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Global Epidemic of Ageing: A Systematic Review of the Literature on Ageing in Low and Middle Income Countries

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List of Abbreviations

GSPA	Global Strategy and Action Plan on Ageing and Health
IDI	In-depth Interview
LMICs	Low and Middle Income Countries
NCDs	Non-Communicable diseases
RCT	Randomized Control Trial
SDG	Sustainable Development Goal
UHC	Universal Health Care
UN	United Nations
WHO	World Health Organization

Abstract

Context: The percentage of the elderly population in Low and Middle Income Countries (LMIC) is rapidly increasing, leading to a growing number of people who are likely to require the care and assistance from caregivers and health services from an often frail health system. In sub-Saharan Africa, the proportion of dependent persons aged 60 and older will increase from 21% to 30% between the years 2000-2050. In India it will increase from 21% to 30%, and in Latin America from 23% to 47% (Acosta, Rottbeck, Rodriguez, Ferri, & Prince, 2008). This increase in ageing populations in LMIC will coincide with an increase in non-communicable diseases for the elderly and care-givers, and could have serious repercussions for health care systems not equipped not equipped to manage the chronic care of the patients or the caregivers.

Objective: To evaluate published data on elderly care in low and middle income countries.

Data Sources: Systematic search of published literature in PubMed, EMBASE, and Web of Science. The literature that was included in the study were from the years of 1993-2018.

Study Selection and Data Extraction: Twenty-nine publications met a priori inclusion criteria (randomized controlled trial, cohort, case-control, case study, and meta-analysis). Publications were reviewed for quality. Published studies identified through websites and institutional review articles were also reviewed and included. Reference lists of published literature and systematic reviews were hand-searched to obtain additional peer-reviewed published studies.

Results: Dependency, caregiver, and health systems for the elderly were identified as the three main themes in the literature.

Conclusion: Both qualitative and quantitative studies need to be conducted to better understand how countries can improve the care of the elderly. National and sub-national indicators and targets need to be created within the World Health Organization's *Global Strategy and Action Plan on Ageing and Health* framework to allow countries to understand the process and steps that can be taken to best improve their ability to care for the elderly.

Key words: ageing, public health, low and middle income countries, elderly care

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Chapter I

Introduction

The percentage of the elderly population in Low and Middle Income Countries (LMIC) is rapidly increasing, leading to a growth in the number of people who will require care and assistance. This assistance could be moderate assistance, such as assistance getting to a primary care physician, or more extreme, such as a long-term care facility. In sub-Saharan Africa, the proportion of dependent persons aged 60 and older, the age that the World Health Organization (WHO) has quantified as elderly, will increase from 21% to 30% from 2000-2050. In India, it will increase from 23% to 44%, and in Latin America from 23% to 47% (Acosta et al., 2008). This increase in ageing populations in LMIC will coincide with an increase in chronic conditions and non-communicable diseases (NCDs) for the elderly, and could put a strain on a health care system that is not equipped to manage chronic care of patients. The health systems in LMIC are not set up to manage the complex continuum of care of the elderly, however as the population continues to age the disease burden will continue to shift toward more chronic NCDs and health systems need to adapt(Acosta et al., 2008).

The World Health Organization (WHO) has created a framework to identify the needs of countries and their respective health systems to promote healthy ageing titled the *Global Strategy and Action Plan on Ageing and Health* (GSPA). Healthy ageing is defined as, "the process of developing and maintaining the functional ability that enables wellbeing in older age," (WHO, 2016). This framework has five strategic objectives: commit to action, align health systems to the needs of older populations, develop age-friendly environments, strengthen long-

term care, and improve measurement, monitoring, and research (WHO, 2016). Each of these objectives has key actions that will be used to accomplish the goals of the WHO on healthy ageing. This special study project will focus on the second objective: align health systems to the needs of older populations. The key actions for this objective are orienting health systems around intrinsic capacity and functional ability, developing and ensuring affordable access to quality older person-centered and integrated clinical care, and ensuring a sustainable and appropriately trained, deployed, and managed health work force (WHO, 2016).

The purpose of this paper is to review published peer-reviewed articles on elderly care in low and middle-income countries to provide information for further investigations to address the barriers faced by the growing elderly population.

Objectives:

1. To identify existing strategies for health care for the elderly, as defined by the WHO as 60 years of age or older, in low and middle-income countries.
2. To identify barriers and facilitators to health care for the elderly and the gaps in the knowledge for low and middle-income countries.
3. To write a manuscript for publication that summarizes current evidence-based strategies for care of the elderly in LMICs and recommendations for priority implementation research.

Definition of Terms

Caregiver: A person who provides support and assistance, formal or informal, with various activities to persons with disabilities or long-term conditions, or persons who are elderly. This

person may provide emotional or financial support, as well as hands-on help with different tasks. Caregiving may also be done from long distance (WHO, 2004).

Chronic condition / disease: A disease which has one or more of the following characteristics: is permanent; leaves residual disability; is caused by nonreversible pathological alternation; requires special training of the patient for rehabilitation; or may be expected to require a long period of supervision, observation or care (WHO, 2004).

Dementia: is used as an umbrella term to encompass multiple diseases that affect a person's memory, cognitive abilities, and behaviors that interfere with a person's ability to do normal daily activities, with age being the strongest risk factor (WHO, 2018c)

Dependent: the requirement for frequent help from other people, beyond what would be expected by virtue of family or social ties (Acosta et al., 2008)

Disability: when a person has difficulty caring out an activity because of discomfort or pain, increased effort, slowness (Acosta et al., 2008). Disability may occur without dependency, or disability can lead to dependency.

Elderly (older): Aged 60 or older (WHO, 2018b)

Environmental factors: include policies, systems, and services related to transport, housing, social protection, streets and parks, social facilities, and health and long-term care; politics; products and technologies; relationships with friends, family, and care givers; cultural and social attitudes and values.

Functional ability: determined by the person's intrinsic capacity, relevant environmental factors, and the interaction between the two (WHO, 2016).

Geriatric Care: "Geriatric Medicine is a specialty that focuses on medical issues and diseases of aging, and of old age. A Geriatrician most often treats people over the age of 60 who are either healthy or have multiple medical issues. Medical care becomes more complex as you age and encounter more medical conditions. A Geriatrician is an expert in how medical conditions impact one another, in how each medication interacts with others and how both medical conditions and medications uniquely affect you as you age," (UNC School of Medicine, 2018)

Intrinsic Capacity: the combination of all the individual's physical and mental capacities (WHO, 2016).

Palliative Care: an approach that improves the quality of life of patients and their families facing the problem associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual (WHO, 2018d)

Chapter II

Comprehensive Literature Review

An ageing population is a unique public health issue, which is a result of the medical advances and the work of public health in the past (UN, 2015). The ageing of the global

population can be seen in Table 1(World Health Organization, 2014). We know that a large proportion of the population will be over the age of 60 by 2050, and outnumber children aged 0-9 years old and adolescents and youth aged 10-24 (UN, 2015). Approximately 80% of older people will be living in low and middle income countries (World Health Organization, 2014). This is one of the most urgent global trends that the world will face. Policy makers are not prepared to deal with the complex social, economic, political and health care consequences that will occur. National health and social systems could be devastated if they do not heed the warnings presented by organizations like the WHO (WHO, 2018a). The *World Report on Ageing and Health* states, "Comprehensive public health action on population ageing is urgently needed. This will require fundamental shifts, not just in the things we do, but in how we think about ageing itself," (WHO, 2017a).

Table 1. Percentage of the Global Population aged 60 and older (WHO, 2014)

	Percentage of Population Aged ≥ 60 years				
Region	*1950*	*1975*	*200*	*2015*	*2050*
Asia	6.7	6.6	8.6	14.8	24.4
Europe	12.1	16.5	20.3	27.3	33.6
Latin America/Caribbean	5.6	6.5	8.4	14.9	25.0
North America	12.4	14.6	16.3	24.7	27.0
Oceania	11.2	11.0	13.4	19.1	23.5
Sub-Saharan Africa	5.2	4.8	4.8	5.5	8.3

The United Nations Sustainable Development Goal number 3 (SDG 3), is focused on health and well-being for all (WHO, 2017c). Achieving universal health coverage (UHC), SDG 3.8, with the twin objectives of defining and delivering an essential set of services for the entire population and doing so with minimal or no financial hardship to individuals, implicitly includes geriatric medical care (WHO, 2017b). However, there is no target specific to geriatric health care, only a blanket addition of the phrase "for all" to encompass those of all ages (WHO, 2017c).

Global burden of disease

The global burden of disease is shifting and health systems must adjust accordingly. When comparing the global burden of disease between 1990, 2000, 2010, and 2016, the last year of available data, as seen in Figure 1, the distribution of diseases that are affecting more people are non-communicable diseases as opposed to the infectious diseases that were more prominent in the past (IHME, 2018).

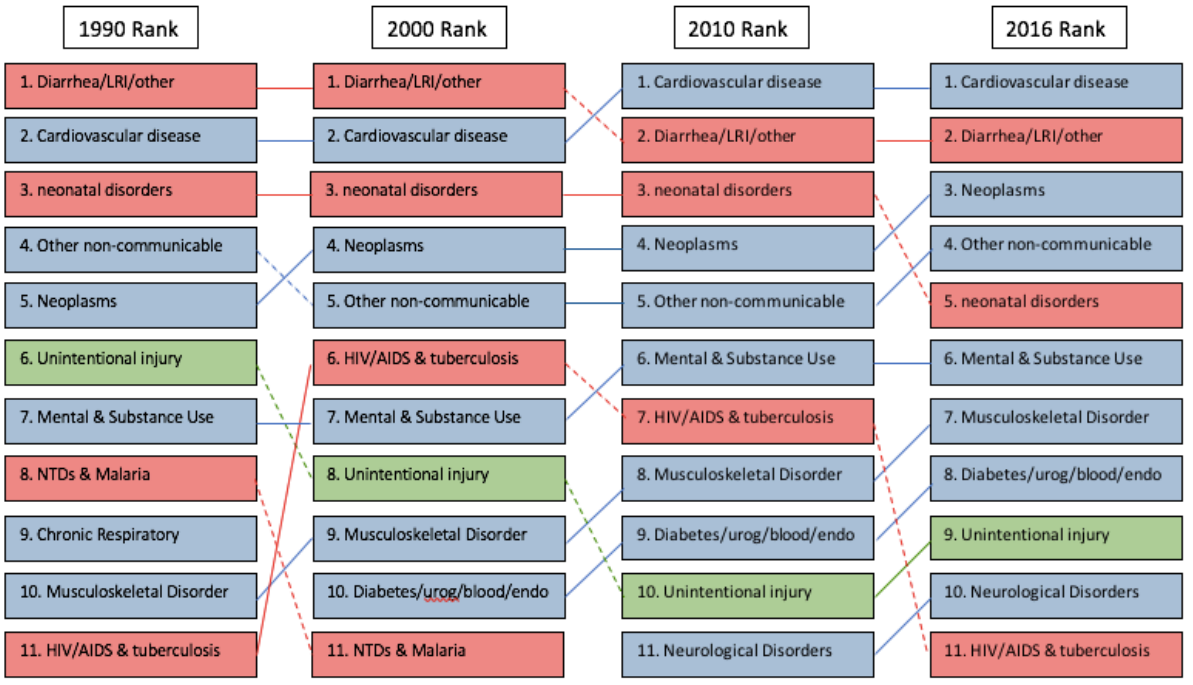

Figure 1.
Global burden of disease. Red: Communicable, maternal, neonatal, and nutritional diseases. Blue: Non-communicable diseases. Green: Injuries. (IHME, 2018)

The proportion of the elderly population is rapidly increasing globally and even more so in low and middle income countries (LMIC) in comparison to higher income countries (Nortey, Aryeetey, Aikins, Amendah, & Nonvignon, 2017). This population increase can be attributed to lower fertility, decreasing and changing mortality rates, and longer life expectancy (Hussein & Ismail, 2017; UN, 2015); a change described as “demographic transition” ((Rowan H. Harwood, Avan Aihie Sayer, & Miriam Hirschfeld, 2004). As the median age of a population increases, so does the country’s burden of disease (Mayston et al., 2017). An ageing population requires more care for chronic disease and non-communicable disease, such as heart disease, stroke, cancer and dementia (Prince et al., 2008). As people age, their health needs tend to become more complex. This complexity can be due to increased likelihoods of them having one or more chronic diseases or declining capacity.

It is important to understand the continuum of care that is used in higher income countries to care for the elderly. This continuum consists of a multitude of different options and variations depending on the needs of those who are considered elderly, 60 years or older, according to the WHO (WHO, 2018a). The needs of an elderly person can vary from minimal, where they can use the existing health care system to continue preventative health practices, to requiring more robust care, such as a long-term care facility or round-the-clock treatment or hospice (Evans et al., 2017). There are a breadth of service models for ageing, as it is not a heterogeneous process, and people's needs vary (Evans et al., 2017)

Breaking down the Continuum of Care

A systematic review by Kings College of London on the continuum of care for the elderly identified two main service delivery models that encompass the full continuum of care: integrated geriatric care and integrated palliative care (Evans et al., 2017). Using higher income countries as a model the authors developed a service model shown in Figure 2. Figure 2 demonstrates the complexity of the care needed for the ageing population to improve the quality of life. The model also emphasizes the need for multi-disciplinary collaboration throughout the continuum (Evans et al., 2017).

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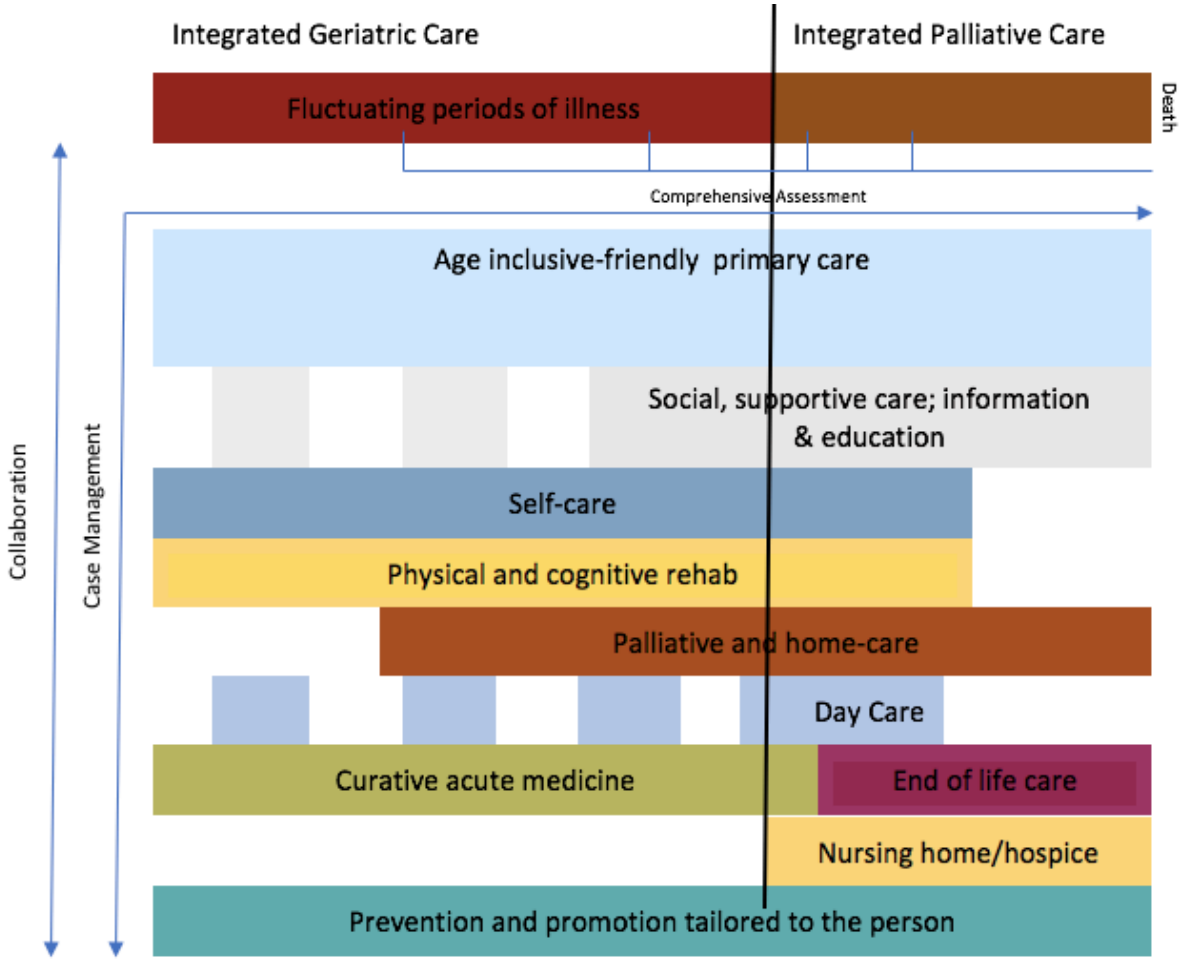
Figure 2: Range of service packages to meet the needs of older people (Evans et al., 2017)



Modified from WHO Kobe Centre working framework [Ong, unpublished; Ong and Evans, 2014 [134]]

Integrated Geriatric Care

Integrated geriatric health care should be a priority of elderly medical care. Most of the health problems that elderly people face are linked to chronic conditions, most of which are due to non-communicable diseases (UN, 2015). Many of these health conditions can be prevented or delayed if there is a health system that has preventive and primary health care as

priorities. Currently many health systems are focused on diseases, both the diagnosis and treatment of specific acute illnesses (WHO, 2017a). These systems need to realign their priorities to handle the increasing incidence of chronic illnesses.

The "moderate" phase of health needs for the elderly can be can be widely variable as health care is highly dependent on the individual's needs and resources. Many programs exist to provide extra support to families to supplement that which they are unable to provide alone, such as home health aides, case management services, and adult day care, all of which can assist a person with their daily activities and take the strain of care-giving (Prince, Livingston, & Katona, 2007). These activities can play a key role in the care of the elderly, whether this person or organization comes to the home of the family daily or becomes the primary caregiver.

Integrated Palliative Care

As the health of an elderly person degrades past the point of the safety of the individual to live in their own space, there are options for the elderly, such as long-term care facilities and toward the end of life, the options of palliative care or hospice care. Long-term care facilities provide comprehensive care to those who have difficulties caring for themselves, and span the continuum of care for the elderly. The *Global strategy and action plan on ageing and health* encourages all countries to have an affordable long-term care system available (WHO, 2016). This is an aspirational goal that is imbedded into the *Global strategy and action plan on ageing and health*, with guidelines including affordability, accessibility, equitable access, in line with human rights declarations, fairly treated health workforce, and that national governments should take the overall responsibility for the functionality of the long-term care systems (WHO, 2017d). However, not every elderly person has access to such facilities. The cost of facilities can

cause a strain on the family and needs to be compared to the cost of the caregiver at the home. Integrated palliative care, which is defined here as more than just palliative care, can provide support for the elderly and their family when the care provided by the family or by the individual is no longer sufficient for the needs of the individual.

Low and Middle Income Countries

Those who are living in sub-Saharan Africa, as opposed to those living in higher income countries, require more assistance as they get older (WHO, 2017d). In Ghana, more than 50% of the population between the ages of 65 and 75 require some assistance with daily activities, and in South Africa more than 35% do. By way of comparison, less than 5% of those in Switzerland require some assistance with daily living. (WHO, 2017d). The need for more assistance in sub-Saharan Africa is not a result of one issue, but instead stems from a multitude of development issues, such as, lack of universal health coverage and social protection, gender inequality, disparities in human rights, and inconsistent educational and economic backgrounds (WHO, 2017d).

Many of the healthcare systems in LMIC are not equipped to focus on conditions or diseases that affect an older population, instead, health systems focus on control of infectious disease and maternal and child health (Bart Jacobs, Richard de Groot, & Adélio Fernandes Antunes, 2016). The public health sector is unable to care for the growing elderly population, leading many people to seek care in the private sector. These private facilities may be poorly regulated and result in a high economic burden on those who have chronic non-communicable diseases (NCDs) or disabilities (Bart Jacobs et al., 2016). Private facilities often have high fees for service and out-of-pocket payments which cause economic difficulties for families (Emiliano

Albanese et al., 2011). Studies have shown that in LMICs, households with older people who are suffering from a disability or chronic NCDs, experience a higher economic burden and "experience higher rates of catastrophic expenditures for health care then other households" (Bart Jacobs et al., 2016). The Universal Health Coverage (UHC) embodies three objectives, one of which is, "people should be protected against financial-risk, ensuring that the cost of using services does not put people at risk of financial harm," (WHO, 2018). This is an important part of the UHC plan put forth by WHO to avoid people from experiencing catastrophic expenditures at the expense of their health.

When older people become dependent they are forced to rely on the care and support of others to be their caregiver. This caregiver is usually a family member or friend unless the family is able to afford the care of a professional and there is access to such care. Without any additional options for care, families take on the duties of caring for their family members themselves. Family values are very important when it comes to determining who will be the main caregiver for the elderly. Many family members see caring for the elderly in their family as a way of giving back to the older generations who cared for them when they were children (Mayston et al., 2017.) This idea of giving back is especially heightened in multi-generational households. Regions with limited services for more comprehensive care can attempt to promote the idea of family values and encourage their citizens that it is their duty to care for their elderly (Mayston et al., 2017). Governments have limited budgets and understand that adopting services for the elderly can be very expensive, encouraging families to take on the burden of care can save the governments money and resources that they would otherwise spend on caregivers.

The dynamics of caregivers are changing at the same time as the elderly population increases. As women become more educated and increase their presence in the work force, they will become less likely to be the caregivers for their families (Prince et al., 2007). Should the women become caregivers, they may forfeit their income, leading to a host of other issues for their families. Declining fertility rates have also had an impact, as there are fewer children to care for parents. In addition, there have been a greater number of young people moving out of rural areas and into more urban areas, and some elderly retiring to more rural areas (Bhan et al., 2017). Rapid urbanization is leading to an increased number of elderly people being left without support and care (Nortey et al., 2017), especially as there are fewer resources for healthcare in rural areas (Bhan et al., 2017).

Elderly people are important to society and should not merely be known for the higher health care costs they accrue. In many LMIC older persons are revered and highly respected members of society (Prince et al., 2007). They can provide unpaid care to children, grandchildren, and others with disabilities, if they themselves have the wherewithal to do so (Lloyd-Sherlock, McKee, & Ebrahim, 2018). Services for the elderly, whether formal or informal, are less than needed for the current population and shortages will only become more severe as the demographic transition accelerates in both high income and LMIC. Public policy and health care organizations are behind the curve in responding to the challenges. This lack of attention does a rapidly growing population a vast disservice and clearly, the care of the elderly needs to be made a global priority.

Chapter III

Methods

The review was undertaken in order to systematically identify, evaluate, and compile peer-reviewed, published literature that detailed the extent of care of the elderly in low and middle income countries, and to identify the barriers and facilitators of those who are caregivers.

Literature Search Strategy

Three electronic databases were used to search for relevant published materials on the topic: PubMed, Embase, and Web of Science. With the help of a librarian, these databases were selected due to the fact that they are commonly used when searching for published materials on global public health topics, and because they contain peer reviewed articles that are published in journals with wide linkages to other high profile databases. The review was expanded to include websites that have expert definitions and information, such as WHO and CDC. Key words were used to search in the abstract and title of the papers. The term 'elderly' ('aged' [MeSH]) was used with the operator 'and' with the terms 'developing countries' [MeSH], 'healthcare' ('delivery of health care' [MeSH]), low and middle income countries,' and 'caregivers' [MeSH]. The reference lists of articles that have been identified for review were searched by hand for additional publications that had potential to fit the criteria, and were included in the review.

Inclusion Criteria

This review included elderly persons' care in low and middle-income countries. Elderly persons are defined by the WHO as being 60 years or age or older (WHO, 2018b); this definition was used when searching for articles to include in the review. Countries that have been classified by the World Bank as low and middle-income countries (World Bank, 2017) were included, as well as those that were identified as "developing countries." All articles needed to meet the country requirement in order to be included in the review. Articles that focused on caregivers of those in low and middle-income countries were also included in this review. Articles that discussed the burden or cost or financial cost of elderly care were included along with those that address health care system access or availability in countries that met the requirements. Articles that discussed diseases related to ageing, such as dementia and Alzheimer's were included, as well as other chronic diseases, if the age range was specified for those over the age of 60.

Publications with randomized control trials, cohort, case-control, observational, qualitative, non-randomized controlled trials, and cross-sectional study designs were all included in this review.

All studies that were identified using the electronic databases were published between 1995 and January of 2018. Because of the limited number of studies around this topic, the inclusion criteria did not specify a range of years that studies could be used. This same time period was used when identifying other sources through different methods, including web searches, and reference lists.

Exclusion criteria

Articles that were not published in the English language were excluded from the search. The Emory database was used to identify the appropriate articles. Only those articles with full text and that were made available through the Emory University Library were used.

Analysis Strategy

Once studies were determined to fit inclusion criteria they were assessed for the strength of the study. This analysis was conducted using the Cochrane GRADE method for systematic review. Because of the lack of continuity of the studies being used a meta-analysis could not be conducted. Articles were assigned a GRADE level from low to high based on the quality and strength of evidence of the study. Quality was assessed base on the potential for bias in the study, whether studies have strong internal and external validity, and how well the studies were reported (Reitsma et al., 2009). Qualitative studies were assessed using the GRADE-CERQual assessment, which is based off of methodological limitations, coherence to primary studies, the richness or adequacy in the study, and relevance (Lewin et al., 2018).

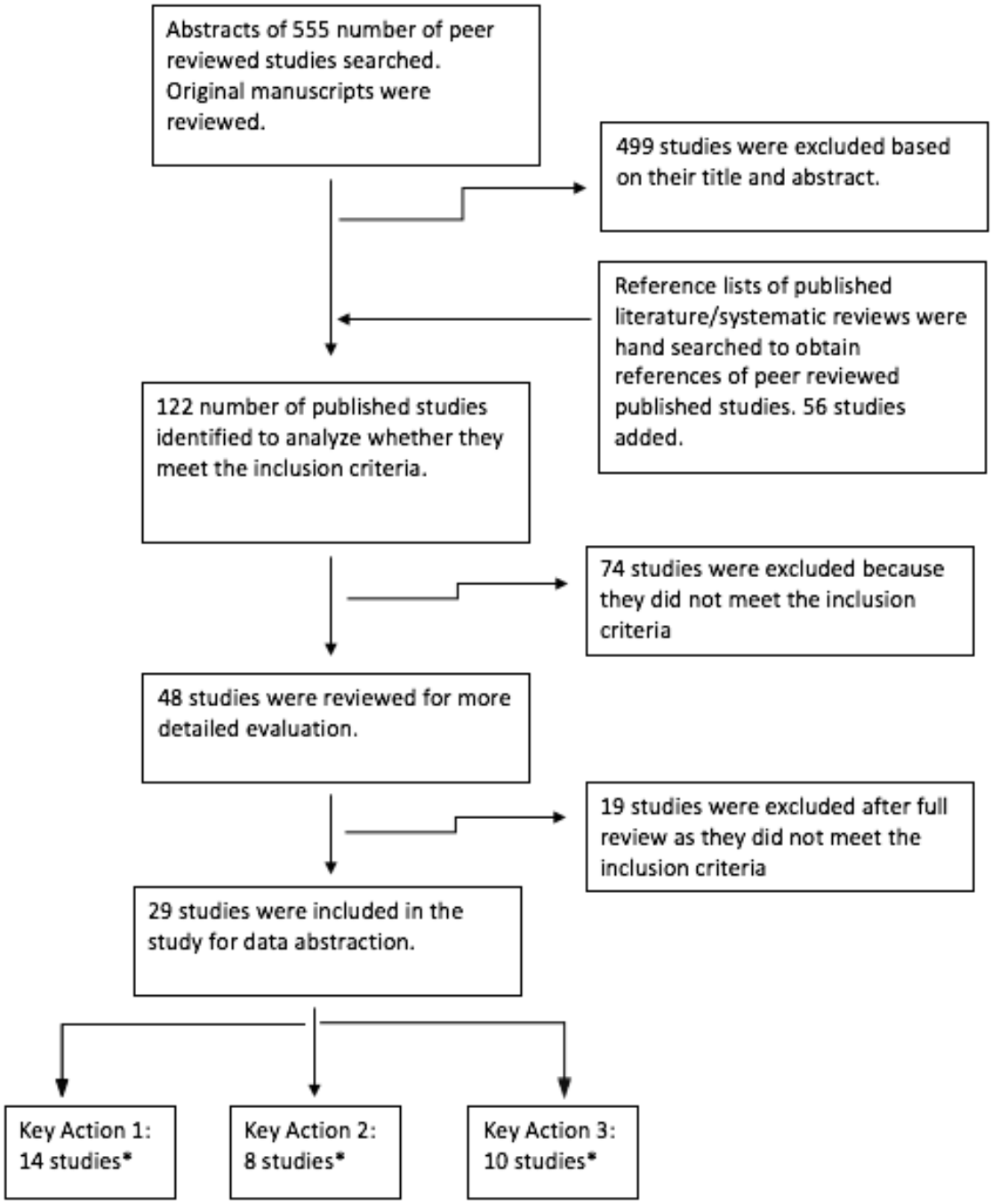
Data was synthesized based on the results presented in the studies and grouped by result. Quantitative results were included in the result section, however a meta-analysis was unable to be performed because of the inconsistency of the results.

Chapter IV

Results

I reviewed the abstracts and titles of 555 published peer reviewed studies (Figure 3: Study Flowchart). The reference lists of 555 articles including systematic reviews were reviewed to identify additional peer reviewed published studies to include in the pool of studies. Fifty six additional studies were identified as relevant and unique from the original 555 published peer reviewed studies, and were added to the list of studies for full review. Of the total of 122 studies identified to be reviewed fully, 74 were excluded because they did not meet the inclusion criteria. The remaining 48 studies were given a more thorough review, 19 were excluded because they did not meet all the inclusion criteria, leaving 29 studies that met all of the inclusion criteria. Of the 29 studies, 28 (96.5%) were published between 2001 and 2018. The geographic focus of the final set of studies included low and middle income countries (LMICs) from the five regions of WHO: African Region (n=17), South East Asia Region (n=9), Eastern Mediterranean Region (n=1), Region of Americas (n=13), Western Pacific Region (n=8). Twelve of the studies, 41%, had a multi-country focus.

Figure 3: Study Flowchart



*There is overlap between the 3 key actions and studies covered more than one key action

Three major themes emerged from the studies that were included in this systematic review. These themes centered upon dependency, caregivers, and health care systems, with the key issue of financing cutting across all three themes.

Dependency

The theme of dependency emerged in 8 articles. Studies that reported and/or used terms, such as dependency, physical impairments, frailty, functional disability, functional limitations, the necessity of care, and disability, are clustered together into the general theme of dependency. Table 2 provides the study design, Cochrane grade level and country where the studies took place.

Table 2: Articles focusing on Dependency with study design, Cochrane grade level, and country where study was conducted

Reference	*Study Design*	*GRADE*	*Country*
(Acosta et al., 2008)	Cross-sectional survey	low	Dominican Republic
(Devkota, Anderson, Soiza, & Myint, 2017)	Cross-sectional survey	low	Nepal
(R. H. Harwood, A. A. Sayer, & M. Hirschfeld, 2004)	Case Study	low	World wide
(Uwakwe et al., 2009)	Cross-sectional survey	low	Nigeria
(Gureje, Ogunniyi, Kola, & Afolabi, 2006)	Cross-sectional survey	low	Nigeria

(Debpuur, Welaga, Wak, & Hodgson, 2010)	Cross-sectional survey	low	Ghana
(Wandera, Ntozi, & Kwagala, 2014)	Cross-sectional survey	low	Uganda
(Payne, Mkandawire, & Kohler, 2013)	Longitudinal study, prospective cohort	moderate	Sub-Saharan Africa

In the Dominican Republic, 7.1% of the study participants required “much care” and 4.7% required “some care”. The prevalence of dependency increased “sharply” with age (Acosta et al., 2008). The same study found that dependent older people were more likely to receive financial support from family members and less likely to have a pension or paid work.

In Nepal the prevalence of frailty was found to be 46.2% among male participants who used to work in the army, with a p-value of less than 0.001 with older age, smoking, living with their son, breathing problems, unspecified pain and fatigue, poor dental health, and history of falls and fractures (Devkota et al., 2017).

A study performed in Nigeria found that the prevalence of dependency was 24.3% (22.1-26.5%), mostly concentrated in those age 80 and older (Uwakwe et al., 2009). This dependency was found to be associated with cognitive impairment, physical impairments, stroke, and depression, with depression being the largest contributor (Uwakwe et al., 2009).

Another study in Nigeria found the prevalence of functional disability, defined as the inability of a person to independently perform any function, was 9.3% with a standard error of 0.6 (Gureje et al., 2006). After performing a logistical regression, they found functional disability to be associated with female sex, older age, urban residence, chronic pain, undernutrition, and those who have self-rated their health as poor (Gureje et al., 2006).

In Ghana it was found that those who self-reported their health as being poor, were more likely to be the oldest old, defined as 60 years or older (Debpuur et al., 2010). Rating ones health as poor was also associated with functional ability, sex of respondent, and household wealth (Debpuur et al., 2010). Older people who were in the higher wealth brackets were less likely to rate their health as poor, as compared to older people in the lower wealth brackets.

A study in Uganda found that a third of the older population was disabled, and that the disability was positively associated with older age (OR=4.91, 95% CI:3.38-7.13), living alone (1.56, 1.07-2.27), separation or divorce (1.96, 1.31-2.94) or widowed (1.86, 1.32-2.61), households' dependence on remittances (1.48, 1.10-1.98), ill health (2.48, 1.95-3.15), and non-communicable diseases (1.81, 0.80-2.33), negatively associated with rural dwelling (OR= 0.56, 0.37-0.85), and with no association with sex of respondent (Wandera et al., 2014).

A study conducted in the sub-Saharan African region found that 45-year-old women can expect to spend 58% (95% CI, 55%-64%) of their remaining 28 years of life (95% CI, 25.7-33.5) with functional limitations, while 45-year-old men can expect to live 41% (95% CI, 35%-46%) of their remaining 25.4 years (95% CI, 23.3-28.8) with functional limitations (Payne et al., 2013).

Another study in the same region found that sub-Saharan Africa has the greatest burden of dependency, where the dependency ratio (the ratio of dependent people to the population of working age) is about 10%, as compared to the 7-8% seen elsewhere in the world (R. H. Harwood et al., 2004).

Despite the abundance of articles researching the topic of dependency, none of the recommendations made were associated directly with dependency.

Caregivers

The second theme that emerged from the data was a focus on caregivers. Ten studies discussed the complicating factors of providing care to the elderly including the financial aspects of being a caregiver. These articles and there grade can be seen in table 3.

Table 3: Articles focusing on Caregivers with study design, Cochrane grade level, and country where study was conducted

Reference	*Study Design*	*GRADE*	*Country*
(Prince et al., 2007)	review	low	Latin America, the Caribbean, India, Russia, China and SE Asia.
(Nortey et al., 2017)	Case study	low	Ghana
(Choo et al., 2003)	Cross-sectional (survey)	low	Malaysia
(Prince, 2004)	Qualitative cross-sectional (IDI)	high	India, China, South East Asia, Latin America, Caribbean, and Africa
(Aboagye, Agyemang, & Tjerbo, 2013)	Qualitative cross-sectional (IDI)	high	Ghana

(Wang, Xiao, He, & De Bellis, 2014)	Qualitative cross-sectional (IDI)	high	China
(Dias et al., 2008)	RCT	high	India
(Mayston et al., 2017)	Qualitative cross sectional (IDI) And Quantitative cross-sectional (survey)	high	Nigeria, China, Peru
(B. Jacobs, R. de Groot, & A. Fernandes Antunes, 2016)	Cross-sectional (survey)	Low	Cambodia

Caregiver burden and stress is important to try to understand and, if possible, alleviate. Three studies focused on caregiver strain or burden, however, the findings appear inconsistent across the studies. One study in Malaysia found that the caregiver burden was lowered by the help of informal support, meaning assistance from family members or friends of the older person (Choo et al., 2003). This same study found that having formal support, such as help from private nurses or maids, did not alleviate the burden that was felt by the caregivers (Choo et al., 2003). This contradicts a study done in China where formal care and care provided to caregivers was limited (Wang et al., 2014). This limited assistance in care was seen to increase caregiver strain (Wang et al., 2014). A randomized control trial in India found that an intervention that provided support that included community and home based care helped to lower the caregiver burden, measured by using a general health questionnaire, which showed a reduction of psychological impact on caregivers(-1.12, 95% CI -2.07 to -0.17) and lowered the care givers perceived distress (-1.96, 95%CI -3.51 to -0.41), measured by using the Neuro-

Psychiatric Inventory Questionnaire (Dias et al., 2008). A multi-country study conducted in India, China, South East Asia, Latin America, Caribbean, and Africa found that larger households with more people to manage caregiving needs had lower caregiver strain (Prince, 2004). Many of the caregivers had to cut back on their own work and shouldered the cost of private medical services and paid workers (Prince, 2004). This same study found that the strain on caregivers in LMIC was at least as high as that in higher income countries, despite the tradition of families caring for their elderly relatives in LMICs (Prince, 2004).

Money is a complicated factor when it comes to providing care and can be difficult for the caregivers when the elderly require expensive health care. Two studies focused on finances and caregivers. In Cambodia it was found that older people spent over 50% more per month on health care costs then younger people (B. Jacobs et al., 2016). This finding was problematic as households with older people residing in them were found to experience catastrophic health expenditures more often (B. Jacobs et al., 2016). If the family lived in rural areas or if a household member had an illness, especially an NCD the likelihood of experiencing catastrophic health expenditures increases (B. Jacobs et al., 2016). The estimated average cost of caregiving in Ghana was found to be US$186.18 per month, with 66% of that amount being the direct cost of caring (Nortey et al., 2017). In the study in Ghana 87% of the caregivers felt financial stress as a result of having to care for an elderly relative (Nortey et al., 2017).

A review of many countries in, Latin America, the Caribbean, India, Russia, China and South East Asia, found that the most cost effective way to care for people with NCDs that cause dependency is through supporting and educating the families who are providing care (Prince et al., 2007). While this may be true, other studies have found that the support from family

members as caregivers is declining while the demand for support is rising (Aboagye et al., 2013). A qualitative study done in Nigeria, China, and Peru found that women were the de facto care givers, but that the idea of families being the main caregiver is being contested, with no plan for another entity or government to take over the responsibility (Mayston et al., 2017).

Again the recommendations made in the studies did not focus on the topic of caregiver stain.

Health Systems

The third and final theme that emerged from the systematic centered on various aspects of the health care system. This is a broad theme that focuses on the need for a change in health care systems, including financial issues that accompany health care work. Seven articles were related to this topic and can be seen in table 4.

Table 4: Articles focusing on Health Systems with study design, Cochrane grade level, and country where study was conducted

Reference	*Study Design*	*GRADE*	*Country*
(Alshamsan, Lee, Rana, Areabi, & Millett, 2017)	Cross-Sectional, survey	low	China, Ghana, India, Mexico, Russia, and South Africa- all working towards UHC
(Bhan et al., 2017)	Qualitative Cross-sectional	high	India
(Abegunde, Mathers, Adam, Ortegon, & Strong, 2007)	Qualitative Cross-sectional	high	Ghana

(Prince et al., 2008)	review	low	Latin America, the Caribbean, India, Russia, China and SE Asia.
(Patel & Prince, 2001)	Qualitative cross-sectional (focus groups)	high	India
(Nortey et al., 2017; Tam & Yap, 2015)	Qualitative cross-sectional (IDI)	high	Uganda and Singapore
(E. Albanese et al., 2011)	Cross-sectional (survey)	low	China, India, Mexico, Nigeria, Peru (rural) Cuba, Dominican Republic, Puerto Rico, Venezuela (urban)

In India researchers found that many chronic conditions that can affect the elderly, such as depression and dementia, were regular missed by primary health care workers, but were diagnosed by trained community health care workers (Patel & Prince, 2001). Depression and dementia are seen as normal side effects of ageing, thus primary care workers do not see these diagnosis in their clinical work (Patel & Prince, 2001). When community health workers become trained in the symptoms of common disease of ageing they can notice the symptoms more often, which leads to the discrepancy in diagnosis (Patel & Prince, 2001). In a multi-country study where the selected countries are striving towards the goal of Universal Health Coverage, it was found that detection and prevention of chronic conditions, such as hypertension and cancer was poorly done and that the cost of services remained an enormous barrier to obtaining health care services, despite insurance schemes being in place. In contrast, a study done comparing the care of the elderly between Uganda and Singapore found that health

insurance is an important intervention for people who are older, as it provides them with economic freedom, and easier access to health care. (Nortey et al., 2017; Tam & Yap, 2015). In another multi-country study the authors found an inverse relationship between the proportion of consultations requiring out-of-pocket costs and the prevalence of health services use(r=-0.50, p=0.09) (E. Albanese et al., 2011). Cost and lack of access are not the only barriers found when it comes to accessing health care. A study conducted in India found that the public health systems were insensitive to the elderly and overburdened with work, which made receiving care undesirable, according to the patients (Bhan et al., 2017).

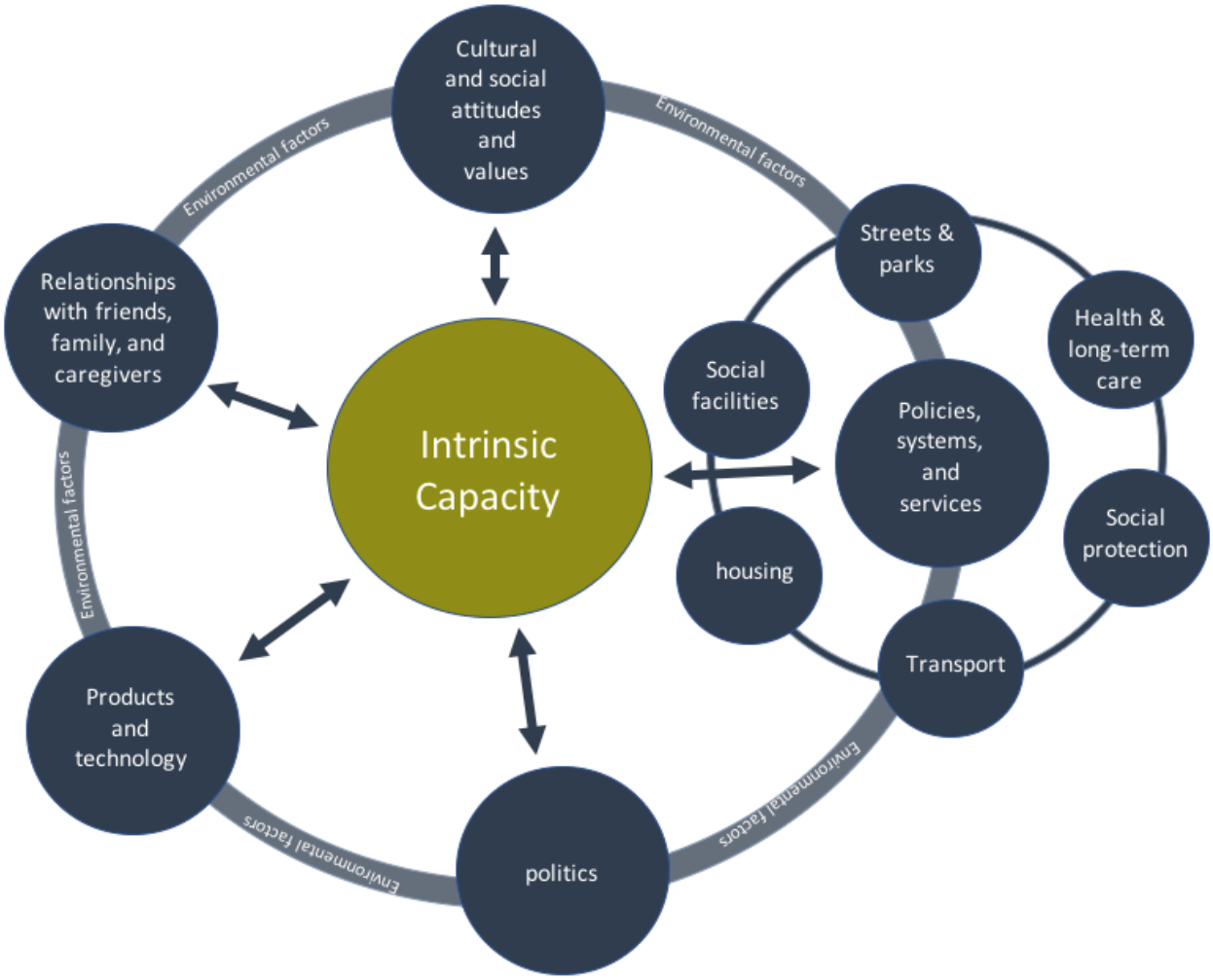
A study conducted in 23 low and middle income countries found that an estimated cost of approximately US$84 billion of economic production was lost between 2003 and 2015 because of heart disease, stroke, and diabetes in those 23 countries alone (Abegunde et al., 2007). This loss of money is due to the indirect costs of having chronic conditions including the loss of availability to work and loss of finances to invest in the economy. This estimate was based off of data for labor input, the capital stock, and the rate of change of both (Abegunde et al., 2007). This finding is particularly disturbing because it only covers three chronic conditions. The impact of the shifting global burden of disease can have a substantial impact on the economy of countries if not managed proactively.

The WHO's framework of *Global Strategy and Action Plan on Ageing and Health* (GSPA) has created five strategic objectives for countries to achieve a population that can practice healthy ageing; commit to action, align health systems to the needs of older populations, develop age-friendly environments, strengthen long-term care, and improve measurement, monitoring, and research (WHO, 2016). In this review we focused on the second objective of

"align health systems to the needs of older populations," (WHO, 2016). This objective has three action items: align health systems around intrinsic capacity and functional ability, developing and ensuring affordable access to quality older person-centered and integrated clinical care, and ensuring a sustainable and appropriately trained, deployed, and managed health work force. These actions items are related to the themes that emerged from the studies, and the recommendations that were discussed in the studies. The recommendations from the review can be seen in table 5 and are discussed below. Almost all of the recommendations in the reviewed articles concerned one or more building blocks of the health system in a given country or region.

The World Health Organization (WHO) states that a person's functional ability is determined by their intrinsic capacity, defined as the combination of a person's physical and mental capacities, relevant to environmental factors, and how they interact, as seen in figure 4 (WHO, 2016). Because of this comprehensive definition, sixteen studies provided information relating to the action and span a number of environmental factors. The recommendations of the studies by topic can be seen in table 5.

Figure 4: Functional ability: the interactions of intrinsic capacity and environmental factors (adapted from WHO. 2016)



Seven out of the 16 studies recommended the importance of increasing access to age appropriate health care facilities including preventive care, detection services, and treatment availability. The topic of improved health facilities spans a number of the environmental factors that interact with a person's intrinsic capacity. Four studies focused on social protection and long-term care facilities. These studies address the need to have facilities and policies set up to manage older people's needs. Of the 16 articles that address the topics within the first key action, align health systems to the needs of older populations, nine address the needs for changes in government's policies.

Eight articles address action item number 2, the topic of ensuring affordable access to quality older person-centered and integrated clinical care. These articles address different aspects of creating affordable access, one article recommending tax incentives to the private sector, two articles suggesting the reformation of welfare programs and the addition of social pensions in LMICs, and two articles suggesting a community level intervention of reducing socio-economic inequalities among older persons and improving the aggregate economic growth. One article specifies the need to provide financial assistance to those with dementia, and two articles were concerned with the reduction of out-of-pocket costs for individuals. These eight articles provide recommendations based on the need to finance a more efficient health care system.

When discussing the need for an appropriately trained, deployed, and managed health work force, the articles focused on four topics: intervention and policies that improve the ability of the health work force to move away from simple curative care and focus more on NCDS (3 studies); the need for the health work force to be able to identify NCDs and educate

the general public on healthy ageing (2 studies); and the need to educate and train home based caregivers to prepare them for their role (2 studies, 1 of which was graded as high); and the need for more active community based rehabilitation and community health workers, (3 studies, 2 of which were graded as high). The remainder of the studies in this topic were graded as low, due to their cross-sectional nature.

Table 5: Recommendations for Aligning health systems to the needs of an older population

Recommendations for orienting health systems around intrinsic capacity and functional ability	
Recommendation	Reference
Establish age appropriate long-term care facilities and develop long-term care policies	Acosta et al, 2008 Hussein et al, 2017 Mayston et al., 2017 Gureje et al., 2006
Increase access to age appropriate health care facilities, including prevention, detection, and treatment	Acosta et al, 2008 Hussein et al, 2017 Prince et al., 2008 Prince et al., 2007 Uwakwe et al., 2009 Wandera et al., 2014 Bhan et al., 2017
Governments and policy makers are obligated to provide care and need to include the input of older people in shaping the policies that they develop. The preference and needs of older people in the context of cultural and religious norms.	Albanese et al., 2011 Uwakwe et al., 2009 Payne et. Al, 2013
Raise awareness about elderly needs	Prince et al., 2007 Patel et al., 2001

Education and information on healthy living need to be made available to the general population to enhance prevention and control of chronic conditions.	Debpuur et al., 2010 Hussein et al., 2017
Aim policies at supporting family members to fulfill such roles remain the most viable and possibly more likely to be culturally acceptable than those centered around institutional or formal care.	Jacobs et al., 2016 Acosta et al., 2008
Attention needs to be directed towards the development of mechanisms for ensuring the social protection of older persons	Acosta et al., 2008 Jacobs et al., 2016 Uwakwe et al., 2009 Bhan et al., 2017
Recommendations for developing and ensuring affordable access to quality older person-centered and integrated clinical care	
Policy makers could consider tax incentives to the private sector to encourage them to take on more corporate social responsibilities that specifically target elderly and other vulnerable populations	Nortey et al., 2017
Provide financial assistance to those with dementia	Prince et al., 2008
Well fare reform is important, such as social pensions	Uwakwe et al., 2009 Acosta et al, 2008
Reduce socio-economic inequalities among older persons and improve aggregate economic growth	Wandera et al., 2014 Payne et al., 2013
Out-of-pocket costs are linked directly to government policies on the financing and reimbursement of healthcare. *Reducing out-of-pocket payments can improve financial affordability of services*	Alshamsan et al., 2017 Albanese et al., 2011

Recommendations for Ensuring a sustainable and appropriately trained, deployed, and managed health workforce	
Interventions and policies should be focused on improving management of NCDs at the primary care level in public facilities, and shift in primary care away from simple curative care	Jacobs et al, 2016 Gureje et al., 2006 Wandera et al., 2014 Harwood et al., 2004
More active community based rehabs and community health workers.	Gureje et al., 2006 Patel et al., 2001 Dias et al., 2008
Workforce need to be able to promote healthy ageing and provide education on healthy living and identify NCDs and mental health disorders.	Debpurr et al., 2010 Acosta et al, 2008
Education and training programs and home based coaching for caregivers led by community nurses should be established to prepare caregivers for their role.	Wang et al., 2014 Patel et al., 2001

Chapter V

Discussion

In this review, I explored published literature concerning elderly care in low and middle-income countries (LMIC), gaps in the literature, and the needs of elderly populations that have been identified and related the research to the global strategy and action plan that the WHO has released on ageing and health. I conducted this systematic review by using peer-reviewed articles from 1993 to 2018. The WHO put out a broad action plan meant to be used to modify the current practices of countries when it comes to working to improve the care of the elderly.

Within the WHO's action plan, I focused on one of the goals: "align health systems to the needs of older populations" (WHO, 2016). This goal was chosen because it has a broad scope and interacts with all of the other 4 strategic objectives; commit to action, develop age-friendly environments, strengthen long-term care, and improve measurement, monitoring, and research.

The studies included in this review highlight some of the gaps in the understanding of the complexity of healthy ageing, and the disparities between the guidelines put out by the WHO and research that has been conducted. The main themes that emerged from the literature centered upon dependency, caregivers, and health care systems. These themes touched on different aspects that need to be addressed when discussing how countries will "align" their health care systems to the needs of the elderly populations. While instructive , the studies reviewed do not cover every part of the issue at hand, and highlighted the lack of detail in the plans laid out by the WHO. The review also starkly revealed the limited number, specificity, and quality of the research conducted to date in LMICs on an issue that countries will face in the future as their populations age, a future for some that is closer than others.

The published literature stresses the changes in the population distribution that are likely to occur in most countries toward a higher proportion of the population 60 years of age and older by 2050. The increased population of those aged 60 and older can be attributed to lower fertility rates, decreasing and changing mortality rates, and long life expectancies (Hussein & Ismail, 2017). As people live longer the burden of disease in countries will shift from infectious disease to chronic non-communicable disease, as seen in figure 2. These trends have already been seen globally and will have an impact on the health systems in the countries with

lowest income who have been focused on curing infectious disease, which is why the goal of, "align health systems to the needs of older populations" (WHO, 2016) was taken as the framework for this systematic review.

The WHO definition of dependent is, "the requirement for frequent help from other people, beyond what would be expected by virtue of family or social ties"(Acosta et al., 2008). This definition is very vague and highly subjective to culture and personal experiences of the person who requires care. In the 8 studies that discussed some aspect of dependency, dependency, physical impairments, frailty, functional disability, functional limitations, the necessity of care, and disability, were terms used to describe a similar problem and highlights the lack of a standard nomenclature. The difference in terminology makes it impossible to conduct a meta-analysis and understand how these findings can be translated and used for all areas of the world that are facing the same problem. This lack of consistency means that more studies will likely be done on the same topic, and will repeat results, without adding value to our understanding of the effects of dependency among the elderly and strategies to reduce such dependency. One has to balance the need for more research funds with the acute need for more services for those who are dependent and in need of care and support. There needs to be standardization of the terminology used when discussing the elderly in order for consistent beneficial research to be conducted to develop a comprehensive understanding of the issues.

The articles discussing dependency varied across many countries but the one consistent result that was found was that as people get older the prevalence of dependency, frailty, etc., increases. This finding is important as it helps us to understand that caregivers and those who

provide support to the dependent will be an important part of allowing the population to age healthily, as more caregivers will be needed as people age. It is well understood that the global population is living longer and the percent of those over the age of 60 will outnumber those less than 9 years old by 2050 (UN, 2015). We also know that as people get older their needs change and that can lead to the need for more care. Studies done to show that the ageing is an important topic to study may no longer be necessary. However, research on aging has not yet garnered the attention of policy makers or funders, so advocacy and well-crafted research must continue apace. Estimating the growing elderly population at national and sub-national level is, however, critical to health workforce planning, financing forecasting for health care costs and social service costs, and effects on social networks as the population ages. If the elderly predominate in a society do their needs take precedence over the younger populations even if the latter populations are smaller as a proportion of the total? Changes in population dynamics have enormous consequences for the way taxes are collected and used. The policy effects of a growing dependent, older population are still unknown particularly in low and middle-income countries where the transition is in its early stages.

The conversation of dependency leads into the discussion of caregivers, as it is caregivers who provide assistance to the rising number of people becoming dependent. When discussing the needs of the ageing population, it is impractical to rule out the needs of the caregivers who support the ageing population. The two are intrinsically connected. Caregivers struggle with burdens of their own from financial issues to health problems. This is a global problem. One study found that the burden of care in low-income countries is at least as high as the burden of care in high-income countries (Prince, 2004). That means that the burden of care

is a global issue, that there are potential lessons for LMICs to learn from the experiences in high-income countries. In this era of universal health coverage, the role of informal providers of care and family members must be embedded in decisions about extending the package of essential health services and minimizing financial risk due to health care seeking. Having a more robust health care system will not alleviate the burden felt by caregivers.

The idea of who is the go-to caregiver is changing as well; the daughter or daughter-in-law is no longer the de facto caregiver in many cases (Mayston et al., 2017). This idea is again, widely understood with sound reasoning behind it, as people are moving away from their families into more urban settings, and more women are working (Bhan et al., 2017). Research should not be focused on why people are less willing to be the caregivers for their elderly relatives, but on what steps can be made to insure that the elderly in need of a caregiver are able to have one, and that there this support for those who are caregivers. These steps need to be more comprehensive then the WHO's recommendation that all nations have a robust long-term care system available that is affordable, accessible, person-centered, with fairly treated workforce, and all the responsibility of the national governments (WHO, 2017d). While there is nothing wrong with idealistic goals that are perhaps too aspirational to achieve, to push countries toward a better system, there is a problem when these goals are set without a solid plan to attempt to attain them. The WHO puts out guidelines and reports covering all the important factors around healthy ageing, without any guidance on how to achieve these goals, most likely because they do not know how to achieve them. The world is not ideal and we do not work with unlimited resources. Country specific research needs to be done to understand how the problem can best be addressed in different contexts. But LMICs can and should learn

from the experiences of high income countries and countries in economic transition. And if that research shows that a comprehensive long-term care system will help alleviate caregiver burden and provide care when there is no one else available, attainable goals, with measurable indicators, should be promulgated in order for countries to attempt to improve their long-term care system, if it exists at all. It is helpful for advocacy purposes for global organizations, like WHO, to make aspirational statements. But the next step, explicating a focused implementation plan, is critical. Without this step, the goals will suffer policy drift and denial from policy and decision makers.

Published literature on the health systems in LMICs indicate that most systems are ill prepared for the shift in the burden of disease and the needs of the elderly population (Prince et al., 2008). This review found that the most widely recommended change in the health system is to increase both physical and financial access to age appropriate health care that can focus on prevention, detection, and treatment. This aligns with the continuum of care that is presented in Figure 2. In this figure, "age inclusive-friendly primary care" and "prevention and promotion tailored to the person" span the entire continuum, stressing their importance at all stages of ageing (Evans et al., 2017).

The issues that have arisen when discussing the problems with in a health care system for the elderly follow similar lines as those issues that affect caregivers. We understand that health care systems in LMICs are generally poor at detecting and preventing chronic conditions and that cost is an enormous barrier for people when it comes to accessing health care. These are well formulated and studied problems, made more salient by the estimates of financial loss that occurs by not managing common chronic conditions like heart disease, stroke, and

diabetes (Abegunde et al., 2007). It is also well understood that just setting up a health insurance system will not fix this problem, and that the barriers to accessing health care are very similar for the elderly as they are for everyone else, e.g. lack of transportation, dependency on other, poor roads, and cost. A study done comparing the care for the elderly in Uganda and Singapore found that health insurance is an important intervention for people who are older, as it provides them with economic freedom and easier access to health care (Nortey et al., 2017; Tam & Yap, 2015). I would argue that this may be true in a region where health care and preventative measures are already accessible and being used, however just adding health insurance as a social intervention will not provide these benefits if the health services are not available for use. And again the WHO sets out guidelines like, "align health systems to the needs of older populations" with action items such as, "developing and ensuring affordable access to quality person-centered and integrated clinical care," (WHO, 2016). This is unhelpful guidance that will lead to no sustainable results. These goals give the reader no clear idea of how to "align" a health system and do not appear to use the health systems strengthening framework to focus on specific building blocks salient to improving, or in many cases, developing health systems that are responsive and that anticipate demographic and burden of disease transitions. These goals also lack any indication of the breadth of coverage needed or the complexity of coverage. No mention of essential medicines is made, nor are delivery and cold chains discussed, there is no understanding of what goes into a health system in general, and no specifics about what an older population needs. A vertical approach cannot be suggested when a horizontal approach is required. Having an integrated clinical care health system with a well prepared workforce is a helpful goal statement but begs many questions.

What if people and medications are not available at the facility or more comprehensive care is needed? Who is paying for all of these things to be in place? Who will be covered at these clinics, will they solely be for the elderly or will they be for everyone, in which case how many staff are needed to make sure they are not overburdened? Who is monitoring to make sure proper care is given? Are records being kept? How are these clinics making money to sustain their work? Will there be an insurance system in place? Will the system be multi-payer or single payer? All of these questions and many more need to be addressed as part of the alignment process. This review stressed the need to include the elderly in the decision making process for countries to identify what policies would be helpful for the elderly. Although not stated explicitly, I would recommend that caregivers are involved in the decision process as well, as the research has indicated that caregivers have a different set of needs then the elderly.

The recommendations set forth about financing and reducing out- of -pocket costs were also very broad and difficult to achieve. It is impractical to recommend that a country should reduce socio-economic inequalities among older persons and improve the aggregate economic growth, as though that were the function of the health care system. These are broader social goals and are likely to compel decision makers to confront uncomfortable trade-offs such as intergenerational wealth transfer, competition among strategies with short term gains with those that have a long time horizon for change, and health systems that are reluctant, if not resistant, to innovation.

There is an opportunity cost of not treating chronic disease, an estimated US$84 billion was lost between 2006 and 2015 in 23 countries because of heart disease, stroke, and diabetes alone (Abegunde et al., 2007). Savings are possible and there is money to be made in care for

the elderly. Public health seems content to wait for the private sector to solve the problems at hand. The private sector is more nimble and more innovative than the public sector. There are many examples of private sector initiatives. Rather than discounting these initiatives, governments and the nonprofit sector can partner with the private sector and encourage the focus on public goods rather than products marketed to a high-income slice of the market while ignoring those at the lower end of the market whose needs are more acute.

Aspirational goals and guidelines are necessary but not sufficient just as research is necessary but not sufficient. The goal of healthy aging is one to which all societies can aspire. It is a goal that requires more than wishful thinking. It will require focused implementation research, joint learning across countries that are at different stages of the demographic transition, learning from distinctive models of care for the elderly that are ready for scale-up, and disciplined public policy decisions that tackle the difficult trade-offs that are required.

Chapter VI

Limitations

One limitation of this review is that only peer-reviewed articles that were published and written in English were included in the review. Future reviews should include articles in other languages, e.g. Japanese, Chinese, as care of the elderly is an indicator of social and cultural norms that will influence health system approaches. . Because of the limited body of published research in this field, most of the studies are of cross-sectional design, leading to most of the studies being graded as “low” when using the Cochrane Grading system for systematic reviews.

Because of the mostly cross-sectional studies the risk of bias in the literature is much higher. The lack of consistency in the studies also made it impossible to do a meta-analysis, which would have strengthened the findings in this paper.

Another limitation of the study was that only one person did the analysis, which increases the bias of the analysis. This bias is diminished by strict inclusion and exclusion criteria for the studies in the review.

What is known about care for the elderly, the current system that supports that care and the recommendations for change that will be required in future fit within the ecological framework. Figure 4 shows how the different recommendations fit within the ecological framework and the multi-dimensional nature improving healthy ageing has. Healthy ageing cannot be achieved by simply tackling one of the recommendations; it is a multi-level issue that needs to be addressed from the individual level all the way to the societal level. The WHO action plan for healthy ageing follows a similar pattern and understands the complexity of the growing population.

Recommendations

There are a myriad of recommendations for improving the ability of the elderly in LMICs to be able to practice healthy ageing. The amount of studies that could be done on this topic are most likely limitless, however further research should focus on implementation science and policy design to reach the goals set forth by the WHO.

We need a more sophisticated understanding of the populations in each country, both on a national level, and a sub-national level. These data will give the country an understanding of the situation they will be facing, both with loss of income as the elderly age out of the formal work environment, but also the needs for their health work force.

More qualitative studies need to be conducted to understand the nuances in the burden that is felt by caregivers and the emic perspective of those who are providing care. This type of literature is crucial because of the discrepancies in the current literature. It is assumed that caregiver strain would be improved by the addition of formal care and support, however in Malaysia, this was found not to be the case (Choo et al., 2003), which means that for some people the addition of formal care services like private nurses and maids may not alleviate the strain felt by the caregivers. To understand why this solution was not successful, quantitative analysis will not be sufficient; in-depth interviews with caregivers, and focus groups among families and those providing formal care will need to be undertaken to understand what is lacking with the addition of formal care.

More studies should be conducted looking at the benefits of community health workers in a community and their ability to detect the presence of some chronic conditions related to ageing, such as dementia and depression. The study conducted in India found that trained community health workers were able to recognize more common chronic conditions then primary care workers (Patel & Prince, 2001). It is not completely well understood how they this increase in diagnosis was made, however this poses an interesting model that should be further researched with either prospective cohort longitudinal studies, or a cluster randomization of

towns or districts to understand how the work of community health workers can best benefit the ageing population.

Along with studies, national and sub-national indicators need to be created around the goals in the WHO *Global Strategy and Action Plan on Ageing and Health*. This framework is not a sufficient mechanism to expect countries to be able to achieve the goals presented in it.

Conclusion

The global population is living longer, which can be linked to successes in public health advances through the years. The impact in low and middle income countries (LMICs) of this increased elderly population will provide many benefits for the countries, especially if countries are able to respond to the shifting challenges of demographic change, the burden of disease, new products and services, and changing cultural and social norms. The elderly are such an important part of society; they not only help with the care of children, but their wisdom and knowledge of how things have been done and how things can be done is invaluable.

There is a growing gap between those who used to provide informal care and access to formal care, and if no safety net is added into the system the ones who will be most at risk are the elderly. There is a clear understanding in the growth of the elderly population, which will lead to more dependent adults. The de facto caregivers are no longer the default for care, and the health system is not set up to manage the potential onslaught of those in need. These

findings are clear from the results of this study and the recommendations from the studies and from the WHO are too broad and unachievable.

A comprehensive response needs to be made ranging from the country level to the individual level in order to properly care for the ageing population. Interventions focusing on education of the population from the general public, to the health work force, to the elderly and their caregivers will be very important for countries to increase understanding of the needs of the elderly. More comprehensive studies will need to be done, including longitudinal and qualitative studies in order to best understand the nuances of the needs of those who are elderly. These studies can help to influence country policies to be better equipped to handle the new demographics in a countries population.

An increase in the older population is a result of the successful work that has been done to manage to keep general populations healthy enough to live longer. It is now the duty of public health, governments and the private sector who have made it possible to live longer lives to provide services for the elderly to live a life where healthy ageing is the norm.

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