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Simultaneously Developing Interventions for Low-/Middle-Income and High-Income Settings: Considerations and Opportunities

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Abstract

Most older adults reside in low- and middle-income countries (LMICs) but most research dollars spent on interventions to improve the lives of older adults are awarded to researchers in high-income countries (HICs). One approach to improve the implementation of evidence-based innovations for older adults in LMICs is designing interventions that are relevant to LMICs and HICs simultaneously. We propose that researchers in HICs could partner with stakeholders in an LMIC throughout the intervention design process to better position their intervention for the implementation in that LMIC. We provide an example study from an adaptation of the Resources for Enhancing Caregiver Health II in Vietnam, which did not use this strategy but may have benefited from this strategy. We then turn to several considerations that are important for researchers to contemplate when incorporating this strategy. Finally, we explore incentives for creating interventions that are relevant to both HICs and LMICs for funders, intervention designers, and intervention receivers. Although this is not the only strategy to bring interventions to LMICs, it may represent another tool in researchers' toolboxes to help expedite the implementation of efficacious interventions in LMICs.

Keywords: Health equity, Implementation science, International collaborations, Research translation, Teams/interdisciplinary/multidisciplinary

Rapid aging in low- and middle-income countries[1] (LMICs) necessitates the development and deployment of interventions that will meet the health needs of this growing population. By 2050, 80% of all older adults will reside in LMICs (World Health Organization, 2021). This manuscript encourages researchers in high-income countries (HICs) to consider the implications of their interventions and intervention development activities for implementation in LMICs. Specifically, we urge investigators to map out and think through the implications of developing interventions for a HIC and a LMIC simultaneously and to employ that strategy when it can be done efficaciously.

There are at least three ways to create effective interventions for older adults in LMICs: (a) develop interventions within, and precisely for, specific regions, cultures, and/or countries (e.g., Dias et al., 2008); (b) evaluate whether evidence-based interventions developed in HICs can be adapted for LMICs (e.g., Hinton et al., 2020); and (c) design interventions in HICs in partnership with LMIC stakeholders from the development stage so that the intervention might be applied to both settings concurrently. While the first two can be effective means to improve the lives of older adults and their caregivers in LMICs, we focus on the third because we were unable to find any examples of it in the extant literature despite a strong potential to expedite implementation.

Dementia in Low- and Middle-Income Countries

This manuscript will focus on the experience of and care for those with Alzheimer's disease (AD) and AD-related dementias (AD/ADRD) because (a) most persons living with AD/ADRD reside in LMICs, (b) rapid increases in AD/ADRD care needs in LMICs are expected, (c) there is massive investment in AD/ADRD care research in HICs and relatively little in LMICs, and (d) the present authorship team possesses relevant experience developing, adapting, and implementing AD/ADRD care interventions in HICs and LMICs. Nonetheless, we believe much of our discussion, experience, and recommendations are broadly applicable to aging interventions.

Among the 46.8 million persons living with dementia worldwide in 2015, it is estimated that 58% lived in LMICs, a rate that is expected to rise to 68% by 2050 (Prince et al., 2015). Yet 99% of biomedical research funding is awarded to researchers in HICs (Adam et al., 2020). This disparity only grows in the context of AD/ADRD: of 3,072 AD/ADRD research grants, 99.9% were awarded to investigators in HICs.

The Authorship Team

The authorship team includes four early-career (<10 years from terminal degree), three mid-career (10–25 years), and two senior-career (>25 years) scholars whose work and training span gerontology, public health, nursing, psychology, psychiatry, sociology, law, and anthropology with a collective 151 years of work in aging broadly and 104 in AD/ADRD specifically. Authors were born in Cameroon, Germany, India, the Philippines, Ukraine, and the United States and currently work in India, the Philippines, and the United States. Authors have been involved with interventions in Australia, Brazil, Chile, England, Hong Kong, India, Indonesia, Italy, New Zealand, Scotland, the United States, and Vietnam.

Example Study: Resources for Enhancing Caregiver Health

Resources for Enhancing Caregiver Health (REACH) is a caregiver support program. This individualized, multicomponent intervention occurred over 6 months in 12 sessions and included disease education, home safety, social support, skills training to address behavioral problems and support of health and well-being of caregivers. Intervention caregivers also participated in structured support groups. Additionally, a specialized computer-integrated telephone system was placed in homes and used to reinforce disease education and skills training. REACH II was an adaptation of REACH to test one intervention across different sites with an ethnically diverse caregiver population (Schulz et al., 2003). REACH II was tested in five sites throughout the United States and involved 642 Latino, White, and African American caregivers and persons living with dementia (Belle et al., 2006). REACH II has been modified and translated for implementation in various care settings and cultures in the United States, including the Veterans Administration (REACH VA) (Napoles et al., 2010; Nichols et al., 2011) as well as internationally (e.g., Hinton et al., 2020).

REACH in Vietnam

REACH VA adaptations for delivery in Vietnam (REACH VN) by health care and allied health professionals (Hinton et al., 2020) included translation of materials in Vietnamese, modifications of study materials for cultural relevance and literacy-appropriateness, and expanded caregiver education about AD/ADRD. Adaptations were made through a partnership between researchers from the United States and Vietnam. Additionally, the REACH VN team made contextual and delivery changes including allowing participation of multiple family members, initial session engagement with some male heads of household, and often accelerating to weekly, rather than biweekly, sessions. Trainers were also trained using principles of Buddhism and case studies for practical experience (Hinton et al., 2020).

Several factors may have contributed to the success of REACH VN. First, the project was driven by in-country priorities rather than priorities of HIC collaborators. Second, the primary organization in Vietnam had prior experience working with international partners and had substantial capacity to conduct the intervention, including a registry of persons living with dementia in the community and strong ties with local organizations. Third, the HIC team included a PRINCIPAL COLLABORATOR who is Vietnamese and fluent in Vietnamese with substantial prior experience conducting research in Vietnam. Finally, a systematic process was used to adapt REACH VA (Nguyen & Hinton, 2020) that included formative research to elicit the perspectives of family caregivers and other key stakeholders (Nguyen et al., 2021).

REACH VN demonstrates that interventions can be developed in HICs and later adapted to LMICs, but it is worth noting that the publication of the pilot trial for REACH VN was 15 years after the publication of the initial REACH II trial. Perhaps if the creators of REACH II had planned that intervention with an LMIC like Vietnam in mind, this timeline could have been considerably shortened. Moreover, several elements that made this adaptation successful (e.g., thorough collaboration with stakeholders in Vietnam) are elements that could be readily incorporated by researchers during intervention development processes.

Considerations for the Proposed Strategy

The present manuscript focuses on designing interventions in a HIC in partnership with LMIC stakeholders so that the intervention may simultaneously be applied to both HICs and LMICs. Such a method of intervention development possesses several appealing opportunities (e.g., addressing issues of equity, helping those who are most in need, adapting interventions more quickly, and augmenting earned royalties; discussed further later). Before turning to those opportunities, we first address some important considerations for understanding the implementation of interventions in LMICs (Table 1).

Considerations in Implementing Interventions in Different Cultural Contexts

Developing individual, culturally-specific interventions is preferable in some contexts (e.g., when the needs of one group do not match the needs of another group), and it is likely impossible to design an intervention that meets everyone's needs, cultural preferences, and values (Castro et al., 2010). Traditionally, interventions developed within one sociocultural context may or may not be effective in another but may hold potential for adaptation, evaluation, and eventual implementation into different settings. Cultural adaptation frameworks and implementation science offer guidance on how interventions can be translated for different settings. Cultural adaptation is a process of modifying an existing evidence-based intervention to consider culture and context in such a way that it is compatible with the client's cultural patterns, meanings, and values (Bernal et al., 2009). Culturally adapted interventions are more effective than generic health interventions for various disease contexts (Barrera et al., 2013; Huang & Garcia, 2020). Here we do not advocate for the creation of generic health interventions. Instead, we advocate that when needs align between a HIC where an intervention is being developed and an LMIC that might use that intervention, researchers might make design decisions that might accommodate both countries (Cabassa & Baumann, 2013). For example, many AD/ADRD interventions focus on relieving the burden on overstretched caregivers: something that has been identified as a paramount need in HICs (Gitlin et al., 2018) and LMICs (Ferri & Jacob, 2017) alike.

Employing a Conceptual Framework

The selection of an appropriate conceptual model (a systematic approach to considering constructs and their interrelationships when developing and evaluating interventions or implementation strategies; see Tabak et al., 2018) is essential when guiding the implementation of innovations in clinical, community, or other care settings. At the intervention level, effective conceptualization allows investigators to identify core mechanisms of benefit or the "essential ingredients" of an intervention that are necessary to modify key outcomes identified in the model. This is critical when considering implementation in LMICs because of the cultural, socioeconomic, political, and likely other key factors that may require, if not dictate, adaptation to the intervention in order to facilitate adoption decisions, feasibility, appropriateness, and acceptability among key stakeholders who will disseminate, deliver, and receive the innovation (Proctor, 2020).

Involving Stakeholders from Low- and Middle-Income Countries

There are important contextual considerations involved in developing interventions for different national settings. Attentiveness to and awareness of differences in language use, dialects, cultural norms, and regulatory structures allow investigators to plan for adequate resources, account for sufficient time, and incorporate processes needed to implement culturally-appropriate and culturally-responsive adaptations (Acquadro et al., 2008). Indeed, these considerations may also vary considerably within national contexts with differences reflected at regional and local levels. Anticipating and allowing for sufficient time to understand the needs, priorities, and regulatory requirements at each of these geographic levels is critical.

One important approach to designing culturally-responsive research is to ensure active participation and involvement of the local workforce into research teams (Soto et al., 2018). The cultural adaptation literature endorses this approach and calls for systemic engagement of everyone involved (Bernal et al., 2009; Soto et al., 2018). Thus, early interaction between intervention developers from HICs with stakeholders in an LMIC (with aligning goals) early in the intervention development process can inform a better understanding of context and needs and facilitate eventual intervention implementation.

Understanding Local Needs

Needs (as identified by local stakeholders) that may align between LMICs and HICs may include investments in

Table 1. Summary of Considerations, Opportunities, and Recommendations Associated With Designing Interventions for Low-/Middle-Income and High-Income Settings Simultaneously

Domain	Summary
Considerations	
Cultural context	It is impossible to design an intervention that meets everyone's needs, cultural preferences, or values
	Cultural adaptation frameworks and implementation science offer guidance on how interventions can be adapted and translated into other settings
	We do not advocate for the creation of generic health interventions but note that when needs align researchers in a HIC might make design decisions with eventual adaptation to a LMIC in mind
Employ a conceptual framework	Effective conceptualization allows investigators to identify core mechanisms of benefit, or the "essential ingredients" of an intervention that are necessary to modify key outcomes again explicated in the model
	Need for significant reconsideration of how capacity/context is incorporated in implementation science conceptual frameworks in LMICs settings (e.g., the building of capacity itself may be a worthy objective of implementation efforts), rather than the traditional conceptualization of capacity/context
	In addition to theoretical and conceptual advancement of implementation, creativity, and reverse innovation should also be considered in these settings
Involving stakeholders	Consider important contextual characteristics (e.g., language usage, dialects, and cultural norms)
	Plan for adequate resources, time, and processes to implement culturally-appropriate adaptations based on needs and priorities
	Ensure timely and active involvement of local stakeholders into collaborating teams
	Recognize where needs align and provide support/resources needed (e.g., mentorship and training)
Opportunities	
Equity	There is a moral/ethical imperative for the implementation of interventions in LMICs due to numerous health inequities
	Awareness of the long-lasting affects of racist and colonial systems of HICs are implicated in the current poor financial, political, and public health systems in many LMICs
	Collaboration between HIC and LMIC to develop interventions that are primed for adaptation/delivery can accelerate achievement of equitable health outcomes in both HICs and LMICs
Transnational aging	Transnational aging is the process of organizing and coping with life that is not limited to the context of a single country
	Three ways of transnational aging: (a) return of older immigrants to country of origin, (b) older adults residing partly in two countries or continents, and (c) international retirement migration of older adults from HIC to different HIC/LMIC
	Creating interventions that are similarly applicable in HICs and LMICs, facilitates continuity of care for transnational aging older adults
Accelerating the research pipeline	It currently takes decades for an intervention to move from design to implementation
	Considering adaptation to LMICs while developing an intervention in a HIC could merge steps and accelerate the research process
	Consideration of adaptation to LMICs at early stages is akin to thinking about implementation in the explanatory stage of research, which could facilitate rapid adaptation/adoption of efficacious interventions
Monetary and prestige incentives	More rapid implementation of interventions by a researcher could raise their scientific profile and encourage promotion
	Increasing the applicability of interventions to other countries, the intervention could, conceivably, increase the royalties it might generate
	Although financial gains are a tangible benefit, we hope that researchers will place more value on the equity and not view adaptation of an intervention to LMICs purely as a money-making opportunity
Bidirectional knowledge transfer	Limitations on resources in LMICs are often thought of as a detriment, but they force a creativity and pragmatism that is also applicable in HICs
	Knowledge to be gained from members of LMICs goes beyond maximization of resources (e.g., integrating Buddhist principles into training for interventionists in LMIC can transfer to Buddhists in HICs)
Opportunities for funders	Bidirectionality of knowledge that is likely to occur from our proposed method (see earlier) is likely to benefit those in HICs
	This collaboration will strengthen ties between international research teams and facilitate increased knowledge that can enable both settings meet national health goals and priorities (e.g., to change the trajectory of AD/ADRD without the costs of brain drain from some settings)

Table 1. Continued

Domain	Summary
Recommendations	
Stakeholder partnership engagement progress	Begin with an in-person meeting (virtual meetings may be an appropriate substitute when in-person meetings are not possible)
	Explore and identify current team expertise and skills
	Identify the collaborative project goal, timeline, and each team member's responsibility/roles
	Build in adequate meeting and open communication structure
	Continuously reevaluate collaboration efforts, goals, and timelines

Notes: HIC = high-income country; LMIC = low- and middle-income country; AD = Alzheimer's disease; ADRD = Alzheimer's disease and related dementias.

training, mentorship, and providing support for in-country research infrastructure. Due to limited infrastructure and resources, AD/ADRD has not been considered a priority in many LMICs (Prince et al., 2008). As such, the research and health care infrastructure in LMICs lags behind the ever-increasing need (Yapa & Bärnighausen, 2018). In resource constrained settings, on-the-ground factors that are necessary to consider for AD/ADRD intervention contexts include: (a) limited number of providers trained in and competent to provide AD/ADRD care, (b) limited awareness of AD/ADRD as a medical problem that affects access to care and caregiving, (c) limited specialty AD/ADRD care (including diagnosis, treatment, and supports), (d) dependence on limited and inadequately trained family caregivers, and (e) limited dementia research and researchers. Notably, the first four of these factors are areas of concern in some parts of HICs too (Alzheimer's Association, 2020; Bradford et al., 2009; Stone, 2015).

Suggested Steps for Generating Partnerships with Stakeholders in LMICs

There are challenges to any collaborative efforts between researchers (Bukvova, 2010). Collaboration between researchers in HICs and LMICs to result in effective intervention development is no exception and might present additional challenges. For example, logistics and administrative processes (e.g., IRB approvals and legal approvals) and different time zones can significantly delay collaborative projects. However, in addition to adequate planning, we propose the following steps to facilitate successful collaboration efforts: (a) begin with an in-person meeting (virtual meetings may be an appropriate substitute when in-person meetings are not possible), (b) explore and identify current team expertise and skills, (c) identify the collaborative project goal, timeline, and each team member's responsibility/role, (d) build in adequate meeting time and open communication structure, and (e) continuously reevaluate collaboration efforts, goals, and timelines.

Opportunities—Why Consider Low- and Middle-Income Countries?

The strategy of working with LMIC stakeholders while developing interventions in HICs is one that holds the potential for many opportunities that can be shared by those receiving interventions, those creating interventions, and those funding interventions alike.

Accelerating the Research Pipeline

The research pipeline is notoriously slow, and recognition of this fact has led to steps taken by funders to speed the process (Mitchell et al., 2020). Developing interventions targeting HICs and LMICs simultaneously might be thought of as merging steps of the research process (analogous to other designs like hybrid effectiveness designs; see Gaugler et al., this issue) and may be one way to speed up that process. Likewise, starting to think about adaptation to LMICs at the early stages of intervention development may facilitate more rapid adaptation and adoption of efficacious interventions in LMICs in the same way that thinking about implementation broadly, while in a much more explanatory stage of research, might speed up that implementation (Gitlin et al., 2020).

Monetary and Prestige Incentives

More rapid implementation of interventions could also raise a researcher's scientific profile and encourage promotion. Likewise, there may be monetary incentives for expanding the potential reach of interventions. In certain circumstances, researchers can and do garner royalties from interventions they develop through licensing, certification, or similar fees. By increasing the applicability of interventions to other countries, the intervention could, conceivably, increase the royalties it might generate. Here we want to note that this is an area that can be ethically fraught, and therefore, careful consideration is encouraged. Our team spent some time discussing this issue and ultimately decided to retain its consideration as we think the financial gains from interventions are a benefit that researchers may consider whether or not we write about them. We also note that sometimes having monetary costs associated with adopting an intervention may be beneficial in the uptake of that intervention (e.g., because those costs might increase investment; Roth et al., 2015). Still, we hope that researchers will place more value on equity and not view adaptation to LMICs purely

as a money-making opportunity, especially in light of the fact that these countries, by definition, have fewer fiscal resources than HICs.

Transnational Aging

Transnational aging is another context that necessitates the development of interventions that are concordant between LMICs and HICs. Transnational aging is the process of organizing and coping with life that is not limited to the context of a single country (Horn & Schweppe, 2017). Some domains of transnational aging include (a) return of immigrants to their country of origin when their health begins to fail (also known as the salmon bias hypothesis; Palloni & Arias, 2004), (b) older adults residing partly in two countries or continents (Nkimbeng et al., 2022), and (c) international retirement migration, where older adults from HICs retire in other countries with a better climate, extended leisure options, lower living costs, and attractive landscapes (Horn & Schweppe, 2017). By creating interventions simultaneously within HICs and LMICs, continuity of care for persons living with dementia and their caregivers could be considerably improved.

Equity

Health inequities refer to inequalities that are deemed to be unfair and avoidable that can be reduced or remedied through policy action (Kawachi et al., 2002). Inequities around AD/ADRD care and caregiving in LMICs will continue to rise, and as such, there is a moral and ethical imperative to implement interventions that improve health and eliminate health inequities. In keeping with the tenets of health equity, defined as the absence of avoidable differences in health outcomes among socioeconomic and demographic groups or geographic areas (Singh et al., 2017), there is a need to provide resources to facilitate dementia diagnosis, care, and treatment that is tailored to the unique circumstances of persons living with dementia. Furthermore, there is a growing awareness of the long-lasting affects of racist and colonial systems in the United States and many HICs. Many LMICs were colonized by HICs, and this history of colonization is implicated in the current poor financial, political, and public health systems in these countries that have led to the observed global health inequities. Developing interventions that are primed for adaptation and delivery in LMICs is an approach that can accelerate equitable AD/ADRD care and well-being for people in these settings.

Bidirectional Knowledge Transfer

Limitations on resources in LMICs are sometimes thought of as a detriment, but they can force creativity and pragmatism that are often also applicable in HICs (e.g., most would prefer less resource-intensive interventions that are as effective as more resource-intensive interventions; Yapa & Bärnighausen, 2018). For instance, REACH VN adaptations aligned with adaptations that were made for implementation in the United States (Nichols et al., 2011). If the intervention designers had the opportunity to work with stakeholders from LMICs from the intervention development stage, these adaptations might have happened much earlier.

Knowledge to be gained from members of LMICs also extends beyond the maximization of resources (Yapa & Bärnighausen, 2018). For instance, incorporating Buddhist principles into training for interventionists in Vietnam (Nguyen & Hinton, 2020) may have been considered because of the long history of Buddhism in that country, but those principles are likely quite applicable to the approximately 2.5 million Buddhists in the United States (Public Religion Research Institute, 2021).

The Case for Funders

Many of the largest funders of biomedical research have goals that are nationally specific (see iadrp.nia.nih.gov for public and private funders from a range of countries). Therefore, it may be difficult for them to allocate additional resources to interventions when those resources are not solely to benefit members of their home nation for noncommunicable diseases like AD/ADRD. However, we believe benefits to these funders may be seen in multiple areas. First, the bidirectionality of knowledge that is likely to occur from our proposed method (see earlier) is likely to benefit those in HICs. Second, this sort of collaboration will strengthen ties between international research teams. This increased knowledge transfer may be able to help HICs meet ambitious goals (e.g., to change the trajectory of AD/ADRD; Epstein-Lubow et al., 2013) without the costs of brain drain (i.e., loss of talent from LMIC to HIC) that are difficult for researchers and countries alike (Docquier & Rapoport, 2012).

Limitations

Our research team lacks experience with interventions in low-income countries. While we have experience working with middle-income countries, this "blind spot" may have created an inability for us to recognize additional considerations that are unique to those contexts. For instance, some low-income countries may have a particularly difficult time prioritizing the allocation of limited resources to chronic conditions of aging, like AD/ADRD, in the face of pressing needs to address acute diseases that may prematurely kill far larger proportions of their populations. At the same time, we suspect collaboration with stakeholders in those countries is, again, paramount. It is plausible that even when resources are limited, there are relevant stakeholders who want to

address burdensome health conditions like AD/ADRD. While the form of the interventions might be altered by resource scarcity, there are doubtless other assets that are likely to be present that can facilitate effective intervention (Yapa & Bärnighausen, 2018).

The strategy we proposed holds promise but is not a panacea. Some researchers in HICs may be unable to find suitable stakeholders to work within LMICs (e.g., because they are very early in their careers and lack appropriate networks). Still, we hope that by offering a thorough treatise of this strategy, those researchers may be more likely to employ it when the opportunity arises. Likewise, we encourage researchers to continue to employ other strategies to help bring effective interventions to LMICs (i.e., developing interventions solely within LMICs and adapting effective interventions developed in HICs to LMICs).

Finally, word limits necessitated a shallow consideration of many opportunities and considerations for the proposed strategy. Much more can, and has, been said on the majority of these points, and this manuscript is by no means meant to be the final word on the considerations and opportunities that deserve attention.

Conclusion

We proposed a strategy wherein researchers in HICs create interventions in partnership with stakeholders from LMICs to speed the adoption of those interventions in both countries. We presented considerations and opportunities germane to a cultural context, involving LMIC stakeholders, equity, transnational aging, accelerating the research pipeline, and incentives for successful intervention development collaboration between HICs and LMICs. We also provided an example study from an adaptation of REACH II to help portray how this strategy could have promise and avoid past adaptation pitfalls. Although this strategy is unlikely to replace other strategies to bring aging interventions to LMICs, it represents another tool in researchers' toolboxes to help expedite the implementation of efficacious interventions in LMICs.

Author Notes

1. Defined by the World Bank (https://datahelpdesk.worldbank.org/knowledgebase/articles/906519), low-income countries are currently those wherein gross national income per capita is less than $1,046. Middle-income countries are those wherein gross national income per capita is $1,046–$12,695. High-income countries are those wherein gross national income per capita is more than $12,695.

2. REACH VA is itself an adaptation of REACH II with three primary differences: (a) computer-assisted screen telephones from REACH II were not used in REACH VA, (b) the time lag between identifying care problems in REACH II was reduced and consultation with senior staff members was removed, and (c) the 51-item risk appraisal from REACH II was reduced to 21 items in REACH VA (Nichols et al., 2011).

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Conflict of Interest

None declared.

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