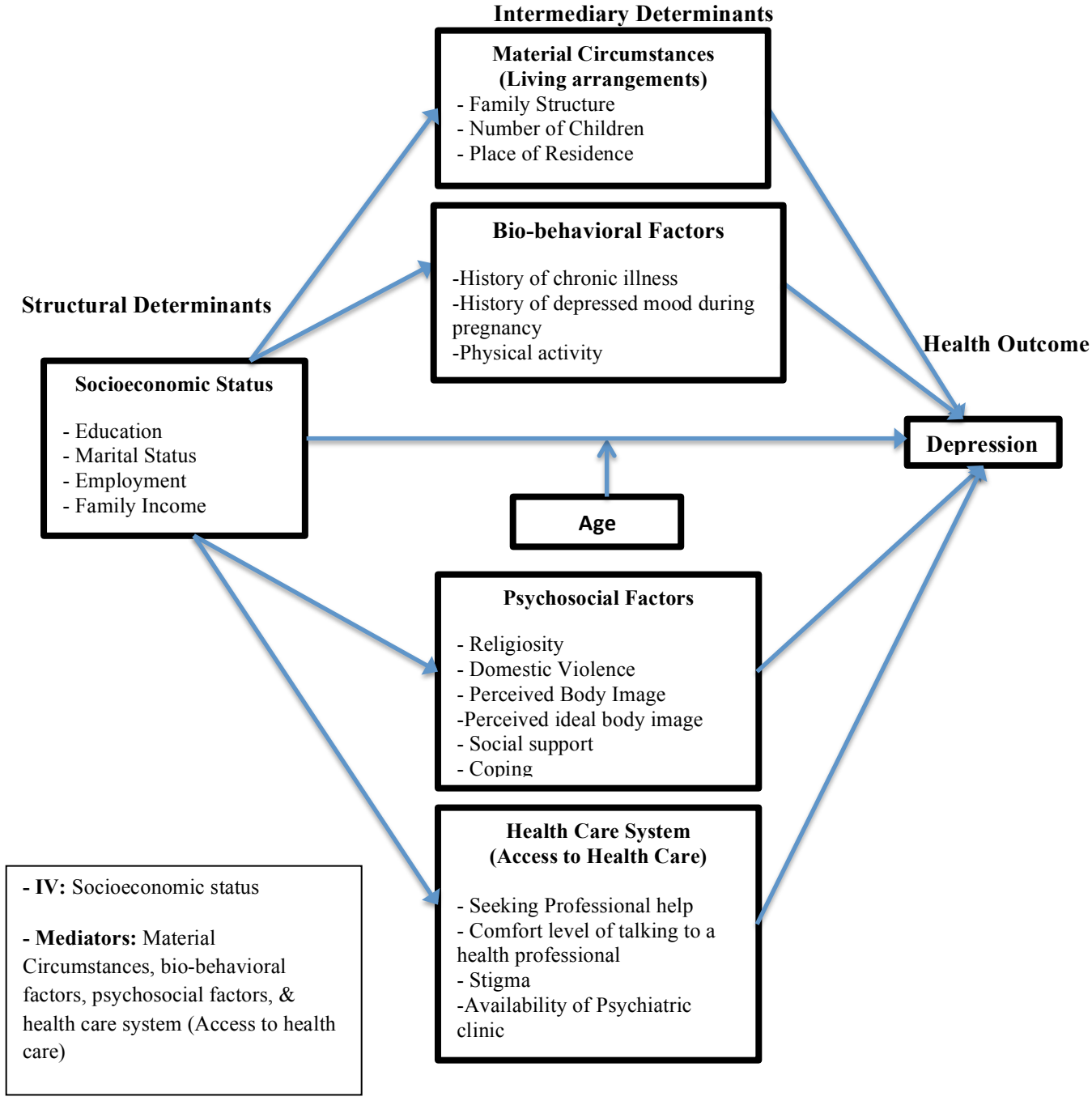


**Figure 3. The Model Indicators**

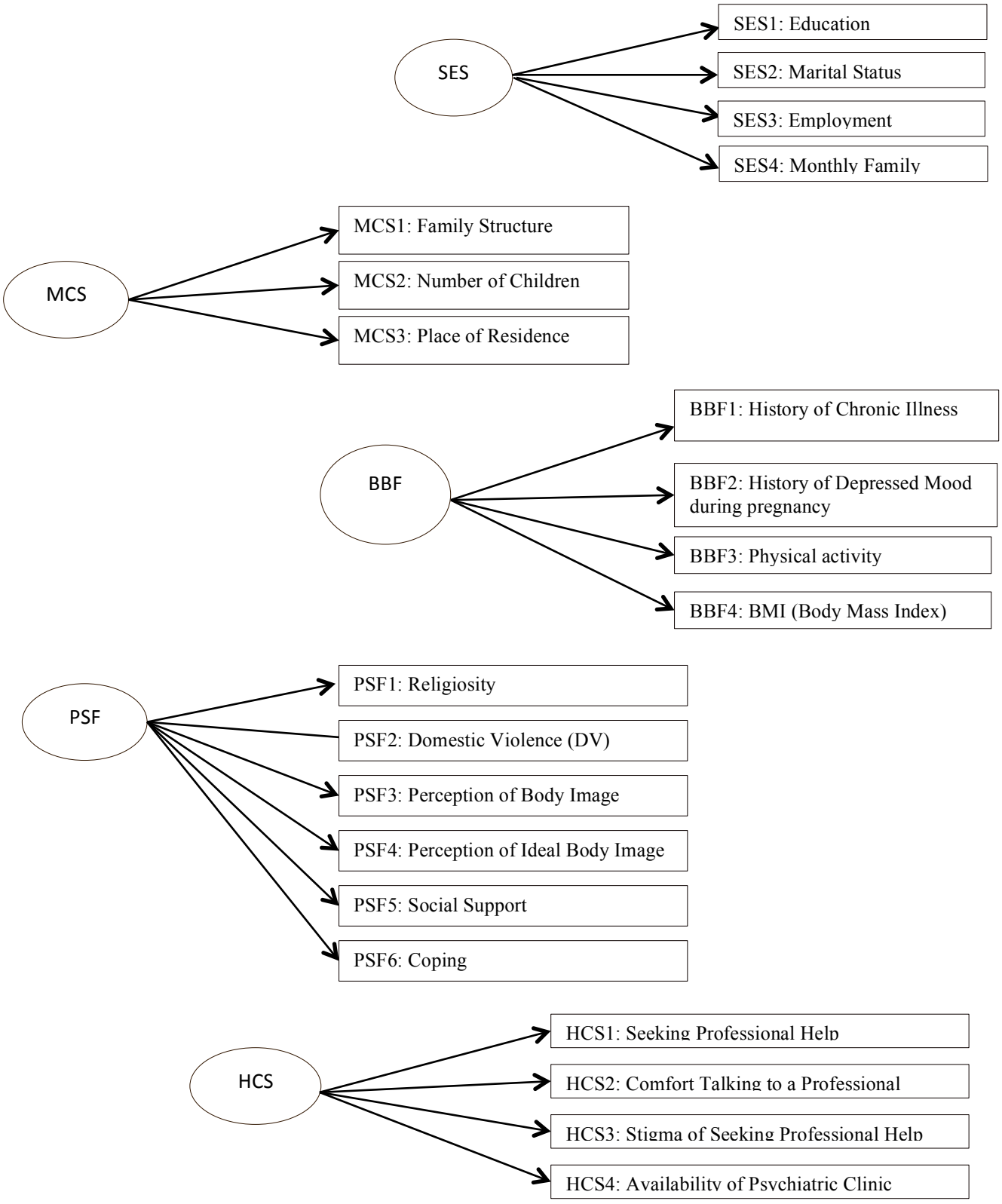


**Figure 4.** Initial Model Diagram (Loading Values of Factors per Latent Variable)

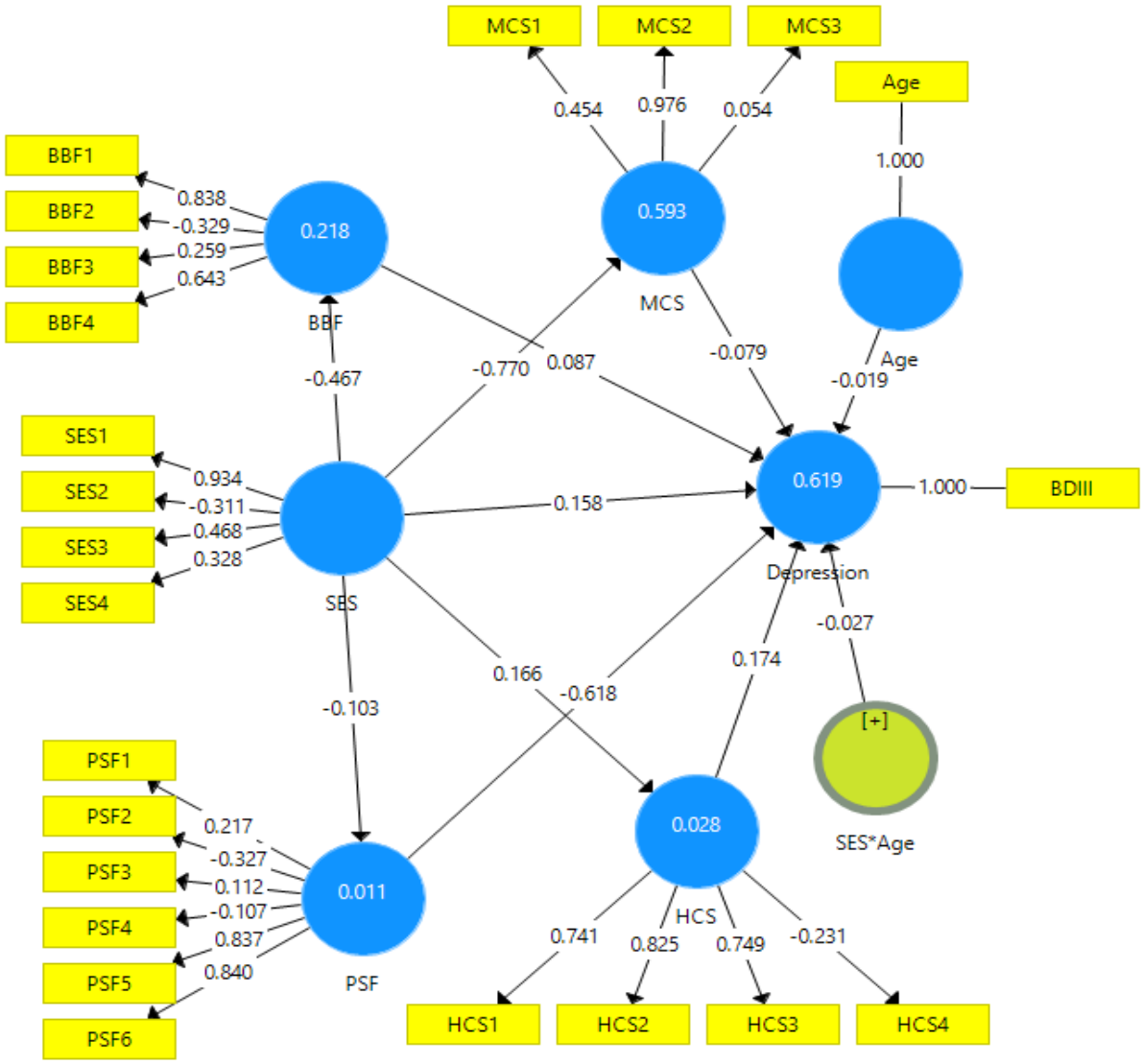


**Figure 5.** Significance level (p-value) of the Model after Omission of Indicators of < 0.4 loading Values

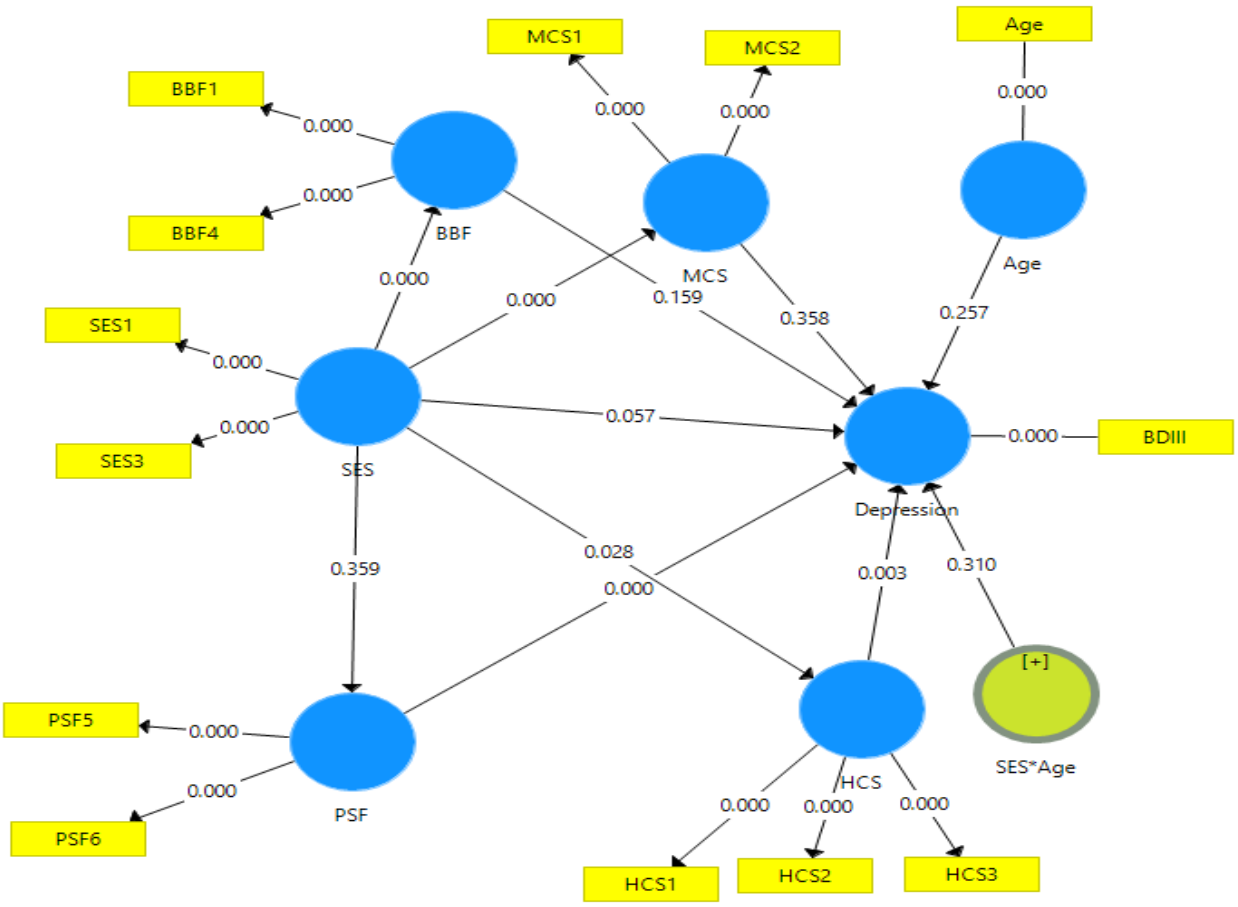
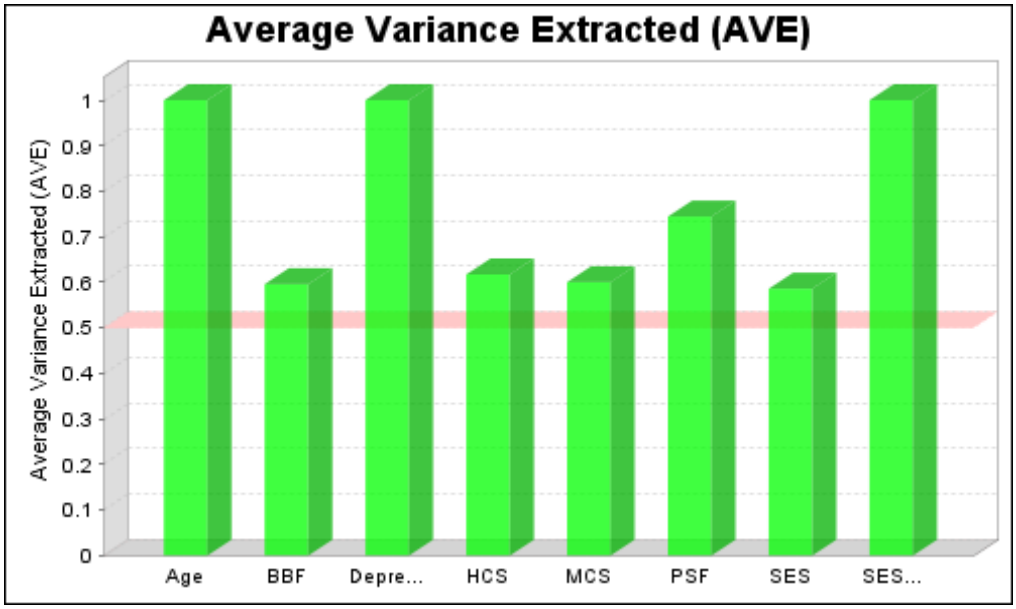
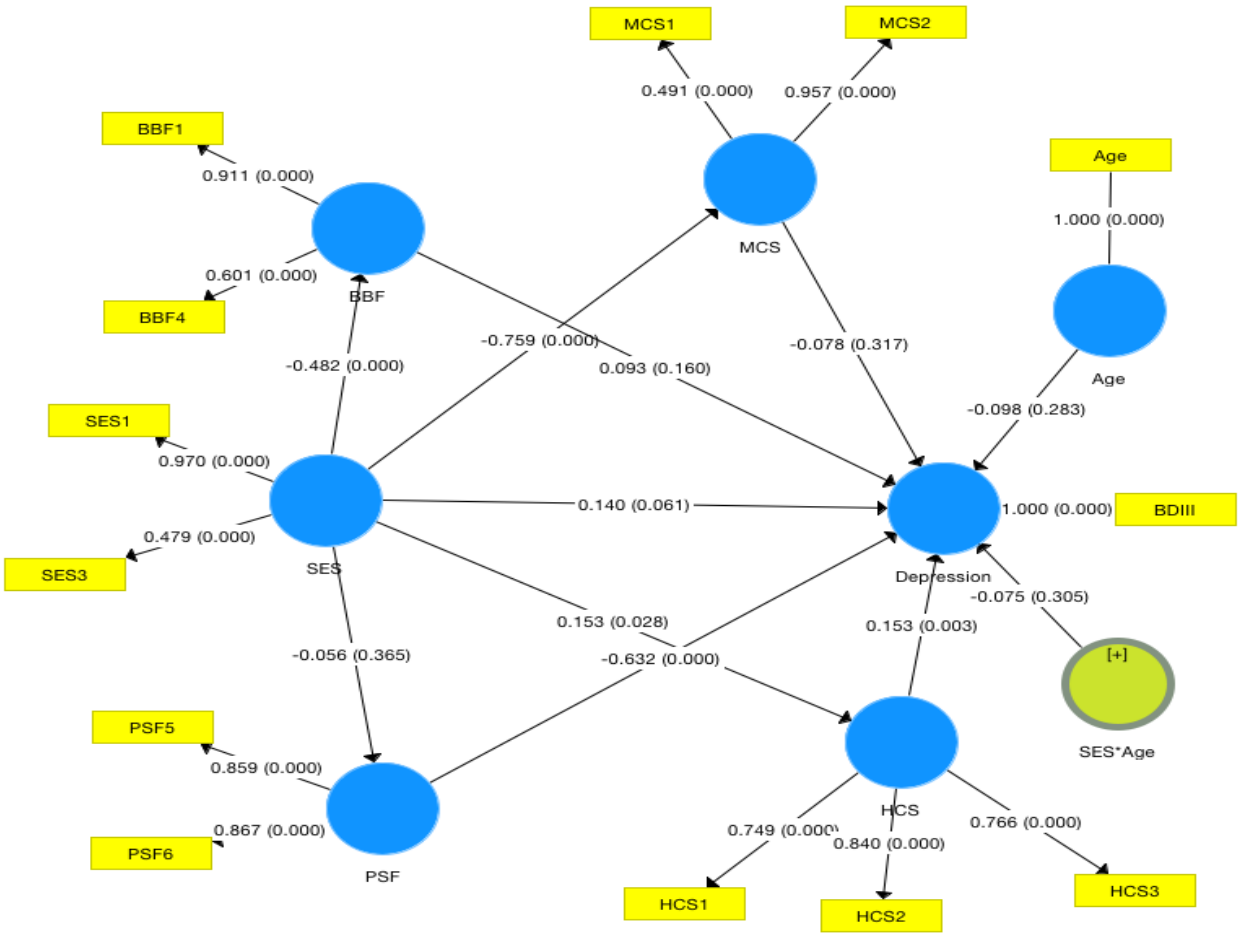


**Figure 6.** Average Variance Extracted (AVE) Diagram of Latent Variables



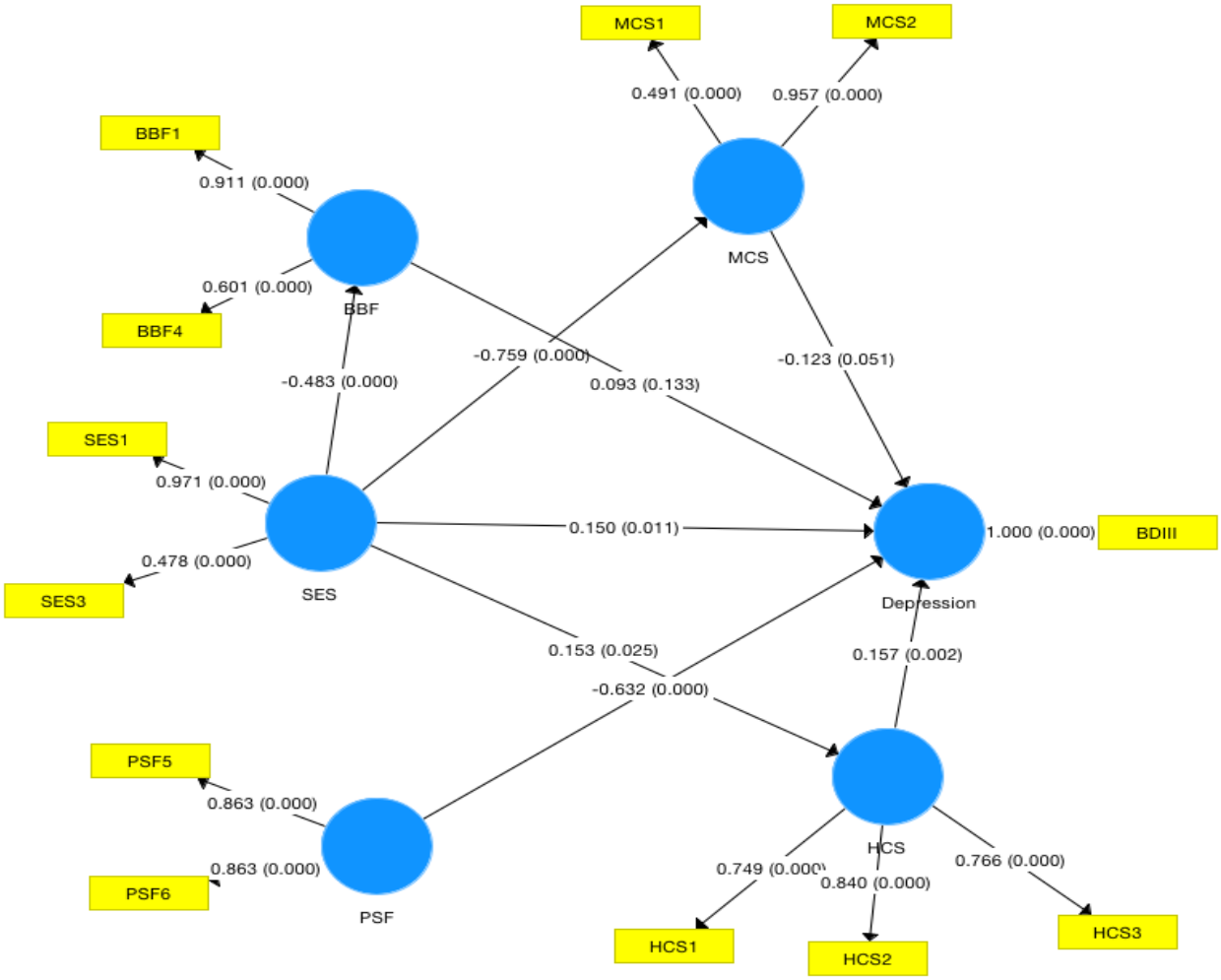

*** The last SES in the diagram represents moderating relationship (SES*age)**

**Figure 7.** The Initial (Preliminary) Model




***- Loading values and p-values are presented for measurement part of the model (Outer model)***
***- Path coefficient values (β) and p-values are presented for structural part of the model (Inner model)***

**Figure 8.** The Final Model (Parsimonious Model) and its Indicators




***- Loading values and p-values are presented for measurement part of the model (Outer model)***
***- Path coefficient values (β) and p-values are presented for structural part of the model (Inner model)***

**Figure 9.** Measurement Model Analysis Result of the Final Model

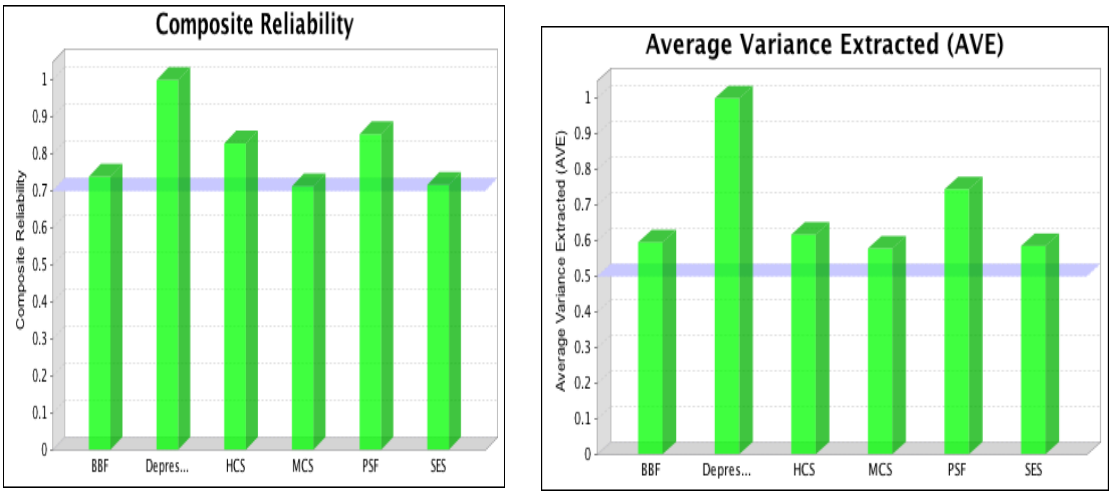



**Figure 10.** $R^2$ Result of the Final Model

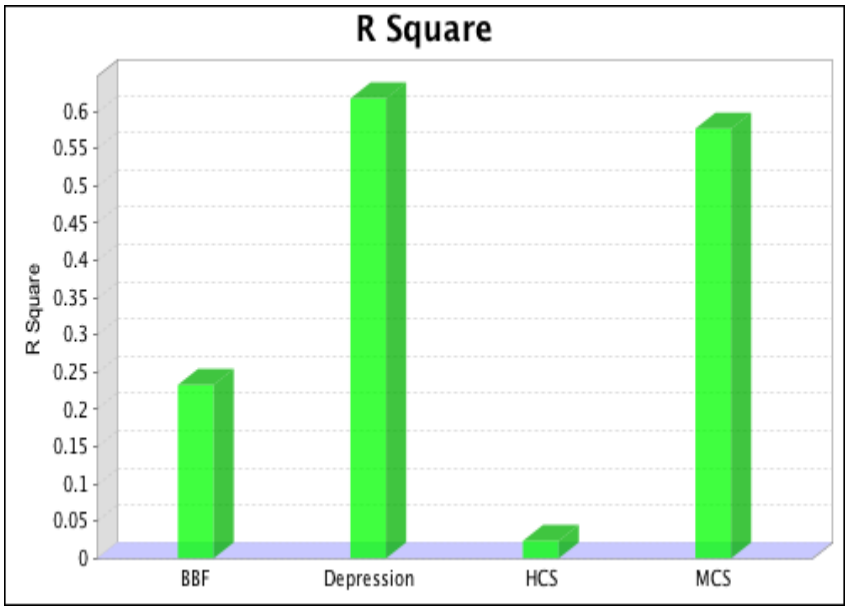


**Figure 11.** Path coefficient ($\beta$) and p-values of the Final Model after Omission of BBF4 (BMI)

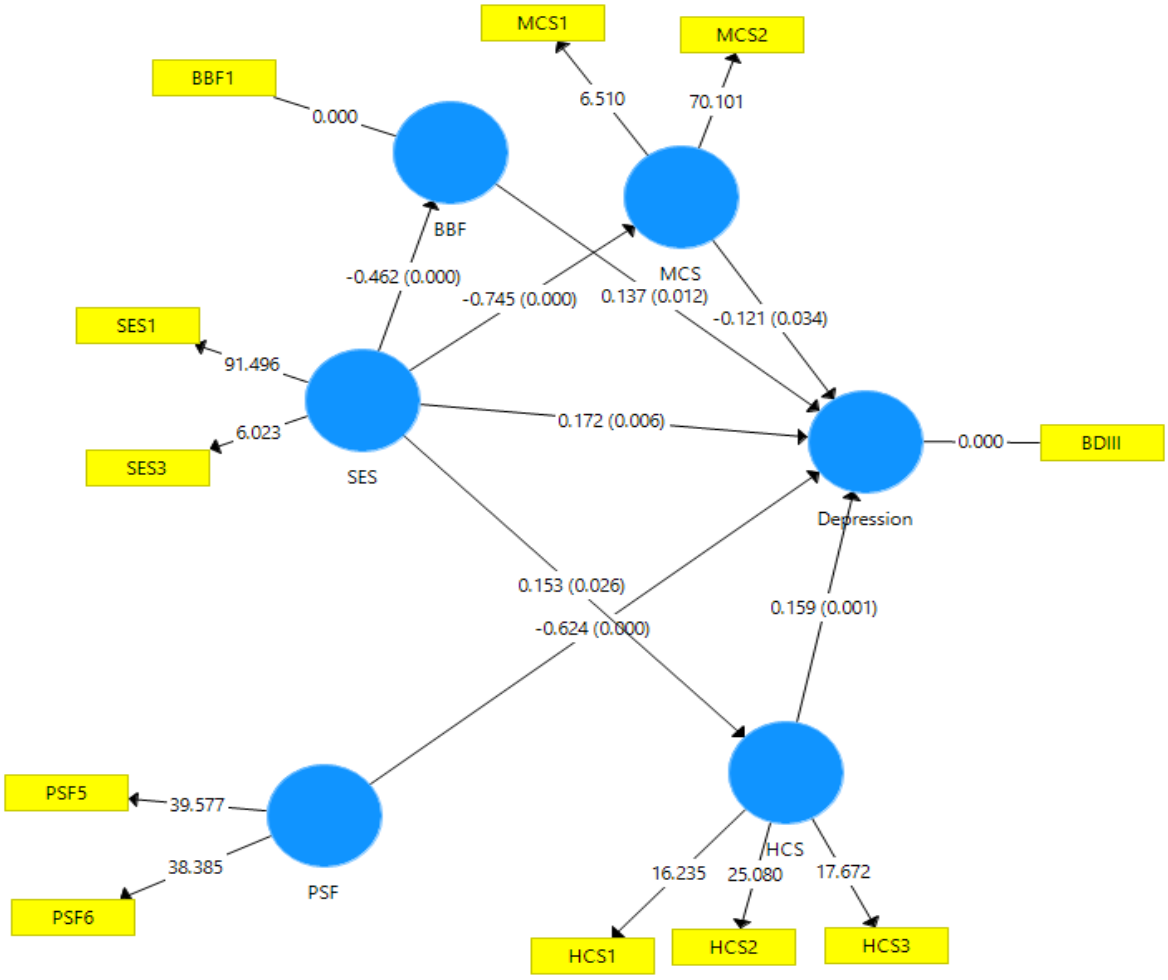


**Table 1.1.** Age & Socioeconomic (SES) Characteristics

| Age & SES Variables/Characteristics | | Frequency (N) | Percent (%) |
|---|---|---|---|
| Age (years) | 18-25 | 55 | 22.9 |
| | 26-33 | 66 | 27.5 |
| | 34-41 | 35 | 14.6 |
| | 42-49 | 25 | 10.4 |
| | 50-57 | 32 | 13.3 |
| | 58-65 | 19 | 7.9 |
| | > 65 | 8 | 3.3 |
| Years of Education | 0 (no formal education/illiterate) | 51 | 21.3 |
| | 1-6 | 38 | 15.8 |
| | 7-12 | 102 | 42.5 |
| | > 12 years (college/university) | 49 | 20.4 |
| Marital Status | Unmarried | 67 | 27.9 |
| | Married | 173 | 72.1 |
| | Single | 46 | 19.2 |
| | Married | 173 | 72.1 |
| | Divorced/Separated | 4 | 1.7 |
| | Widow | 17 | 7.1 |
| Employment | Not employed | 201 | 83.8 |
| | Employed | 39 | 16.3 |
| Monthly Family Income | < OMR 500 | 97 | 40.4 |
| | OMR 500-999 | 95 | 39.6 |
| | OMR 1000-1499 | 25 | 10.4 |
| | OMR 1500-1999 | 9 | 3.8 |
| | OMR 2000-2499 | 8 | 3.3 |
| | OMR 2500-3000 | 4 | 1.7 |
| | > OMR 3000 | 2 | 0.8 |

**Table 1.2.** Material Circumstances Characteristics

| Material Circumstances Variables/Characteristics | | Frequency (N) | Percent (%) |
|---|---|---|---|
| Family Structure | Living with extended family | 59 | 24.6 |
| | Living with nuclear family | 171 | 71.3 |
| | Living with a spouse only | 8 | 3.3 |
| | Living alone | 2 | 0.8 |
| | Living in extended family | 59 | 24.6 |
| | Other living conditions (living with nuclear family, living with a spouse only, living alone) | 181 | 75.4 |
| Number of Children | No Children | 59 | 24.6 |
| | 1-4 Children | 81 | 33.8 |
| | 5-8 Children | 52 | 21.7 |
| | > 8 Children | 48 | 20.0 |
| Place of Residence | Rural | 120 | 50.0 |
| | Urban | 120 | 50.0 |

**Table 1.3.** Bio-Behavioral Characteristics

| Bio-Behavioral Variables/Characteristics | | Frequency (N) | Percent (%) |
|---|---|---|---|
| | No Illness | 172 | 71.7 |
| | 1 illness | 48 | 20.0 |
| | > 1 illness | 20 | 8.3 |
| History of Chronic Illnesses | Diabetes | 33 | 13.8 |
| | HTN | 35 | 14.6 |
| | Cardiovascular | 4 | 1.7 |
| | Cancer | 0 | 0.0 |
| | Respiratory diseases | 11 | 4.6 |
| | Neurological disorders | 3 | 1.3 |
| | Blood disorders | 7 | 2.9 |
| History of Depressed Mood during Pregnancy | No | 203 | 84.6 |
| | Yes | 37 | 15.4 |
| Physical Activity | Not Active | 179 | 74.6 |
| | Active | 61 | 25.4 |

| | | | |
|---|---|---|---|
| BMI | Underweight (< 18.5) | 13 | 5.4 |
| | Normal weight (18.5-24.9) | 87 | 36.3 |
| | Overweight (25.0-29.9) | 73 | 30.4 |
| | Obese (≥ 30.0) | 67 | 27.9 |

**Table 1.4.** Psychosocial Characteristics

| **Psychosocial Variables/Characteristics** | | **Frequency (N)** | **Percent (%)** |
|---|---|---|---|
| Religiosity | Scores < 65 | 105 | 43.8 |
| | Scores of 65 (maximum score) | 135 | 56.3 |
| Domestic Violence | No | 236 | 98.3 |
| | Yes | 4 | 1.7 |
| Perceived Body Image | Underweight (Figure 1 and 2) | 36 | 15.0 |
| | Normal Weight (Figure 3 and 4) | 93 | 38.8 |
| | Overweight (Figures 5-7) | 104 | 43.3 |
| | Obese (Figure 8 and 9) | 7 | 2.9 |
| Perceived Ideal Body Image | Underweight (Figure 1 and 2) | 37 | 15.4 |
| | Normal Weight (Figure 3 and 4) | 139 | 57.9 |
| | Overweight (Figures 5-7) | 63 | 26.3 |
| | Obese (Figure 8 and 9) | 1 | 0.4 |
| Social Support | 84-99 | 5 | 2.1 |
| | 100-115 | 25 | 10.4 |
| | 116-131 | 58 | 24.2 |
| | 132-147 | 90 | 37.5 |
| | 148-163 | 62 | 25.8 |
| Coping | Maladaptive coping (dysfunctional-focused coping) | 44 | 18.3 |
| | Adaptive coping (emotion/problem-focused coping) | 196 | 81.7 |

**Table 1.5.** Health Care System (Access to health care) characteristics

| Access to Health Care Variables/Characteristics | | Frequency (N) | Percent (%) |
|---|---|---|---|
| Seeking Professional Help | Definitely willing | 50 | 20.8 |
| | Probably willing | 56 | 23.3 |
| | Probably not willing | 25 | 10.4 |
| | Definitely not willing | 109 | 45.4 |
| Comfort Level of Talking to a Health Care Professional | Very comfortable | 59 | 24.6 |
| | Somehow comfortable | 84 | 35.0 |
| | Not very comfortable | 52 | 21.7 |
| | Not comfortable at all | 45 | 18.8 |
| Perceived Stigma around Seeking Professional Help | No Perceived Stigma | 94 | 39.2 |
| | Low Perceived Stigma | 12 | 5.0 |
| | Some Perceived Stigma | 78 | 32.5 |
| | High Perceived Stigma | 56 | 23.3 |
| Availability of Psychiatric Clinic | No | 120 | 50.0 |
| | Yes | 120 | 50.0 |

**Table 2.** Prevalence of Depression

| Depression Categories | Frequency (N) | Percent (%) |
|---|---|---|
| Not Depressed (scores 0-13) | 188 | 78.3 |
| Depressed (scores 14-63) | 52 | 21.7 |
| No/Minimal (0-13) | 188 | 78.3 |
| Mild (14-19) | 30 | 12.5 |
| Moderate (20-28) | 16 | 6.7 |
| Severe (29-63) | 6 | 2.5 |

**Table 3.1.** Socioeconomic Characteristics of Depressed and Non-Depressed Participants

| **Socioeconomic Variables/Characteristics** | | **Total (N)** | **N (%) within depressed** | **N (%) within non-depressed** | **Chi-Square $X^2$ (P)** |
|---|---|---|---|---|---|
| Education | 0 | 51 | 6 (11.5) | 45 (23.9) | |
| | 1-6 | 38 | 5 (9.6) | 33 (17.6) | 7.331 (.062) |
| | 7-12 | 102 | 27 (51.9) | 75 (39.9) | |
| | > 12 years | 49 | 14 (26.9) | 35 (18.6) | |
| Marital Status | Unmarried | 67 | 15 (28.8) | 52 (27.7) | .029 (.866) |
| | Married | 173 | 37 (71.2) | 136 (72.3) | |
| Employment | Not employed | 201 | 39 (75.0) | 162 (86.2) | 3.735 (.053) |
| | Employed | 39 | 13 (25.0) | 26 (13.8) | |
| Monthly Family Income | < OMR 500 | 97 | 22 (42.3) | 75 (39.9) | |
| | OMR 500-999 | 95 | 20 (38.5) | 75 (39.9) | 5.036 (.539) |
| | OMR 1000-1499 | 25 | 8 (15.4) | 17 (9.0) | |
| | OMR 1500-1999 | 9 | 1 (1.9) | 8 (4.3) | |
| | OMR 2000-2499 | 8 | 0 (0.0) | 8 (4.3) | |
| | OMR 2500-3000 | 4 | 1 (1.9) | 3 (1.6) | |
| | > OMR 3000 | 2 | 0 (0.0) | 2 (1.1) | |

**Table 3.2.** Material Circumstances Characteristics of Depressed and Non-Depressed Participants

| **Material Circumstances variables/characteristics** | | **Total (N)** | **N (%) within depressed** | **N (%) within non-depressed** | **Chi-Square $X^2$ (P)** |
|---|---|---|---|---|---|
| Family structure | Living with extended family | 59 | 11 (21.2) | 48 (25.5) | 1.347 (.718) |
| | Living with nuclear family | 171 | 38 (73.1) | 133 (70.7) | |
| | Living with a spouse only | 8 | 2 (3.8) | 6 (3.2) | |
| | Living alone | 2 | 1 (1.9) | 1 (0.5) | |
| | Living with extended family | 59 | 11 (21.2) | 48 (25.5) | .421 (.516) |
| | Other living conditions | 181 | 41 (78.8) | 140 (74.5) | |
| Number of children | No children | 59 | 16 (30.8) | 43 (22.9) | 3.471 (.352) |
| | 1-4 children | 81 | 20 (38.5) | 61 (32.4) | |
| | 5-8 children | 52 | 9 (17.3) | 43 (22.9) | |
| | > 8 children | 48 | 7 (13.5) | 41 (21.8) | |
| Place of residence | Urban | 120 | 34 (65.4) | 86 (45.7) | 6.285 (.012)* |
| | Rural | 120 | 18 (34.6) | 102 (54.3) | |

**** Significant at alpha < 0.05 (2-tailed)***

**Table 3.3.** Bio-Behavioral Characteristics of Depressed and Non-Depressed Participants

| **Bio-Behavioral variables/characteristics** | | **Total (N)** | **N (%) within depressed** | **N (%) within non-depressed** | **Chi-Square $X^2$ (P)** |
|---|---|---|---|---|---|
| History of chronic illnesses | No illness | 172 | 36 (69.2) | 136 (72.3) | 4.723 (.094) |
| | 1 illness | 48 | 8 (15.4) | 40 (21.3) | |
| | > 1 illness | 20 | 8 (15.4) | 12 (6.4) | |
| History of depressed mood in pregnancy | No | 203 | 44 (84.6) | 159 (84.6) | .000 (.994) |
| | Yes | 37 | 8 (15.4) | 29 (15.4) | |
| Physical activity | Not active | 179 | 40 (76.9) | 139 (73.9) | .192 (.662) |
| | Active | 61 | 12 (23.1) | 49 (26.1) | |
| BMI | Underweight (< 18.5) | 13 | 3 (5.8) | 10 (5.3) | 4.652 (.199) |
| | Normal weight (18.5-24.9) | 87 | 25 (48.1) | 62 (33.0) | |
| | Overweight (25.0-29.9) | 73 | 11 (21.2) | 62 (33.0) | |
| | Obese (≥ 30) | 67 | 13 (25.0) | 54 (28.7) | |

**Table 3.4.** Psychosocial Characteristics of Depressed and Non-Depressed Participants

| **Psychosocial Variables/Characteristics** | | **Total (N)** | **N (%) within depressed** | **N (%) within non-depressed** | **Chi-Square $X^2$ (P)** |
|---|---|---|---|---|---|
| Religiosity | Scores less than 65 | 105 | 24 (46.2) | 81 (43.1) | .156 (.693) |
| | Scores of 65 | 135 | 28 (53.8) | 107 (56.9) | |
| Domestic Violence | No | 236 | 50 (96.2) | 186 (98.9) | 1.924 (.165) |
| | Yes | 4 | 2 (1.1) | 2 (3.8) | |
| Perceived body image | Underweight (Figure1and 2) | 36 | 10 (19.2) | 26 (13.8) | 2.370 (.499) |
| | Normal weight (Figure 3 and 4) | 93 | 22 (42.3) | 71 (37.8) | |
| | Overweight (Figures 5-7) | 104 | 18 (34.6) | 86 (45.7) | |
| | Obese (Figure 8 and 9) | 7 | 2 (3.8) | 5 (2.7) | |
| Perceived ideal body image | Underweight (Figure 1 and 2) | 37 | 6 (11.5) | 31 (16.5) | 1.128 (.770) |
| | Normal weight (Figure 3 and 4) | 139 | 31 (59.6) | 108 (57.4) | |
| | Overweight (Figures 5-7) | 63 | 15 (28.8) | 48 (25.5) | |
| | Obese (Figure 8 and 9) | 1 | 0 (0.0) | 1 (0.5) | |
| Social support | 84-99 | 5 | 3 (5.8) | 2 (1.1) | 79.033 (.000)* |
| | 100-115 | 25 | 17 (32.7) | 8 (4.3) | |
| | 116-131 | 58 | 25 (48.1) | 33 (17.6) | |
| | 132-147 | 90 | 7 (13.5) | 83 (44.1) | |
| | 148-163 | 62 | 0 (0.0) | 62 (33.0) | |
| Coping | Maladaptive coping | 44 | 36 (69.2) | 8 (4.3) | 114.858 (.000)* |
| | Adaptive coping | 196 | 16 (30.8) | 180 (95.7) | |

**** Significant at alpha < 0.05 (2-tailed)***

**Table 3.5.** Health Care System (Access to Health Care) Characteristics of Depressed and Non-Depressed Participants

| **Access to Health Care Variables/Characteristics** | | **Total (N)** | **N (%) within depressed** | **N (%) within non-depressed** | **Chi-Square $X^2$ (P)** |
|---|---|---|---|---|---|
| Seeking Professional Help | Definitely Willing | 50 | 0 (0.0) | 50 (26.6) | 47.194 (.000)* |
| | Probably Willing | 56 | 4 (7.7) | 52 (27.7) | |
| | Probably Not Willing | 25 | 15 (28.8) | 10 (5.3) | |
| | Definitely Not Willing | 109 | 33 (63.5) | 76 (40.4) | |
| Comfort level of Talking to a Health Care Professional | Very comfortable | 59 | 2 (3.8) | 57 (30.3) | 46.216 (.000)* |
| | Somehow comfortable | 84 | 8 (15.4) | 76 (40.4) | |
| | Not very comfortable | 52 | 21 (40.4) | 31 (16.5) | |
| | Not comfortable at all | 45 | 21 (40.4) | 24 (12.8) | |
| Perceived Stigma around Seeking Professional Help | No perceived stigma | 94 | 2 (3.8) | 92 (48.9) | 46.838 (.000)* |
| | Low perceived stigma | 12 | 0 (0.0) | 12 (6.4) | |
| | Some perceived stigma | 78 | 25 (48.1) | 53 (28.2) | |
| | High perceived stigma | 56 | 25 (48.1) | 31 (16.5) | |
| Availability of Psychiatric Clinic | Yes | 120 | 34 (65.4) | 86 (45.7) | 6.285 (.012)* |
| | No | 120 | 18 (34.6) | 102 (54.3) | |

**** Significant at alpha < 0.05 (2-tailed)***

**Table 3.6.** Age Characteristics of Depressed and Non-Depressed Participants

| Age Variables/Characteristics | | Total (N) | N (%) within depressed | N (%) within non-depressed | Chi-Square $X^2$ (P) |
|---|---|---|---|---|---|
| Age | 18-25 | 55 | 13 (25.0) | 42 (22.3) | 4.974 (.547) |
| | 26-33 | 66 | 19 (36.5) | 47 (25.0) | |
| | 34-41 | 35 | 8 (15.4) | 27 (14.4) | |
| | 42-49 | 25 | 3 (5.8) | 22 (11.7) | |
| | 50-57 | 32 | 5 (9.6) | 27 (14.4) | |
| | 58-65 | 19 | 3 (5.8) | 16 (8.5) | |
| | > 65 | 8 | 1 (1.9) | 7 (3.7) | |

**Table 4.1.** Bivariate Relationship between Depression (BDI-II score) and Socioeconomic Characteristics

| Socioeconomic Characteristics | | N | Mean | Mean Rank | SD | p-value (2-tailed) |
|---|---|---|---|---|---|---|
| Education | Actual education grade | | | | | .000*, r = .274 (Spearman's rho) |
| | No formal education | 51 | 7.59 | 100.42 | 5.084 | |
| | 1-6 years/grades | 38 | 6.61 | 80.61 | 7.575 | |
| | 7-12 years/grades | 102 | 10.87 | 133.51 | 7.472 | |
| | > 12 years | 49 | 11.71 | 145.24 | 6.621 | |
| Marital Status | Unmarried | 67 | 11.25 | 132.37 | 8.536 | .099 (Mann-Whitney) |
| | Married | 173 | 9.06 | 115.90 | 6.401 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Employment | Not employed | 201 | 9.18 | 116.36 | 6.654 | .036 (Mann-Whitney) |
| | Employed | 39 | 12.18 | 141.85 | 8.799 | |
| Monthly Family income | <OMR 500 | 97 | 9.43 | 117.22 | 7.594 | .380, r = .057 (Spearman's rho) |
| | OMR 500-999 | 95 | 9.63 | 119.63 | 6.806 | |
| | OMR 1000-1499 | 25 | 9.96 | 122.56 | 7.374 | |
| | OMR 1500-1999 | 9 | 11.78 | 156.67 | 4.522 | |
| | OMR 2000-2499 | 8 | 8.13 | 114.25 | 4.454 | |
| | OMR 2500-3000 | 4 | 13.50 | 138.75 | 12.369 | |
| | > OMR 3000 | 2 | 8.50 | 120.75 | 2.121 | |

***P < .001***

**Table 4.2.** Bivariate Relationship between Depression (BDI-II score) and Material Circumstances

| **Material Circumstances Characteristics** | | **N** | **Mean** | **Mean Rank** | **SD** | **p-value (2-tailed)** |
|---|---|---|---|---|---|---|
| Family Structure | Living in extended family | 59 | 9.61 | 122.49 | 6.335 | .779 (Mann-Whitney) |
| | Living in other conditions | 181 | 9.69 | 119.85 | 7.364 | |
| Number of Children | Actual number of children | | | | | .000*, r = -.250 (Spearman's rho) |
| | No children | 59 | 12.10 | 140.28 | 9.036 | |
| | 1-4 children | 81 | 10.51 | 132.48 | 6.609 | |
| | 5-8 children | 52 | 8.25 | 108.01 | 5.653 | |
| | > 8 children | 48 | 6.81 | 89.50 | 5.314 | |
| Place of Residence | Urban | 120 | 11.03 | 132.27 | 7.970 | .009 (Mann-Whitney) |
| | Rural | 120 | 8.31 | 108.73 | 5.858 | |

***P < .001***

**Table 4.3.** Bivariate Relationship between Depression (BDI-II score) and Bio-Behavioral Characteristics

| Bio-Behavioral Characteristics | | N | Mean | Mean Rank | SD | p-value (2-tailed) |
|---|---|---|---|---|---|---|
| History of Chronic Illness | No illness | 172 | 9.42 | 119.65 | 6.615 | .622, r = .032 (Spearman's rho) |
| | 1 illness | 48 | 9.71 | 115.64 | 8.305 | |
| | More than 1 illness | 20 | 11.70 | 139.50 | 8.183 | |
| History of Depressed Mood During Pregnancy | No | 203 | 9.47 | 118.45 | 7.059 | .283 |
| | Yes | 37 | 10.76 | 131.76 | 7.399 | (Mann-Whitney) |
| Physical Activity | Not Active | 179 | 9.79 | 123.18 | 6.707 | .306 |
| | Active | 61 | 9.33 | 112.65 | 8.238 | (Mann-Whitney) |
| BMI | Actual BMI score | | | | | .060, r = -.122 (Spearman's rho) |
| | Underweight | 13 | 10.15 | 125.92 | 6.706 | |
| | Normal weight | 87 | 11.26 | 137.28 | 7.379 | |
| | Overweight | 73 | 8.25 | 106.97 | 6.105 | |
| | Obese | 67 | 9.06 | 112.40 | 7.574 | |

**Table 4.4.** Bivariate Relationship between Depression (BDI-II score) and Psychosocial Characteristics

| Psychosocial Characteristics | | N | Mean | Mean Rank | SD | p-value (2-tailed) |
|---|---|---|---|---|---|---|
| Religiosity | Actual religiosity score | | | | | .546, r = -.039 (Spearman's rho) |
| | Scores < 65 | 105 | 10.06 | 122.43 | 7.780 | |
| | Score of 65 | 135 | 9.37 | 119.00 | 6.559 | |
| Domestic Violence | No | 236 | 9.51 | 119.12 | 6.947 | .018 (Mann-Whitney) |
| | Yes | 4 | 19.25 | 202.00 | 11.177 | |
| Perception of Body Image | Underweight | 36 | 10.33 | 126.76 | 6.874 | .110, r = -.104 (Spearman's rho) |
| | Normal weight | 93 | 10.49 | 128.45 | 7.491 | |
| | Overweight | 104 | 8.62 | 111.33 | 6.603 | |
| | Obese | 7 | 10.86 | 118.93 | 9.822 | |
| Perception of Ideal Body Image | Underweight | 37 | 7.46 | 98.84 | 5.231 | .567, r = .037 (Spearman's rho) |
| | Normal weight | 139 | 10.35 | 128.48 | 7.233 | |
| | Overweight | 63 | 9.54 | 116.45 | 7.637 | |
| | Obese | 1 | 5.00 | 68.00 | - | |
| | Actual social support score | | | | | .000*, r = -.601 (Spearman's rho) |
| | 84-99 | 5 | 23.00 | 190.40 | 14.967 | |
| | 100-115 | 25 | 18.56 | 200.38 | 6.935 | |
| | 116-131 | 58 | 12.43 | 156.48 | 6.024 | |
| | 132-147 | 90 | 7.37 | 99.09 | 5.464 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 148-163 | 62 | 5.77 | 80.07 | 3.107 |  |
| Coping | Maladaptive | 44 | 19.18 | 202.61 | 7.774 | .000* (Mann-Whitney) |
| | Adaptive | 196 | 7.54 | 102.07 | 4.866 | |

***P < .001***

**Table 4.5.** Bivariate Relationship between Depression (BDI-II score) and Healt Care System (Access to Health Care)

| **Access to Health Care Characteristics** | | **N** | **Mean** | **Mean Rank** | **SD** | **p-value (2-tailed)** |
|---|---|---|---|---|---|---|
| Seeking Professional Help | Definitely Willing | 50 | 6.46 | 90.18 | 3.845 | .000*, r = .292 (Spearman's rho) |
| | Probably Willing | 56 | 6.54 | 90.70 | 3.785 | |
| | Probably Not Willing | 25 | 15.32 | 184.38 | 5.445 | |
| | Definitely not Willing | 109 | 11.46 | 135.07 | 8.418 | |
| Comfort Level of Talking to a Health Care Professional | Very Comfortable | 59 | 6.31 | 86.31 | 4.264 | .000*, r = .425 (Spearman's rho) |
| | Somewhat Comfortable | 84 | 7.57 | 102.43 | 4.808 | |
| | Not Very Comfortable | 52 | 12.85 | 154.75 | 7.405 | |
| | Not Comfortable at All | 45 | 14.33 | 159.48 | 9.266 | |
| Perceived Stigma Around Seeking Professional Help | No Perceived Stigma | 49 | 6.32 | 86.30 | 3.968 | .000*, r = .428 (Spearman's rho) |
| | Low Perceived Stigma | 12 | 5.42 | 77.42 | 3.423 | |
| | Some Perceived Stigma | 78 | 11.53 | 144.05 | 6.946 | |
| | High Perceived Stigma | 56 | 13.63 | 154.34 | 8.907 | |
| Availability of Psychiatric Clinic | Yes | 120 | 11.03 | 132.27 | 7.970 | .009 (Mann-Whitney) |
| | No | 120 | 8.31 | 108.73 | 5.858 | |

***P < .001***

**Table 4.6.** Bivariate Relationship between Depression (BDI-II score) and Age

| Characteristics | | N | Mean | Mean Rank | SD | p-value (2-tailed) |
|---|---|---|---|---|---|---|
| Age | Actual age | | | | | .000*, r = -.251 (Spearman's rho) |
| | 18-25 yrs | 55 | 11.55 | 141.03 | 7.282 | |
| | 26-33 yrs | 66 | 11.68 | 138.42 | 8.420 | |
| | 34-41 yrs | 35 | 8.66 | 112.80 | 6.029 | |
| | 42-49 yrs | 25 | 6.44 | 85.50 | 5.229 | |
| | 50-57 yrs | 32 | 7.03 | 93.25 | 5.239 | |
| | 58-65 yrs | 19 | 7.68 | 100.58 | 5.991 | |
| | > 65 yrs | 8 | 10.00 | 130.88 | 4.957 | |

***P < .001***

**Table 5.1.** Results of Measurement Model Evaluation: Reliability

| Latent variable | First Iteration | | | | Final Iteration | | |
|---|---|---|---|---|---|---|---|
| | Indicators | Loading | CR | AVE | Loading | CR | AVE |
| SES | SES1 | 0.934 | | | 0.970 | 0.718 | 0.586 |
| | SES2 | -0.311 | 0.427 | 0.324 | Omitted | | |
| | SES3 | 0.468 | | | 0.482 | | |
| | SES4 | 0.328 | | | Omitted | | |
| MCS | MCS1 | 0.454 | | | 0.526 | 0.735 | 0.60 |
| | MCS2 | 0.976 | 0.545 | 0.387 | 0.961 | | |
| | MCS3 | 0.054 | | | Omitted | | |
| BBF | BBF1 | 0.838 | 0.424 | 0.323 | 0.911 | 0.739 | 0.596 |
| | BBF2 | -0.329 | | | Omitted | | |
| | BBF3 | 0.259 | | | Omitted | | |
| | BBF4 | 0.643 | | | 0.601* | | |
| PSF | PSF1 | 0.217 | | | Omitted | | |
| | PSF2 | -0.327 | | | Omitted | | |
| | PSF3 | 0.112 | 0.359 | 0.264 | Omitted | 0.854 | 0.745 |
| | PSF4 | -0.107 | | | Omitted | | |
| | PSF5 | 0.837 | | | 0.859 | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | PSF6 | 0.840 | | | 0.867 | | |
| HCS | HCS1 | 0.741 | | | 0.749 | | |
| | HCS2 | 0.825 | 0.668 | 0.461 | 0.840 | 0.829 | 0.618 |
| | HCS3 | 0.749 | | | 0.766 | | |
| | HCS4 | -0.231 | | | Omitted | | |
| Age* | Age | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Depression | BDI-II | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

**- CR = Composite Reliability, AVE: Average Variance Extracted**

*** Omitted later to enhance significance power**

**Table 5.2.** Discriminant Validity (Fornell-Larcker) Results

| | **Age** | **BBF** | **Depression** | **HCS** | **MCS** | **PSF** | **SES** | **SES*Age** |
|---|---|---|---|---|---|---|---|---|
| Age | **1.00** | | | | | | | |
| BBF | 0.541 | **0.772** | | | | | | |
| Depression | -0.23 | 0.039 | **1.00** | | | | | |
| HCS | -0.147 | 0.024 | 0.522 | **0.786** | | | | |
| MCS | 0.777 | 0.519 | -0.221 | -0.105 | **0.76** | | | |
| PSF | 0.047 | -0.122 | -0.736 | -0.516 | 0.026 | **0.863** | | |
| SES | -0.801 | -0.482 | 0.258 | 0.153 | -0.759 | -0.056 | **0.765** | |
| SES*Age | -0.649 | -0.4 | 0.073 | 0.055 | -0.363 | -0.003 | 0.531 | **1.00** |

**Table 5.3.** $R^2$ Results of Endogenous Latent Variables

| **Variable** | **$R^2$** |
|---|---|
| MCS | 0.554 |
| BBF | 0.232 |
| PSF | 0.003 |
| HCS | 0.023 |
| Depression | 0.62 |

**Table 5.4.** Path Coefficient and p-value of the Model

| | ***B*** | ***t*-values** | **P-values** |
|---|---|---|---|
| SES -> MCS | -0.744 | 24.263 | 0.000* |
| SES -> BBF | -0.482 | 9.2 | 0.000* |
| SES -> PSF | -0.056 | 0.918 | 0.359 |

| | | | |
|---|---|---|---|
| SES -> HCS | 0.153 | 2.202 | 0.028 |
| SES -> Depression | 0.143 | 1.901 | 0.057 |
| MCS -> Depression | -0.069 | 0.92 | 0.358 |
| BBF -> Depression | 0.091 | 1.409 | 0.159 |
| PSF -> Depression | -0.631 | 12.705 | 0.000* |
| HCS -> Depression | 0.152 | 2.947 | 0.003 |
| Age -> Depression | -0.098 | 1.07 | 0.283 |
| SES*Age -> Depression | -0.075 | 1.015 | 0.31 |

***P < .001***

**Table 5.5.** Measurement Model Analysis Results of the Final Model

| Variable | CR | AVE |
|---|---|---|
| SES | 0.72 | 0.59 |
| MCS | 0.71 | 0.58 |
| BBF | 0.74 | 0.6 |
| PSF | 0.85 | 0.74 |
| HCS | 0.83 | 0.62 |
| Depression | 1.00 | 1.00 |

**- CR = Composite Reliability, AVE: Average Variance Extracted**

**Table 5.6.** The Fornell-Larcker Result of Parsimonious Model

| | BBF | Depression | HCS | MCS | PSF | SES |
|---|---|---|---|---|---|---|
| BBF | **0.77** | | | | | |
| Depression | 0.04 | **1.00** | | | | |
| HCS | 0.02 | 0.52 | **0.79** | | | |
| MCS | 0.52 | -0.22 | -0.11 | **0.76** | | |
| PSF | -0.12 | -0.74 | -0.52 | 0.02 | **0.86** | |
| SES | -0.48 | 0.26 | 0.15 | -0.76 | -0.05 | **0.77** |

**Table 5.7.** Cross Loadings Result of Parsimonious Model

| | BBF | Depression | HCS | MCS | PSF | SES |
|---|---|---|---|---|---|---|
| BBF1 | **0.91** | 0.08 | 0.00 | 0.47 | -0.12 | -0.46 |
| BBF4 | 0.6 | -0.06 | 0.05 | 0.31 | -0.06 | -0.25 |
| BDIII | 0.04 | **1.00** | 0.52 | -0.22 | -0.74 | 0.26 |
| HCS1 | 0.07 | 0.33 | **0.75** | -0.01 | -0.32 | 0.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| HCS2 | 0.15 | 0.44 | **0.84** | 0.06 | -0.48 | -0.02 |
| HCS3 | -0.12 | 0.43 | **0.77** | -0.25 | -0.4 | 0.32 |
| MCS1 | 0.24 | 0.03 | 0.11 | **0.49** | -0.11 | -0.29 |
| MCS2 | 0.5 | -0.26 | -0.16 | **0.96** | 0.07 | -0.76 |
| PSF5 | -0.22 | -0.64 | -0.42 | -0.04 | **0.86** | 0.07 |
| PSF6 | 0 | -0.63 | -0.47 | 0.08 | **0.86** | -0.16 |
| SES1 | -0.51 | 0.24 | 0.16 | -0.78 | -0.05 | **0.97** |
| SES3 | -0.09 | 0.16 | 0.04 | -0.21 | -0.04 | **0.48** |

**Table 5.8.** Variance Inflation Factor (VIF) of the Final Model

| | **BBF** | **Depression** | **HCS** | **MCS** |
|---|---|---|---|---|
| BBF | | 1.45 | | |
| HCS | | 1.39 | | |
| MCS | | 2.55 | | |
| PSF | | 1.39 | | |
| SES | 1.00 | 2.47 | 1.00 | 1.00 |

**Table 5.9.** $R^2$ Result of Parsimonious Model

| **Variable** | **$R^2$** |
|---|---|
| BBF | 0.23 |
| Depression | 0.62 |
| HCS | 0.02 |
| MCS | 0.58 |

**Table 5.10.** Path Coefficient and p-value of the Final Model

| | ***β*** | ***t*-values** | **P-values** |
|---|---|---|---|
| SES -> Depression | 0.150 | 2.42 | 0.016 |
| SES -> MCS | -0.759 | 24.66 | 0.000* |
| MCS -> Depression | -0.123 | 1.97 | 0.049 |
| SES -> BBF | -0.462 | 9.16 | 0.000* |
| BBF -> Depression | 0.093 | 1.51 | 0.130 |
| SES -> HCS | 0.153 | 2.24 | 0.025 |
| HCS -> Depression | 0.157 | 3.1 | 0.002 |
| PSF -> Depression | -0.632 | 12.9 | 0.000* |

***P < .001***

**Table 5.11.** Construct Cross-Validated Redundancy ($Q^{2)}$ of the Final Model

| Variable | $Q^2$ |
|---|---|
| MCS | 0.31 |
| BBF | 0.12 |
| HCS | 0.01 |
| Depression | 0.58 |

**Table 6.1.** Direct Effect of SES on Depression without Mediators

| | ***β*** | **SD** | **T-values** | **P- values** |
|---|---|---|---|---|
| **SES -> Depression** | 0.26 | 0.05 | 5.16 | 0.000* |

***P < .001***

**Table 6.2.** Direct Effect of SES on Depression with Material Circumstance (MCS)

| | ***β*** | **SD** | **T-values** | **P- values** |
|---|---|---|---|---|
| SES -> Depression | 0.21 | 0.08 | 2.51 | 0.01 |
| SES -> MCS | -0.76 | 0.03 | 25.04 | 0.000* |
| MCS -> Depression | -0.06 | 0.09 | 0.65 | 0.51 |

***P < .001***

**Table 6.3.** Direct Effect of SES on Depression with Bio-Behavioral Factors (BBF)

| | ***β*** | **SD** | **T-values** | **P- values** |
|---|---|---|---|---|
| SES -> Depression | 0.36 | 0.06 | 6.15 | 0.000* |
| SES -> BBF | -0.48 | 0.05 | 9.51 | 0.000* |
| BBF -> Depression | 0.21 | 0.08 | 2.51 | 0.01 |

**Table 6.4.** Direct Effect of SES on Depression with Health Care System (HCS)

| | ***β*** | **SD** | **T-values** | **P- values** |
|---|---|---|---|---|
| SES -> Depression | 0.19 | 0.05 | 3.83 | 0.000* |
| SES -> HCS | 0.14 | 0.07 | 1.98 | 0.05 |
| HCS -> Depression | 0.49 | 0.05 | 10.6 | 0.000* |

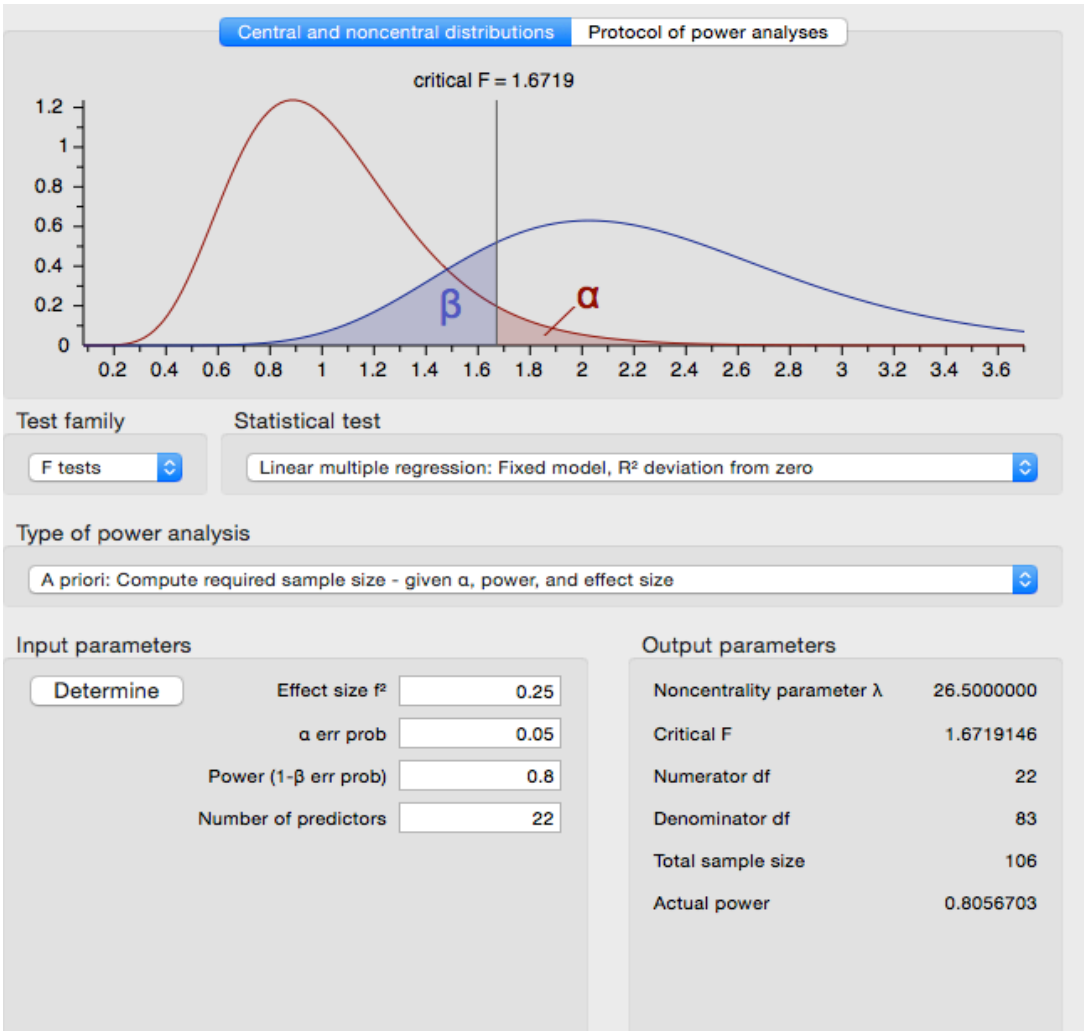
***P < .001***

**Table 6.5.** Mediation Effect of Latent Variables

| **Variables** | **Sobel test (T-values)** | **P- values** |
|---|---|---|
| MCS | 0.67 | 0.50 |
| BBF | -2.53 | 0.01 |
| PSF | 0.86 | 0.39 |
| HCS | 1.96 | 0.05 |

# Appendices

**Appendix 1.** G* Power Diagram



**Appendix 2.** Ministry of Health (MOH), Oman, Approval Letter of Study

Sultanate of Oman
Ministry of Health
Directorate General of Planning and Studies

سلطنة عمان
وزارة الصحة
المديرية العامة للتخطيط والدراسات

Ref. : MH/DGP/R&S/PROPOSAL_ APPROVED/37/2015 الرقم:

Date : 29.10.2015 التاريخ:

الموافق:

**Shawana Masad Al Harrasi**
**Principal Investigator**

Study Title: **"Predictors of Depression among Adult Omani Women in Wilayat of Rustaq ".**

**After compliments**

We are pleased to inform you that your research proposal **" Predictors of Depression among Adult Omani Women in Wilayat of Rustaq "** has been approved by Research and Ethical Review & Approve Committee, Ministry of Health.

**Regards,**

**Dr. Ahmed Mohamed Al Qasmi**
**Director General of Planning and Studies**
**Chairman, Research and Ethical Review and Approve Committee**
**Ministry of Health, Sultanate of Oman.**

**Appendix 3.1**. Study Flyer (English Version)

# ARE YOU INTERESTED IN PARTICIPATING IN A WOMEN'S HEALTH RESEARCH PROJECT?

## Participants

**Women 18 years and older living in Rustaq Villages**

## Purpose

Assess the social, financial, and cultural characteristics of Omani women and the relationship of these factors to their psychological health

## STUDY CONDUCTED BY

**Shawana Al Harrasi, RN, MSN**

**Doctoral Student, UCLA School of Nursing**

## LOCATION OF STUDY

**Confidential place selected by participant**

## FIND OUT IF YOU QUALIFY TO BE IN THIS STUDY!

## STEPS

**If you are interested in participating, the following will occur:**

1. **Complete a 60 minute questionnaire**
2. **Have your height and weight measured**

**If interested, call Shawana: between 9 am – 8 pm**

**(Mobile number: 99367472)**

**This study has been reviewed and approved by Research Ethical Review Board, University of California, Los Angeles (UCLA) and Ministry of Health (Research & Ethical Committee), Oman**

**Appendix 3.2.** Study Flyer (Arabic version)

# هل لديكٍ الرغبة بالمشاركة في مشروع بحثي عن صحة المرأة؟

**المشاركين**

**النساء بعمر ١٨ سنة وما فوق المقيمات في قرى الرستاق**

**الهدف**

**دراسة الخصائص الإجتماعية والإقتصادية وثقافة المجتمع، وتأثيرها على الصحة النفسية للمرأة العمانية**

**ستجري الدراسة**

**شوانة الحراصي، بكالوريوس وماجستير تمريض**

**طالبة دكتوراة، جامعة كالفورنيا ـ لوس أنجلوس (كلية التمريض)**

**موقع الدراسة**

**المرأة المشاركة لها حرية إختيار مكان إجراء الدراسة**

**إعرفي إذا كنتٍ مؤهلة للمشاركة في هذه الدراسة**

**الخطوات**

**إذا كنت مهتمة بالمشاركة، فسيحدث التالي:**

**١ـ تعبئة إستبيان لمدة ٦٠ دقيقة**

**٢ـ أخذ قياس الطول والوزن**

**إذا كنتِ مهتمة بالمشاركة،برجاء التواصل مع:شوانة الحراصي**

**رقم الهاتف: ٩٩٣٦٧٤٧٢ (٨ صباحا ـ ٩ مساء)**

**هذا البحث تمت مراجعته والموافقة عليه من قبل مجلس مراجعة البحوث بجامعة كالفورنيا، لوس أنجلوس (الولايات المتحدة الإمريكية) ومديرية الدراسات البحوث بوزارة الصحة ( سلطنة عمان)**

**Appendix 4.1.** Eligibility Screening Consent Form (English version)

University of California, Los Angeles

**CONSENT TO PARTICIPATE IN ELIGIBILITY SCREENING**

Psychological health of adult Omani women

My name is (Shawana Al Harrasi), and I am a doctoral student at the University of California, Los Angeles (UCLA), School of Nursing, and a nursing tutor in Rustaq Nursing Institute (Ministry of Health, Oman). I would like to evaluate your eligibility to participate in this study.

**Why is this study being done?**

We are doing this study to know the effects of social, economic, and cultural factors on depression among Omani women. By conducting this study, we will learn factors that positively and negatively affect depression in Omani women.

**What will happen if I take part in this screening?**

If you voluntarily agreed to be screened for eligibility to participate in the study, I will ask you to do the following:

- Allow me to assess if you are qualify to participate in the study by asking you few questions on the eligibility screening form.

I will personally notify you about whether you are qualified or not to participate in the study.

**How long will I be in the research study?**

Completing the questions in the eligibility screening form will take 5 minutes as maximum.

**Are there any potential risks or discomforts that I can expect from screening?**

Screening for eligibility involves only the answering of few questions. There are no invasive procedures or assessments for screening. There are no anticipated risks or discomforts by participating in the eligibility screening.

**Are there any potential benefits if I participate?**

Determining if you are qualified to join this study will not have direct benefits to you.

**Will information about my participation and me be kept confidential?**

The information you provided for eligibility screening will remain confidential and secured. Confidentiality of the information will be ensured by giving a code number to the form. The form will be kept secured in a locked file cabinet.

**What are my rights if I take part in this screening?**

- You can choose not to participate in this screening, and you may withdraw your consent for eligibility screening at any time.
- If you decided not to participate or discontinue your participation, there will be no penalty to you and your medical care will not be affected by your decision.

**Who can I contact if I have questions about the screening or the study?**

If you want to know more about this study or if you have a question or concern about it, you may contact the principle investigator (Shawana Al Harrasi): mobile Number (99367472); E-mail address: alharrasi.shawana@gmail.com

You may also express your concern or any problems about the study by contacting the Directorate of Studies and Research of Ministry of Health (Oman), telephone number (24601161) or mail them at P.O. Box 393; Postal Code 100; Muscat, Oman

**SIGNATURE OF SCREENING PARTICIPANT**

_____

Name of Participant

_____ _____

Signature of Participant Date

**SIGNATURE OF PERSON OBTAINING CONSENT**

_____ _____

Name of Person Obtaining Consent Contact Number

_____ _____

Signature of Person Obtaining Consent Date

**Appendix 4.2.** Eligibility Screening Consent Form (Arabic version)

جامعة كاليفورنيا، لوس أنجلوس

**عقد المشاركة في فحص الأهلية**

الصحة النفسية للنساء العمانيات البالغات

إسمي شوانة الحراصي، طالبة دكتوراة بجامعة كاليفورنيا، لوس أنجلوس، بكلية التمريض، وكذلك أعمل مدرسة علوم تمريض في معهد الرستاق للتمريض التابع لوزارة الصحة بسلطنة عمان. أرغب في تقييم أهليتكِ للمشاركة في هذه الدراسة.

**لماذا يجري القيام بهذه الدراسة؟**

نقوم بهذه الدراسة لمعرفة تأثيرات العوامل الاجتماعية والاقتصادية وتقافة المجتمع على الصحة النفسية للمرأة العمانية. من خلال إجراء هذه الدراسة سنتمكن من التعرف على العوامل التي قد تؤثر إيجاباً وسلباً على الإكتئاب عند المرأة العمانية.

**ماذا سيحدث إذا شاركت في هذا التقييم؟**

إذا وافقتِ طوعاً بإجراء فحص لأهليتكِ للمشاركة في الدراسة، فسوف أطلب منكِ القيام بالآتي:

- السماح لي بفحص إذا كنتِ مؤهلة للمشاركة بهذه الدراسة وذلك من خلال طرح بعض الأسئلة عليكِ في إستمارة فحص الأهلية

سأقوم شخصياً بإعلامكِ إذا كنتِ مؤهلة أم لا للمشاركة في الدراسة.

**كم الفترة التي سأقضيها في هذا الفحص؟**

لإكمال أسئلة الفحص ستحتاجين إلى مدة لا تزيد عن 5 دقائق.

**هل هنالك أي مخاطر يمكن أن اتوقعها من الفحص؟**

فحص أهلية المشاركة يتضمن فقط الإجابة عن بعض الأسئلة. لن يكون هناك أي إجراء سريري أو فحوصات طبية خلال الفحص. لي هناك أي مخاطر متوقعة أو شعور بعدم الراحة بسبب المشاركة في الفحص.

**هل هنالك أي فوائد متوقعة من المشاركة؟**

تحديد إذا كنتِ مؤهلة للمشاركة في الدراسة لن يعود عليكِ بفائدة مباشرة.

**هل سيتم الإلتزام بسرية المعلومات المتعلقة بمشاركتي وبي؟**

جميع المعلومات التي ستقدميها خلال الفحص ستضل سرية ومحمية. سيتم الإلتزام بسرية المعلومات من خلال ترميز إستمارة الفحص. كما ستحفظ الإستمارة في كابينة ملفات مقفلة.

**ما هي حقوقي إذا شاركت في هذا الفحص؟**

- يمكنك إختيار عدم المشاركة في هذا الفحص، أو سحب موافقتك الموقعة في أي وقت.
- إذا قررتِ عدم المشاركة أو وقف مشاركتكِ، سوف لن يكون هناك أي إجراء عقابي عليكِ وسوف لن تتاثر الخدمة الصحية المقدمة لكِ.

**بمن يمكنني الإتصال إذا كان لدي أسئلة عن الفحص أو الدراسة؟**

إذا أردتِ معرفة المزيد عن هذه الدراسة، أو كان لديكِ أي إستفسار عنها ، يمكنكِ التواصل مع الباحث المسؤول (شوانة الحراصي): رقم الهاتف (٩٩٣٦٧٤٧٢)،

البريد الإلكتروني alharrasi.shawana@gmail.com

كما يمكنكِ التعبير عن أي مشاكل أو مخاوف لديكِ قيما يتعلق بهذه الدراسة بالتواصل مع مديرية الدراسات والبحوث في وزارة الصحة (سلطة عمان): رقم الهاتف (٢٤٦٠١١٦١) أو التواصل بريديا على العنوان: ص.ب: ٣٩٣، الرمز البريدي ١٠٠، مسقط

**توقيع المشارك بالفحص**

_____

**أسم المشارك**

_____ _____

**توقيع المشارك** **التاريخ**

**توقيع الشخص الحاصل على الموافقة**

_____ _____

**أسم الشخص** **رقم التواصل (الهاتف)**

_____ _____

**التوقيع** **التاريخ**

**Appendix 5.1.** Eligibility Screening Form (English Version)

University of California, Los Angeles

**Eligibility SCREENING FORM FOR RESEARCH**

Psychological health of adult Omani women

Thank you for your interest regarding the research study.

I need to ask you a few questions in order to determine whether you may be eligible for the research. I will ask you a few questions about your age, citizenship, current pregnancy or if post-natal, and if taking any prescribed medication for depression. Before I begin I would like to tell you a little bit about the research.

We are doing this study to know the effects of social, economic, and cultural factors on depression among Omani women. By conducting this study, we will learn factors that positively and negatively affect depression in Omani women.

Would you like to continue with the 5 minute screening?

☐ Yes [If yes-continue with the screening].

☐ No [If no thank person for their time, end screening.

You do not have to answer any questions you do not wish to answer and you may stop at any time. Your participation in the screening is voluntary. A decision whether or not to participate in the screening will not affect your relationship with UCLA, or _____[name of health care facility]. You will not directly benefit from the screening. Compensation will be provided for any travel costs incurred.

Your answers will be confidential. No one will know the answers except for the researcher team. If you are not eligible for the study, the screen will be destroyed. If eligible, your answers to the screen will not be linked to the other study data and will be kept confidential. Please know that we will destroy the screen at the end of the study.

Can we proceed with answering screening questions?

Please answer the following questions:

1) How old are you? _____

2) What is your citizenship/nationality? _____

3) Are you currently pregnant? ( ) Yes [**If yes, skip Q.4**] ( ) No

4) Are you currently in a postnatal period (first 6 weeks of delivery)? ( ) Yes ( ) No

5) Are you taking any prescribed drugs for depression? ( ) Yes ( ) No

6) Please state the following:

Today date: _____ current month: _____ current year: _____

Name of your village: _____

Thank you for participating in this screening. We will inform you if you are eligible for participation in the study.

**Who can I contact if I have questions about the screening or the study?**

If you want to know more about this study or if you have a question or concern about it, you may contact the principle investigator (Shawana Al Harrasi): mobile Number (99367472); E-mail address: alharrasi.shawana@gmail.com

You may also express your concern or any problems about the study by contacting the Directorate of Studies and Research of Ministry of Health (Oman), telephone number (24601161) or mail them at P.O. Box 393; Postal Code 100; Muscat, Oman

**Appendix 5.2.** Eligibility Screening Form (Arabic Version)

جامعة كاليفورنيا، لوس أنجلوس

**عقد المشاركة في فحص الأهلية**

الصحة النفسية للنساء العمانيات البالغات

شكرا لإهتمامكٍ بهذا البحث العلمي .

أريد أن أسألك بعض الأسئلة لكي نحدد ما إذا كنتٍ مؤهلة للمشاركة بهذا البحث. سأسألك بعض الأسئلة عن عمرك، جنسيتك، إذا كنت حامل حاليا أو في فترة النفاس، وإذا كنت تأخذين أي وصفة طبية للإكتئاب. قبل أن أبدأ، أود أن أخبرك قليلاعن هذا البحث.

نحن نقوم بهذه الدراسة لمعرفة تأثيرات العوامل الاجتماعية والاقتصادية وثقافة المجتمع على الصحة النفسية للمرأة العمانية. من خلال إجراء هذه الدراسة سنتمكن من التعرف على العوامل التي قد تؤثر إيجاباً وسلباً على الإكتئاب عند المرأة العمانية.

هل تحبين أن المتابعة بإجراء الفحص لمدة ٥ دقائق؟

☐ نعم (إذا نعم، المواصلة بإجراء الفحص)

☐ لا (إذا لا تقديم الشكر للنساء لوقتهم، إنهاء الفحص)

ليس عليكٍ الإجابة عن أي سؤال لا ترغبين بالإجابة عليه، ويمكنكٍ التوقف عي أي وقت. مشاركتكٍ في هذا الفحص طوعي. القرار بمشاركتك أوعدم مشاركتكٍ في الفحص لن يؤثر على علاقتك بجامعة كاليفورنيا ـ لوس أنجلوس أو
_____ (أسم المركز/ المجمع الصحي). سوف لن تكون هناك إستفادة مباشرة لكٍ من الفحص. سيتم دفع مبلغ مادي لكٍ كتعويض للمواصلات التي قد تكوني دفعتيها.

إجاباتك ستكون سرية. لن يستطيع أحد معرفة إجاباتكٍ ما عدا أعضاء البحث. إذا كنت غير مؤهلة لهذه الدراسة، سيتم التخاص نهائيا من الفحص. أذا كنت مؤهلة، لن يتم ربط إجاباتكٍ للبيانات الأخرى لهذه الدراسة، وستبقى سرية.

هل يمكننا الآن المتابعة في هذا التقييم وذلك بالإجابة عن الإسئلة الواردة بالفحص؟ (إذا كان الفحص يتم عن طريق الهاتف)

الرجاء الإجابة عن الأسئلة التالية:

1) كم تبلغين من العمر؟ _____

2) ما هي جنسيتكِ؟ _____

3) هل أنتِ حاملٌ حالياً؟ نعم ( ) [إذا نعم، تخطي السؤال ٤] لا ( )

4) هل أنتٍ حالياً في فترة نفاس ( ٦ أسابيع الأولى للولادة)؟ نعم ( ) لا ( )

5) هل تتناولين حاليا أدوية طبية لمرض الإكتئاب؟ نعم ( ) لا ( )

6) الرجاء ذكر الآتي:

اليوم: _____ الشهر الحالي:_____ السنة الحالية: _____

أسم قريتكِ: _____

شكراً لكِ للمشاركة في هذا الفحص، وسوف نعلمكِ إن كنتِ مؤهلة للمشاركة في هذه الدراسة.

**بمن يمكنني الإتصال إذا كان لدي أسئلة عن الفحص أو الدراسة؟**

إذا أردتٍ معرفة المزيد عن هذه الدراسة أو إذا كان لديك أي إستفسار، تعليقات، أو مخاوف عن هذه الدراسة ،الرجاء الإتصال ب: شوانة الحراصي (رقم الهاتف: ٩٩٣٦٧٤٧٢)،

البريد الإلكتروني: alharrasi.shawana@gmail.com

يمكنكٍ أيضا التعبير عن مخاوفكٍ أو أي مشاكل متعلقة بهذه الدراسة، بالإتصال بمديرية الدراسات والبحوث بوزارة الصحة رقم الهاتف (٢٤٦٠١١٦١) أو التواصل بريديا على العنوان: ص.ب: ٣٩٣، الرمز البريدي ١٠٠، مسقط

**Appendix 6.1.** Study Consent Form (English version)

University of California, Los Angeles

**CONSENT TO PARTICIPATE IN RESEARCH**

Psychological Health of Adult Omani women

My name is (Shawana Al Harrasi), and I am a doctoral student at the University of California, Los Angeles (UCLA), School of Nursing, and a nursing tutor in Rustaq Nursing Institute (Ministry of Health, Oman). Thank you for participating in this research. You were selected as a participant in this research because you are an Omani adult women living in one of Rustaq's Villages. Your participation in this research is voluntary.

**Why is this study being done?**

The purpose of this study is to learn about the effects of social, cultural, physical, and economic factors on depression among adult Omani women. The study will assist in determining the factors that positively and negatively influence depression in Omani women.

**What will happen if I take part in this research study?**

You will be asked to fill questionnaires for one time. Additionally, the researcher will measure your height and weight. By agreeing to participate, you also agree to provide honest answers to the research's questions.

**How long will I be in the research study?**

This research will take approximately 60 minutes of your time. There will be no contact or follow-up with you after completion of the study.

**Are there any potential risks or discomforts that I can expect from this study?**

There are no anticipated risks, however, it is expected that you may have minor emotional discomforts such as sadness and minimal distress during the study. There is no clinical procedure or intervention during the study.

**Are there any potential benefits if I participate?**

There will be no clinical benefits from participation in this research. However, you will be compensated for transportation or other costs incurred. The result of this research will help us to understand the risk factors of psychological disorders in Omani women.

**Will information about me and my participation be kept confidential?**

Any information that is obtained in connection with this study and that can identify you will remain confidential. A code number will be assigned to your questionnaires, and all your data will be stored in a locked cabinet, and only my advisor (research mentor) and I can access it.

**What are my rights if I take part in this study?**

- You can choose to participate or not in this study; and you may withdraw your consent and discontinue participation at any time during the study.
- Whatever decision you make, there will be no penalty to you.
- You may refuse to answer any questions that you do not want to answer and still remain in the research.

**Who can I contact if I have questions about this study?**

If you have any questions, comments or concerns about the research, please contact:

Mrs. Shawana Al Harrasi (Phone 99367472), E-mail address: alharrasi.shawana@gmail.com

If you have questions about your rights while taking part in this research, or you have concerns or suggestions and you want to talk to someone other than the researcher about the study, please call the Directorate of Studies and Research of Ministry of Health (Oman), telephone number (24601161) or mail them at P.O. Box 393; Postal Code 100; Muscat, Oman

**SIGNATURE OF STUDY PARTICIPANT**

_____

Name of Participant

_____ _____

Signature of Participant Date

**SIGNATURE OF PERSON OBTAINING CONSENT**

_____ _____

Name of Person Obtaining Consent Contact Number

_____ _____

Signature of Person Obtaining Consent Date

**Appendix 6.2.** Study Consent Form (Arabic version)

جامعة كاليفورنيا، لوس أنجلوس

**عقد المشاركة في الدراسة**

الصحة النفسية للنساء العمانيات البالغات

إسمي شوانة الحراصي، طالبة دكتوراة بجامعة كاليفورنيا، لوس أنجلوس، بكلية التمريض، وكذلك أعمل مدرسة علوم تمريض في معهد الرستاق للتمريض التابع لوزارة الصحة بسلطنة عمان. شكرا لقبولكم المشاركة في هذه الدراسة. تم إختياركم للمشاركة في هذا البحث لأنكم نساء عمانيات بالغات. مشاركتكم في هذا البحث طواعية.

**لماذا يجري القيام بهذه الدراسة؟**

الهدف من هذه الدراسة هو لمعرفة تأثير العوامل الإجتماعية والإقتصادية والجسدية وثقافة المجتمع على الإكتئاب عند المرأة العمانية. الدراسة ستساعدنا في معرفة العوامل التي لها تأثير إيجابي وسلبي على الإكتئاب عند المرأة العمانية.

**ماذا سيحدث إذا شاركت في هذه الدراسة؟**

سوف يطلب منك ملأ إستبيان وذلك لمرة واحدة. بالإضافة لذلك، فسيقوم البحث بقياس طولك ووزنك. من خلال موافقتك على المشاركة ، فأنك توافق على تقديم إجابات صادقة على أسئلة الدراسة.

.

**كم المدة التي سأقضيها في هذا الدراسة؟**

سوف يستغرق هذا البحث حوالي 45 الى 60 دقيقة من وقتك. سوف لن يكون هناك أي إتصال معكِ أو متابعة بعد الإنتهاء من هذه الدراسة.

**هل هنالك أي مخاطر يمكن أن اتوقعها من الدراسة؟**

ليست هناك أي مخاطر متوقعة،ولكن من المحتمل أن تشعرين بقليل من أعراض عدم الراحة كالحزن والقلق البسيط.لا يتضمن البحث أي إجراء سريري أو تدخل علاجي.

**هل هنالك أي فوائد متوقعة من المشاركة؟**

سوف لن تكون هناك فوائد سريرية من المشاركة في هذا البحث ولكن سيتم دفع مبلغ مادي لكٍ كتعويض للمواصلات أو لأي مصروفات أخري دفعتيها للمشاركة في هذا البحث. نتائج هذا البحث سوف تساعدنا على فهم العوامل المساعدة للإضطرابات النفسية عند المرأة العمانية.

**هل سيتم الإلتزام بسرية المعلومات المتعلقة بمشاركتي وبي؟**

أي معلومات يتم الحصول عليها من هذه الدراسة عنكِ والتي يمكن من خلالها التعرف عليكِ ستبقى سرية. سيتم تخصيص رمز لورقة إجاباتك،وسيتم حفظ جميع بياناتكِ في كابينة مقفلة، يستطيع الوصول إليها مرشدي الدراسي وأنا فقط.

**ما هي حقوقي إذا شاركت في هذا الفحص؟**

- يمكنك إختيار المشاركة أو عدم المشاركة في هذه الدراسة، كما يمكنك سحب موافقتك على المشاركة والإنسحاب في أي وقت خلال فترة الدراسة.
- أيا كان قرارك، فإنك لن تواجه أي عقوبة.
- يمكنك رفض الإجابة عن أي سؤال لا تريد الإجابة عليه، وستبقى كمشارك في الدراسة.

**بمن يمكنني الإتصال إذا كان لدي أسئلة عن الدراسة؟**

إذا كان لديك أي إستفسار، تعليقات، أو مخاوف عن هذه الدراسة ،الرجاء الإتصال ب: شوانة الحراصي (رقم الهاتف: ٩٩٣٦٧٤٧٢)،

البريد الإلكتروني: alharrasi.shawana@gmail.com

إذا كان لديك أي إستفسار عن حقوقك خلال مشاركتك في هذه الدراسة، أو كانِ لديك مخاوف أو مقترحات وتريدين التحدث مع شخص آخر غير الباحث، فيرجى الإتصال بمديرية الدراسات والبحوث بوزارة الصحة

رقم الهاتف (٢٤٦٠١١٦١) أو التواصل بريديا على العنوان: ص.ب: ٣٩٣، الرمز البريدي ١٠٠، مسقط

**توقيع المشارك بالدراسة**

_____

**أسم المشارك**

_____ _____

**توقيع المشارك** **التاريخ**

**توقيع الشخص الحاصل على الموافقة**

_____ _____

**أسم الشخص** **رقم التواصل (الهاتف)**

_____ _____

**توقيع الشخص** **التاريخ**

**Appendix 7.1.** Socioeconomic & Health-Related Information (English version)

**The following questions are placed to obtain general social and economic information. Please circle the appropriate response or write the appropriate answer for each of the these questions:**

Q1. How old are you?

a. I am _____ years old

Q2. What is the highest education grade you attained? _____

Q3. What is your marital status?

a. Single
b. Married
c. Divorced/separated
d. Widowed

Q4. How many children do you have? (***If single leave the question blank***)

I have _____ children

Q5. Which of the following statement describe your living condition?

a. I live alone
b. I live with my husband
c. I live in a nuclear family
d. I live in an extended family

Q6. Do you currently have a job with salary?

a. Yes
b. No

Q7. What is the monthly income of your family?

a. Less than OMR 500
b. OMR 500-999
c. OMR 1000-1499
d. OMR 1500-1999
e. OMR 2000-2499
f. OMR 2500-3000
g. More than OMR 3000

**The following questions are placed to attain information about your physical and psychological health. Please circle or write the appropriate answer for each of the these questions:**

Q8. How many times in the past 7 days have you engaged in moderate-intense exercise (e.g. brisk walking, swimming) for at least 30 minutes?

a. Never
b. 1-4 times
c. More than 4 times
d. Daily

Q9. How many times in the past 7 days you engaged in vigorous exercise (e.g. running, extended fast walking, jogging, intense gymnastic activities, ball sports) for at least 20 minutes?

a. Never
b. 1-3
c. More than 3 times
d. Daily

Q10. Have you been diagnosed with any of the following diseases?

- Diabetes a. Yes b. No

- Hypertensive blood pressure a. Yes b. No

- Coronary artery/Heart diseases a. Yes b. No

- Cancer a. Yes b. No

- Respiratory diseases a. Yes b. No

- Neurological diseases a. Yes b. No

- Blood disorders (e.g. Sickle Cell Disease, Thalassemia) a. Yes b. No

Q11. Did you experience any episodes of excessive sadness, hopelessness, or depressed mood during your pregnancy?

a. Yes
b. No

Q12. Did you experience any type of physical abuses (e.g. kicking, hard pushing, threatening with a sharp object, throwing, slapping, attacking with stick and/or belt, attacking with sharp object, strangulation, hard pulling of your hair intending to harm you) from your spouse or another close family member during the past 12 months?

a. Yes
b. No

Q13. If you have serious emotional or psychological problem/concerns, would you go to see psychological/mental health professionals?

a. Definitely
b. Probably
c. Probably not
d. Definitely not

Q14. How comfortable you will feel talking to a health care professional about emotional/mental problems/concerns?

a. Not comfortable at all
b. Not very comfortable
c. Somewhat comfortable
d. Very comfortable

Q15. How embarrassed would you be if people in your community knew you were Getting professional help for an emotional or psychological problem?

a. Very embarrassed
b. Somewhat embarrassed
c. Not very embarrassed
d. Not at all embarrassed

Q16. Does the health center that served your village include psychology or psychiatric clinic?

a. Yes
b. No

**Appendix 7.2.** Socioeconomic & Health-Related Information (Arabic version)

**الأسئلة التالية وضعت للحصول على معلومات عامة عن وضعك الإجتماعي والإقتصادي. الرجاء وضع دائرة حول الإجابة المناسبة أو كتابة الإجابة المناسبة لكل سؤال من هذه الأسئلة:**

1. كم تبلغين من العمر؟

   عمري_____ سنة

2. ما أعلى مستوى دراسي وصلتِ إليه؟ _____

3. ما هي حالتكِ الإجتماعية؟
   a) عزباء
   b) متزوجة
   c) مطلقة/منفصلة
   d) أرملة

4. كم عدد أبنائكِ؟ (أترك السؤال فارغاً إذا كنتِ عزباء)
   لدي _____ أبناء

5. أي من الجمل التالية تصف وضعكِ المعيشي؟
   a) أعيش لوحدي
   b) أعيش مع زوجي
   c) أعيش في أسرة صغيرة (مع زوجي وأبنائي أو مع والدي فقط)
   d) أعيش في أسرة كبيرة (ممتدة)

6. هل لديكِ حاليا وظيفة براتب؟
   a) نعم
   b) لا

7. كم يبلغ الدخل الشهري لأسرتك؟
   a) أقل من 500 ريال عماني
   b) 500 999 ريال عماني
   c) 1000 1499 ريال عماني
   d) 1500 1999 ريال عماني
   e) 2000 2499 ريال عماني

f) 2500 3000 ريال عماني
g) أكثر من 3000 ريال عماني

**الأسئلة التالية وضعت للحصول على معلومات عامة عن وضعك الصحي والنفسي. الرجاء وضع دائرة حول الإجابة المناسبة أو كتابة الإجابة المناسبة لكل سؤال من هذه الأسئلة:**

8. كم مرة في السبعة (7) أيام الماضية مارستِ الرياضة المعتدلة (على سبيل المثال: المشي السريع، السباحة) لمدة لا تقل عن 30 دقيقة؟
   a) أبدا
   b) 1 4 مرات
   c) أكثر من 4 مرات
   d) يوميا

9. كم مرة في السبعة (7) أيام الماضية مارستِ الرياضة القوية (على سبيل المثال: الجري/الركض، المشي السريع لمسافات طويلة، أنشطة الجمباز الشديدة، رياضات الكرة) لمدة لا تقل عن 20 دقيقة؟
   a) أبدا
   b) 1 3 مرات
   c) أكثر من 3 مرات
   d) يوميا

10. هل تم تشخيصكِ بأي من الأمراض الاتية؟

| | | |
|---|---|---|
| a) السكري | a) نعم | b) لا |
| b) ضغط الدم | a) نعم | b) لا |
| c) أمراض الشرايين/أمراض القلب | a) نعم | b) لا |
| d) السرطان | a) نعم | b) لا |
| e) أمراض التنفس | a) نعم | b) لا |
| f) أمراض الأعصاب | a) نعم | b) لا |
| g) أمراض الدم (مثال: الأنيميا المنجلية، الثلاسيميا) | a) نعم | b) لا |

11. هل عانيتِ من حالات حزن شديدة، يأس، أو مزاج مكتئب خلال فترة حملكِ؟
   a) نعم
   b) لا

12. هل واجهتِ أي نوع من العنف الجسدي (على سبيل المثال: الركل، الدفع بقوة، التهديد بأداة حادة، الرمي على الأرض، الصفع، الضرب بعصا أو بحزام، الضرب أو الهجوم عليك بأداة حادة ، الخنق،السحب بقوة من شعركِ لإحداث أذى بكِ) خلال 12 شهرا الماضية؟
   a) نعم
   b) لا

13. إذا كنتٍ تعانين من مشاكل أو مخاوف عاطفية أو نفسية جدية، فهل ستذهبين لرؤية المختصين بالصحة النفسية والعقلية (كالطبيب النفسي أو طاقم التمريض)؟

a) بالتأكيد
b) ربما
c) ربما لا
d) بالتأكيد لا

14. ما مدى شعوركِ بالراحة عند تحدثكِ مع أحد العاملين بالمجال الصحي (كالطبيب أو طاقم التمريض) عن مشاكلكِ أو مخاوفكٍ العاطفية والنفسية؟

a) غير مرتاحة بتاتا
b) غير مرتاحة جدا
c) مرتاحة بعض الشئ
d) مرتاحة جدا

15. ما مقدار الحرج الذي ستشعرين به إذا علِم أحد في مجتمعكٍ (قريتكٍ) بأنكٍ تحصلين على مساعدة طبية لمشكلتكٍ العاطفية أو النفسية؟

a) إحراج شديد
b) إحراج بعض الشئ
c) إحراج ليس بالشديد
d) لا إحراج أبدا

16. هل تتواجد في المركز الصحي الذي يخدم قريتكٍ عيادة للصحة النفسية؟

a) نعم
b) لا

**Appendix 8.** Permission Letter to Translate and Use of the Personal Resource Questionnaire (PRQ 85-II)

April 25, 2015

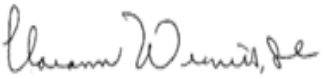
Shawana Al Harrasi
P.O Box 228 P.C. 329 Burj Al Rada
Rustaq, South Batinah
Oman, 329

Dr. Ms. Al Harrasi:

Please let this letter serve as your permission to use the PRQ85 or PRQ2000. Any changes to question stems or answer sets must be approved in advance. Translation of the PRQ into other languages is acceptable and encouraged. A copy of the translated version of the PRQ should be sent to me. If you do, in fact, use the PRQ for data collection in your study, I ask that you send me an abstract of your findings. Should you have any questions or need clarification, kindly write or e-mail cweinert@montana.edu. I will try to respond in a timely manner.

Thank you for your interest in the PRQ. I hope that this social support measure will be helpful in your research.

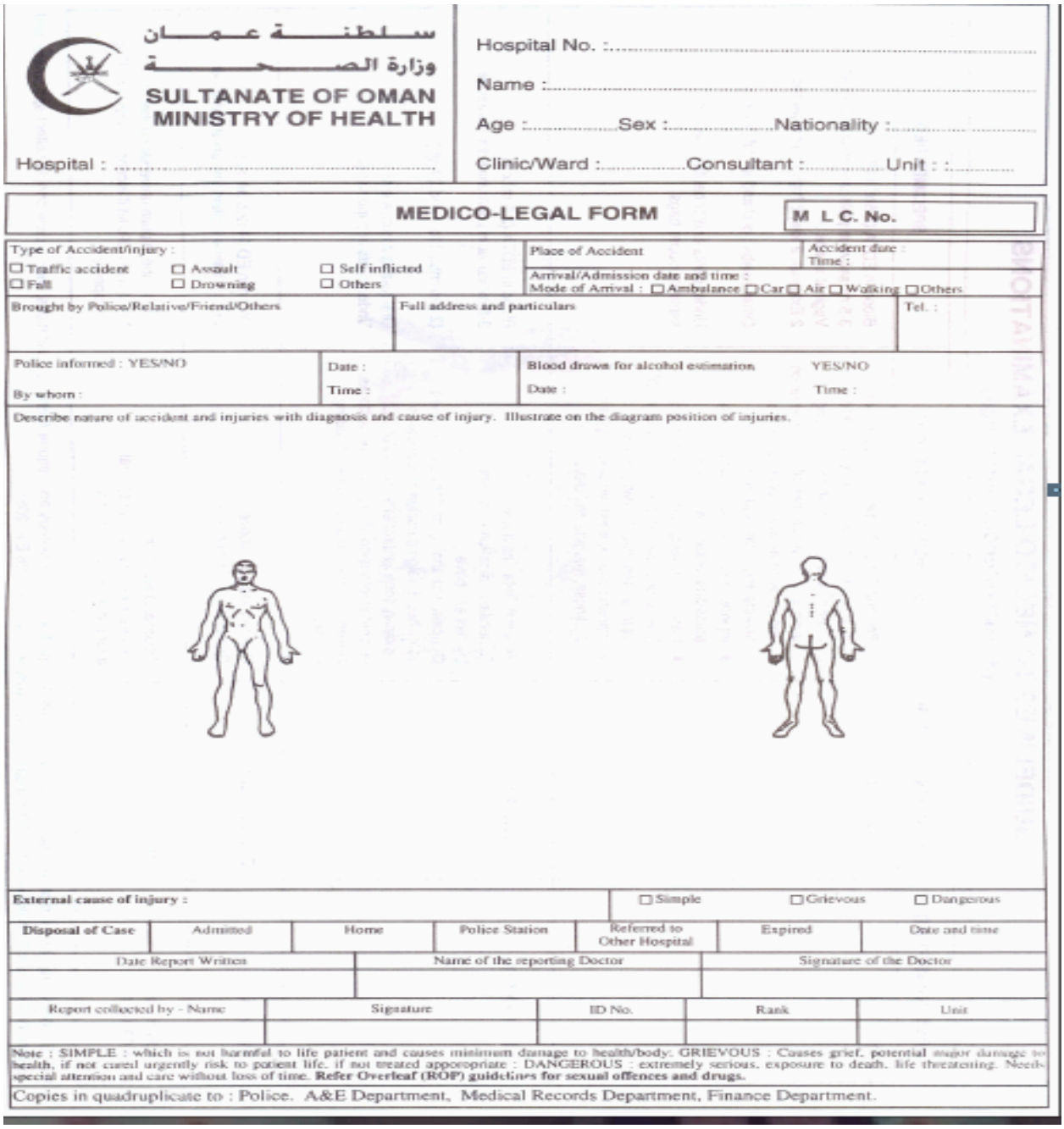
Sincerely,



Clarann Weinert, SC.PhD.RN.FAAN
Professor Emerita
www.montana.edu/cweinert

**Note:** The translated PRQ85-II instrument is available from the dissertation author.

**Appendix 9.** Medico-Legal Form (Ministry of Health, Oman)



سلطنة عمان
وزارة الصحة
SULTANATE OF OMAN
MINISTRY OF HEALTH

Hospital No. :.....
Name :.....
Age :.....Sex :.....Nationality :.....
Hospital : .....
Clinic/Ward :.....Consultant :.....Unit : :.....

**MEDICO-LEGAL FORM** M L C. No.

Type of Accident/injury :
☐ Traffic accident ☐ Assault ☐ Self inflicted
☐ Fall ☐ Drowning ☐ Others

Place of Accident | Accident date : Time :

Arrival/Admission date and time :
Mode of Arrival : ☐ Ambulance ☐ Car ☐ Air ☐ Walking ☐ Others

Brought by Police/Relative/Friend/Others | Full address and particulars | Tel. :

Police informed : YES/NO
By whom :
Date :
Time :
Blood drawn for alcohol estimation YES/NO
Date : Time :

Describe nature of accident and injuries with diagnosis and cause of injury. Illustrate on the diagram position of injuries.

External cause of injury : ☐ Simple ☐ Grievous ☐ Dangerous

| Disposal of Case | Admitted | Home | Police Station | Referred to Other Hospital | Expired | Date and time |
|---|---|---|---|---|---|---|

| Date Report Written | Name of the reporting Doctor | Signature of the Doctor |
|---|---|---|
| | | |

| Report collected by - Name | Signature | ID No. | Rank | Unit |
|---|---|---|---|---|
| | | | | |

Note : SIMPLE : which is not harmful to life patient and causes minimum damage to health/body. GRIEVOUS : Causes grief, potential major damage to health, if not cared urgently risk to patient life, if not treated appropriate : DANGEROUS : extremely serious, exposure to death, life threatening. Needs special attention and care without loss of time. **Refer Overleaf (ROP) guidelines for sexual offences and drugs.**

Copies in quadruplicate to : Police, A&E Department, Medical Records Department, Finance Department.

*Received from*: Rustaq Polyclinic, Directorate General of Health Services (South Batinah Region, Ministry of Health, Oman.

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