



## Preparing nurses and nursing students to care for older adults in lower and middle-income countries: A scoping review



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### ABSTRACT

**Background:** The aim of this review was to examine the extent and nature of published literature on nurses' and nursing students' preparedness to care for older adults in lower and middle-income countries.

**Method:** A scoping review with 27 articles, guided by the Arksey and O'Malley (2005) framework was conducted. The following electronic databases were searched: MEDLINE, CINAHL, ERIC and SCOPUS. Grey literature using Google Scholar and ProQuest were also searched. Key search terms and subject headings such as "nursing students", "nurses", "stakeholders", "ministry of health", "readiness", "knowledge", "attitudes", "elder care", "seniors care" and "older adults" were used to identify relevant articles. Studies that reported on gerontological nursing, nursing students' and nurses' knowledge and attitudes towards older adults, and stakeholders/employers' views about nursing students' knowledge and attitudes towards older adults were included.

**Results:** Nurses reported having moderate to insufficient knowledge in the care of older adults in the majority of the studies. Nursing students reported insufficient knowledge in the care of older adults. However, both nurses and nursing students reported positive attitudes towards the care of older adults but held misconceptions about caring for older adults. Nursing students also reported a low preference for working with older adults.

**Discussion and implications:** The inadequate preparation of nurses and nursing students in the care of older adults means there are opportunities to enhance knowledge about health and nursing care in lower and middle-income countries and build on the positive attitudes towards older adults.

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### What is already known about the topic?

- Gerontological nursing education is gaining attention in high income countries.
- Working with older adults is the least preferred career choice for nursing students.
- There is no previous scoping review on nurses' and nursing students' preparedness to care for older adults in lower and middle-income countries.

### What this paper adds

- There are general and specialized knowledge gaps about the care of older adults among nurses and nursing students in lower and middle-income countries.
- Nursing students' in lower and middle-income countries have high positive attitudes towards older adults. There are gaps in empirical literature regarding stakeholders' views on gerontological nursing education in lower and middle-income countries.

### 1. Introduction

The growth of the ageing populations is a global concern. The rate of increase in the proportion of older adults in the population is greater in lower and middle-income countries than in high-income countries (Beard et al., 2012; Parmar et al., 2014). According to a UN report (United Nations, 2015) about 60% of persons aged 60+ live in

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lower and middle-income countries. A more recent UN report (United Nations, 2017) projects that by 2050 nearly 8 of 10 persons aged 60+ will be living in lower and middle-income countries. This will result in an increased demand on social and health care services (Debuur et al., 2010). Yet, health systems in lower and middle-income countries in parts of Asia, the Middle East, and particularly, in sub-Saharan Africa may lack specialized and adequately trained personnel and infrastructure to provide comprehensive care for the older adult population (Ocansey et al., 2013).

Due to economic challenges and the focus on primary healthcare conditions particularly communicable diseases (Debuur et al., 2010), lower and middle-income countries may have inadequate time to adjust to the rapidly changing demographics in the older adult population with chronic health conditions (Beard et al., 2012; Parmar et al., 2014). However, the incidence of chronic conditions such as cardiovascular disease, cancer, and diabetes are increasing in lower and middle-income countries (Bollyky et al., 2017). Older adults are more at risk of developing chronic conditions, thus, their search for health care will likely also increase (Gomez-Olive et al., 2013). The consequence of the focus on communicable diseases, has been the inadequate attention by stakeholders in responding to the needs of the growing older adult population (Kwankye, 2013). For this review, stakeholders are defined as employers/decision-makers and implementers of policies for the education and training of health professionals in lower and middle-income countries. Nurses are required to be adequately prepared with a sufficient theoretical knowledge base which guides their clinical practices (Sheaff et al., 2009) and provision of comprehensive nursing care to older adults (Dahlke et al., 2015). Evidence suggests that adequately prepared nurses with better knowledge and skills, and positive attitudes towards older adults improve patient outcomes such as reduced hospital length of stay, reduced readmission rates, and patient and family satisfaction (Mattos et al., 2015; Salmond and Echevarria, 2017).

However, the literature regarding the preparedness of nurses to provide care to older adults in lower and middle-income countries has not been reviewed. For this review and in line with previous research (Blais et al., 2006; Jansen and Morse, 2004; Kloster et al., 2007; McCann et al., 2010; Williams et al., 2007), preparedness is defined as: the ability of the nurse to exhibit adequate theoretical knowledge, skills, positive attitudes with or without preference for providing care for older adults. The World Bank definition of lower and middle-income countries, as countries with a gross national income per capita of between \$1006 and \$ 3995 (World Bank, 2017) was used for this review.

The review aimed to examine what is known about the preparedness of nurses to provide care for older adults in lower and middle-income countries. We also sought to explore the literature on the perspectives of stakeholders on the readiness of nurses to provide care for older adults. The research questions were:

- What are the perspectives of nursing students and nurses on their preparedness to provide care for older adults in lower and middle-income countries?
- What are the views of employers/stakeholders in the healthcare sector on the preparedness of nurses to provide care for older adults in lower and middle-income countries?

## 2. Methods

A scoping literature review is an iterative process of summarizing literature in a field to identify the breadth and depth of a concept or issue (Levac et al., 2010). The Arksey and O'Malley (2005) framework for conducting scoping reviews was adopted. The framework includes six stages:

### 2.1. Identifying the research question

See above.

### 2.2. Identifying relevant studies

The search was developed with the assistance from a health sciences librarian. Four databases were searched: MEDLINE, CINAHL, ERIC, and SCOPUS. Various free text and keywords were used in controlled vocabulary databases in each database with MeSH and subheadings. See Supplementary material for MEDLINE search strategy. The total number of abstracts obtained from the four databases was 3593 (see Fig. 1). The articles were imported to Covidence (Covidence, 2016). Titles and abstracts were screened by the first author (DAB) then full-text articles were reviewed for eligibility in consultation with the research team. Grey literature search using Google Scholar and ProQuest with key words and search terms was also conducted. Google Scholar allowed for a broad search for scholarly resources, public policy documents, and academic literature on the preparedness of nurses to care for older adults. ProQuest provided open access to scholarly articles as well as dissertations and theses across the world. The search yielded over 3 million results from ProQuest and Google Scholar; given the vast amount of results from the grey literature, we depended on the settings of "sort by relevance ranking" within Google Scholar to bring the most relevant results to the top of the list. We also set the number of pages to be screened to the first ten pages of each search's results (representing 200 results) (Dunleavy, 2014). This strategy ensures that the most relevant results are captured and ensuring a feasible amount to be screened. With the title and short text, the results were screened using the inclusion criteria for the review. The grey literature search did not yield relevant results for the review. Most of the studies were conducted in high-income countries and other fields such as social work and physiotherapy, which were not relevant to the inclusion criteria for the review.

### 2.3. Inclusion criteria

- Original research studies using quantitative, qualitative and mixed methods research designs;
- Conducted in lower and middle-income countries;
- Published in English between January 1990 and June 2017. Due to the paucity of literature on the topic especially in sub-Saharan African countries, the search was limited to 1990 to June 2017.
- Reported on the education of nurses in geriatrics and gerontology, preferences or willingness to work with older adults;
- Reported on the views of nurses and nursing students on their knowledge, skills, and attitudes to provide care for older adults; reported on employers or stakeholders' views on the knowledge, skills, and attitudes of nurses and nursing students to provide care for older adults;

### 2.4. Study selection

One author (DAB) reviewed and selected the articles on Covidence base on the inclusion criteria in consultation with the research team.

### 2.5. Charting the data

Data were manually extracted from the selected articles using Excel and summarized in a tabular form. Extracted data included: study design, the knowledge, skills, attitudes, perceptions and preference of nurses and nursing students concerning working

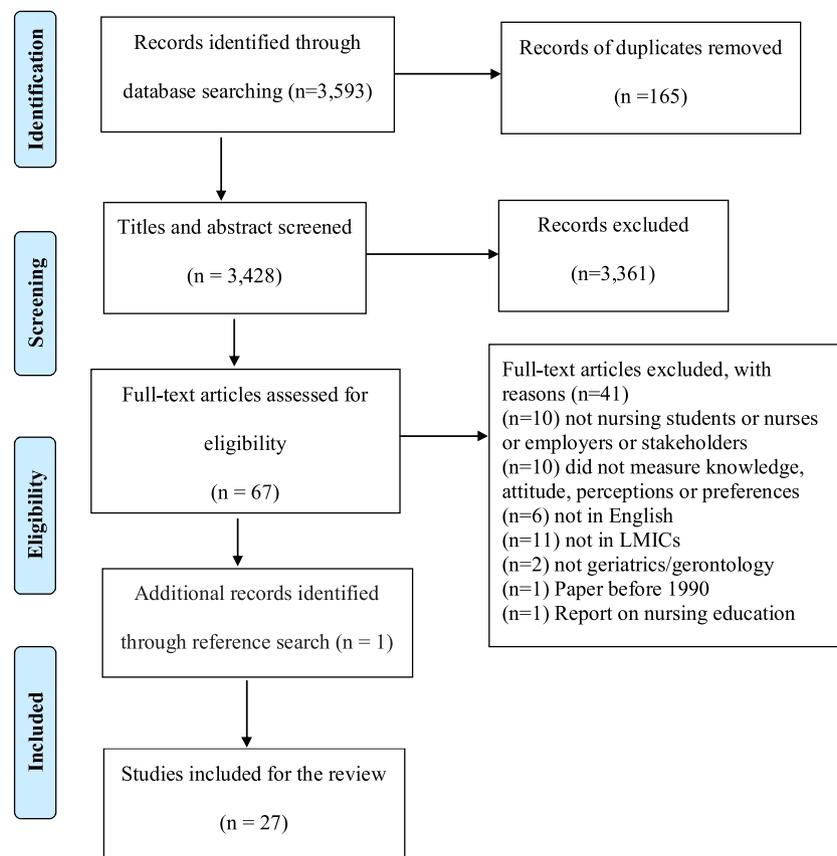


Fig. 1. PRISMA flow diagram for included articles.

with older adults: participants characteristics; and sample size (see Tables A1 and B1) appended.

### 2.6. Collating, summarizing and reporting the results

The tables enabled the identification of differences, similarities and common themes in the studies. The extracted data were synthesized and summarized in tables and presented in a narrative summary. To summarize and compare, the concepts of preparedness were categorized into knowledge, attitudes, perceptions, and preferences to work with older adults. Knowledge was sub-categorized into (a) general gerontological knowledge, defined as the study of the ageing process and how the changes and challenges of ageing affects human interactions and (b) specialized knowledge about the care of older adults that focuses on a specific syndrome or disease commonly associated with aging (*Encyclopedia Britannica, 1998*). Nurses' and nursing students' attitudes were defined in this review as their behavior towards older adults based on their views/perceptions of older adults and of providing care for older adults (*Ajzen, 1991*). Views/perceptions were defined as how nurses and nursing students think about and perceive older adults (*Ajzen, 1991; Oxford Dictionary, 2017*).

### 2.7. Consultation exercise

Consulting stakeholders is an optional stage that was not conducted in this literature review due to lack of resources.

## 3. Results

In all, 27 articles from 15 lower and middle-income countries were included (see Fig. 1). Two of these articles were comparative

studies of a high-income country and a lower and middle-income country (*Runkawatt et al., 2013; Xiao et al., 2013*). There were no studies on the views of employers/decision-makers regarding the preparedness of nurses from our search. The grey literature search did not yield any additional documents or studies for this review.

### 3.1. Characteristics of the studies

Table B1 summarizes the main characteristics of the studies. Three studies ( $n=3$ ) were conducted in West Africa, specifically, Nigeria (*Achalu, 1999; Fajemilehin, 2004; Oyetunde et al., 2013*) and one was conducted in Brazil (*Alexandre et al., 2016*). The majority of the studies were conducted in Asia ( $n=13$ ) (*Cheng et al., 2015; De Guzman et al., 2009a,b,c; De Guzman et al., 2013; Poreddi et al., 2015; Rathnayake et al., 2016; Runkawatt et al., 2013; Shen and Xiao, 2012; Varghese et al., 2014; Xiao et al., 2013; Yu and Petrini, 2007; Yuan, 2010; Zhang et al., 2016*). Ten ( $n=10$ ) studies were conducted in the Middle East (*Adibelli and Kilic, 2013; Ayoglu et al., 2014; Celik et al., 2010; Haron et al., 2013; Hweidi and Al-Obeisat, 2006; Polat et al., 2014; Rejeh et al., 2011; Usta et al., 2012; Uysal et al., 2014; Yildirim et al., 2011*).

The majority of the studies ( $n=22$ ) used quantitative research designs (see Table B1), and 17 of these used validated measurement tools; the Facts on Ageing Quiz (*Palmore, 1981*) to measure knowledge and the Kogan's Attitudes Towards Old People Scale (*Kogan, 1961*) to measure attitudes and willingness to care for older adults (*Adibelli and Kilic, 2013; Ayoglu et al., 2014; Cheng et al., 2015; De Guzman et al., 2013; Fajemilehin, 2004; Hweidi and Al-Obeisat, 2006; Polat et al., 2014; Poreddi et al., 2015; Rathnayake et al., 2016; Runkawatt et al., 2013; Shen and Xiao, 2012; Usta et al., 2012; Uysal et al., 2014; Xiao et al., 2013; Yu and Petrini, 2007; Yuan, 2010; Zhang et al., 2016*). Five studies used

qualitative designs (Alexandre et al., 2016; Celik et al., 2010; De Guzman et al., 2009a,b,c; Rejeh et al., 2011).

The study populations included registered nurses, nursing students, a mixed sample of nursing students and medical students, and other health professionals including clinicians, faculty, physicians and older adults (see Table B1). Convenience sampling was the most commonly used sampling method (see Table B1). The sample sizes of the studies ranged from 8 (De Guzman et al., 2009a,b,c) to 916 (Cheng et al., 2015) with a mean sample size of 307 participants and a combined total of 8608 participants. The mean ages of study participants ranged from 20 years for student nurses (Usta et al., 2012) to 34.7 years for nurses (Yuan, 2010).

### 3.2. Nurses' general gerontological knowledge

In three studies, nurses' general gerontological knowledge was classified as moderate (Oyetunde et al., 2013) to insufficient (Adibelli and Kilic, 2013; De Guzman et al., 2009a,b,c). Adibelli and Kilic (2013) studied 270 nurses (work experience of 1–9 years) in Turkey, using a non-validated tool to measure the difficulties experienced by nurses in the care of older adults. Sixty-one percent of the nurses reported difficulties with insufficient knowledge, skills, and experience in the care of older adults.

### 3.3. Nursing students' general gerontological knowledge

In three studies, nursing students' general gerontological knowledge was reported as insufficient (De Guzman et al., 2009a,b,c; Rejeh et al., 2011; Zhang et al., 2016). Based on a survey of 400 nursing students, participants had a low mean score of 25/50 points on the Facts on Ageing Quiz scale (Palmore, 1981) indicating insufficient knowledge (Zhang et al., 2016). Similarly, insufficient knowledge was reported in two qualitative studies (De Guzman et al., 2009a,b,c; Rejeh et al., 2011). Nursing students reported difficulties with limited theoretical and procedural knowledge in working with older adults (De Guzman et al., 2009a,b,c) and lack of education (Rejeh et al., 2011) as barriers to providing care for older adults.

### 3.4. Gerontological knowledge and the willingness to work with older adults

In two studies (De Guzman et al., 2013; Zhang et al., 2016) the relationship between knowledge and willingness of nursing students to work with or care for older adults was examined and mixed findings were reported. Using the Modified Caring Attributes Questionnaire (Schofield et al., 2005), De Guzman et al. (2013) reported that nursing students' knowledge of geriatric nursing roles did not correlate with their intent to provide care for older adults. In contrast, Zhang et al. (2016) reported that students with higher levels of knowledge about ageing were more likely than those with lower levels of knowledge about ageing to intend to provide care for older adults out of gratitude towards and experience with older adults.

### 3.5. Nurses' specialized knowledge about care of older adults

Nurses' specialized knowledge about the care of older adults was reported in three studies (Varghese et al., 2014; Yu and Petrini, 2007; Yuan, 2010). Nurses reported a moderate level of knowledge of symptoms and impact of urinary incontinence (Yuan, 2010). In the same study insufficient knowledge was found with respect to risk factors, prevention, treatment and management of urinary incontinence in patients with cardiac disease, hypertension, or diabetes mellitus (Yuan, 2010), and with respect to pain and pain management in older adults (Yu and Petrini, 2007).

### 3.6. Nursing students' specialized knowledge about the care of older adults

Poreddi et al. (2015) explored knowledge about the care of older adults in 122 third and fourth year nursing students using the Alzheimer's Disease Knowledge Scale (ADKS) (Carpenter et al., 2009). A low mean score of 16.8 (SD ± 3.48) of 30, indicating inadequate geriatric knowledge was reported.

### 3.7. Nursing students' attitudes towards the care of older adults

The attitudes of nursing students toward the care of older adults were examined in 16 studies (Achal, 1999; Ayoglu et al., 2014; Celik et al., 2010; Cheng et al., 2015; De Guzman et al., 2009a,b,c; De Guzman et al., 2013; Haron et al., 2013; Hweidi and Al-Obeisat, 2006; Poreddi et al., 2015; Rathnayake et al., 2016; Runkawatt et al., 2013; Shen and Xiao, 2012; Usta et al., 2012; Uysal et al., 2014; Xiao et al., 2013; Zhang et al., 2016). Eleven reported positive attitudes of nursing students towards older adults (Achal, 1999; Ayoglu et al., 2014; Celik et al., 2010; Cheng et al., 2015; Hweidi and Al-Obeisat, 2006; Poreddi et al., 2015; Rathnayake et al., 2016; Runkawatt et al., 2013; Usta et al., 2012; Uysal et al., 2014; Zhang et al., 2016). Of these, five studies used Kogan's Attitudes Toward Old People scale to measure attitudes (Ayoglu et al., 2014; Hweidi and Al-Obeisat, 2006; Rathnayake et al., 2016; Runkawatt et al., 2013; Zhang et al., 2016). The most commonly cited reasons for the positive attitudes of nursing students towards older adults were cultural norms of respecting older adults, filial piety, and religious values that honor older adults. However, De Guzman et al. (2009a,b,c) who interviewed five nursing students and three clinical faculty members, found that the nursing students identified communication difficulties and the burden of providing care to older adults as negatively influencing their attitudes towards older adults (De Guzman et al., 2009a,b,c).

### 3.8. Association between nursing students' attitudes and general gerontological knowledge

In two studies (De Guzman et al., 2013; Zhang et al., 2016) the relationship between attitudes towards older adults (using Kogan's Attitude Toward Old People Scale) and general gerontological knowledge was reported with varied results. In one study positive attitudes were associated with higher levels of knowledge about older adults (De Guzman et al., 2013), while Zhang et al. (2016) reported that positive attitudes were not related to nursing students' knowledge about caring for older adults. Positive attitudes were significantly correlated with a willingness to care for older adults. Students who perceived older adults as deserving of respect were more likely to have positive attitudes and were willing to provide care for older adults (Zhang et al., 2016).

### 3.9. Association between nursing students' attitudes and willingness to care

In seven studies that examined the relationship between attitudes and students' willingness to work with older adults (Cheng et al., 2015; Haron et al., 2013; Hweidi and Al-Obeisat, 2006; Rathnayake et al., 2016; Shen and Xiao, 2012; Xiao et al., 2013; Zhang et al., 2016), findings revealed that nursing students with positive attitudes were more willing than those with negative attitudes to work with older adults (Cheng et al., 2015; Haron et al., 2013; Hweidi and Al-Obeisat, 2006; Rathnayake et al., 2016; Shen and Xiao, 2012; Xiao et al., 2013; Zhang et al., 2016).

### 3.10. Views and perceptions of nurses about care of older adults

Polat et al. (2014) examined the views and perceptions of nurses regarding the care of older adults using the Ageism Attitude scale (Vefikuluçay and Terzioğlu, 2010). The findings indicated that most nurses tended to give older adults priority in routine procedures and preferred to receive the older person's history from their relatives. Most of the nurses perceived older adults as intolerant, weak, demented, lonely and having decreased mental abilities.

### 3.11. Views and perceptions of nursing students about older adults

Nursing students' views of ageing, the ageing process, and caring for older adults were examined in three studies (Alexandre et al., 2016; Celik et al., 2010; Fajemilehin, 2004). Nursing students had misconceptions and negative views of the ageing process (Alexandre et al., 2016; Celik et al., 2010) and misconceptions about caring for older adults (Fajemilehin, 2004). Nursing students perceived caring for older adults as a burden (Fajemilehin, 2004). Similar misconceptions were reported by Alexandre et al. (2016) who found that nursing students viewed ageing as a period of youthfulness (physically active and strong) and financial stability. The authors argued that a consumerist and performance-driven culture, may explain these perceptions of the nursing students.

### 3.12. Nurses' and nursing students' preference for working with older adults

The willingness of nursing students' to work with older adults or choose gerontological nursing as a career path were examined in eight studies that reported mixed findings (Cheng et al., 2015; Fajemilehin, 2004; Haron et al., 2013; Hweidi and Al-Obeisat, 2006; Shen and Xiao, 2012; Xiao et al., 2013; Yildirim et al., 2011; Zhang et al., 2016). In two of the studies (Cheng et al., 2015; Zhang et al., 2016), nursing students had moderate to high motivation and willingness to work with older adults. The remaining six studies suggest a low preference for working with older adults or specializing in gerontological nursing (Fajemilehin, 2004; Haron et al., 2013; Hweidi and Al-Obeisat, 2006; Rathnayake et al., 2016; Xiao et al., 2013; Yildirim et al., 2011).

Low wages, heavy workload, a boring and unattractive field, lower status of geriatric nurses, difficulty in communicating with geriatric patients, and limited resources were reported to be the key reasons for the unwillingness of some students to choose gerontological nursing as a career path (De Guzman et al., 2009a,b,c; Haron et al., 2013; Rejeh et al., 2011; Shen and Xiao, 2012; Xiao et al., 2013). Registered nurses also cited similar concerns as some of the significant challenges they encounter providing care for older adults (Adibelli and Kilic, 2013; De Guzman et al., 2009a,b,c).

## 4. Discussion

The results of the review showed that nursing students in lower and middle-income countries reported insufficient general gerontological and specialized knowledge about the care of older adults. Nurses reported moderate to inadequate general gerontological and specialized knowledge about the care of older adults. Negative perceptions and misconceptions about older adults resulted in a lack of interest of nursing students to work in the field of gerontological nursing. Positive attitudes towards older adults by nursing students were also reported. These findings suggest that nurses and nursing students may perceive themselves as inadequately prepared to provide care for older adults in lower and middle-income countries.

Findings regarding insufficient general gerontological and specialized knowledge about the care of older adults among nurses

and nursing students raise concerns regarding the education and training curricula for preparing nurses in lower and middle-income countries. Insufficient general gerontological knowledge was reported as a barrier to providing care for older adults (Adibelli and Kilic, 2013; De Guzman et al., 2009a,b,c; Rejeh et al., 2011). Similar findings of insufficient gerontological and specialized knowledge about the care of older adults among nurses and nursing students have been reported in high-income countries (Baillie et al., 2012; Bleijenberg, 2012; De Almeida Tavares et al., 2015; Lambrinou et al., 2009; Mattos et al., 2015; Pachana et al., 2013), indicating a global concern. Several studies in the review (Achal, 1999; Celik et al., 2010; Cheng et al., 2015; Fajemilehin, 2004; Haron et al., 2013; Hweidi and Al-Obeisat, 2006; Rathnayake et al., 2016; Rejeh et al., 2011) recommended curricular improvements based on the authors assumption of a likely limited gerontological nursing content in the curricula and inadequate mentorship of nursing students (De Guzman et al., 2009a,b,c; Yildirim et al., 2011). However, none of the studies examined the content of curricula. Increasing gerontological content may be possible in some lower and middle-income countries where there is centralized control over curriculum in some autonomous public and private educational institutions where nurses are educated. In addition to ensuring adequate preparation of nursing students to care for older adults, it is also imperative to educate practicing registered nurses about the care of older adults through continuous professional career development programs. Steps have been made in some high-income countries to build the capacity of faculty in gerontological nursing and to enhance curricula to include gerontological and specialized content (AACN and Hartford Institute for Geriatric Nursing, 2010; Gray-Miceli et al., 2014; McCleary et al., 2009). Lower and middle-income countries could emulate these initiatives to enhance gerontological nursing education and practice.

Findings regarding the relationship between gerontological knowledge and intention to work with older adults highlight the influence of culture and exposure to older adults in decision making for career choices. Students with higher levels of gerontological knowledge and those who had lived with or worked with older adults, were more likely to provide care for older adults than those with lower levels of gerontological knowledge and limited exposure to older adults (Zhang et al., 2016). Whereas culture and exposure to older adults impacts knowledge and intentions to working with older adults in lower and middle-income countries, other factors in high income-countries such as work environment, seminars and training programs related to older adults, stand-alone graduate courses in gerontology and care of older adults also influences nursing students' knowledge and intentions to working with older adults (Brown et al., 2008; King et al., 2013; Parsons et al., 2015). This reinforces the importance of exposing nursing students to older adults and actively involving them with older adults and gerontological care programs, which may pique the interest of nursing students in gerontological nursing (Mattos et al., 2015).

However, there were also misconceptions and negative views of older adults among nurses and nursing students. These included viewing older adults as mostly ill and frail, a burden to care for, and boring to work with, which are similar to findings reported in some high-income countries (Brown et al., 2008; Koh, 2012; Kydd et al., 2013; Stevens, 2011). Some scholars contend that the perceptions of older adults as a burden to care for may stem from nurses' interaction with, and nursing students' practicum experience in under-resourced hospitals (Brown et al., 2008; Fajemilehin, 2004; Stevens, 2011).

With respect to attitudes towards older adults, nurses and nursing students had positive attitudes towards the care of older adults. This may be attributed to the cultural and societal values of lower and middle-income countries which accord older adults with high respect. Caring for older adults in these societies is

considered as a good deed and to some extent, a religious and moral obligation. This provides a chance to build on nursing students' interest in gerontological nursing. Further research is needed in other lower and middle-income regions including sub-Saharan Africa to understand the influence of culture on the attitudes of nursing students toward older adults. The positive attitudes reported in this review differ from results of similar studies conducted in the United States (Ferrario et al., 2007) and Canada (Allan and Johnson, 2008), where nurses and nursing students were reported to have negative attitudes towards the care of older adults. The Western culture which is considered individualistic compared to a more pluralistic Eastern culture may explain the differences in the attitudes towards older adults of nurses and nursing students.

Though nurses and nursing students reported positive attitudes towards older adults, they also held negative views about older adults and caring for older adults. This may be due to social desirability in caring for older adults in Middle Eastern and Asian countries, which formed the majority of studies for this review. The discrepancy may also be due to the methodological differences used in the studies. Validated tools were used to measure attitudes, whereas, perceptions were determined using qualitative approaches. Similar reviews in high income-countries have reported findings of discrepancy between perceptions and attitudes towards older adults (Liu et al., 2013; McKinlay and Cowan, 2006).

#### 4.1. Critique of the articles

Convenience sampling was the most commonly used sampling approach. Though convenience sampling is not considered a strong sampling technique due to the likelihood of selection biases, it was the most feasible given the study topic and population of nurses and nursing students. Most of the studies also had large sample sizes with high response rates which is commendable (see Table B1). Validated and reliable tools were used to measure knowledge and attitudes in several studies (17/22) and the reliabilities of these tools were reported. The tools were developed in Western countries with different cultural contexts. The Facts on Aging Quiz has been criticized (Dikken et al., 2017) for measuring opinions and beliefs which are not factual knowledge and may not represent nurses' knowledge about older adults. The attitudes scales in most of the studies provided relevant quantitative data about attitudes towards older adults. Perceptions were assessed with qualitative approaches (Alexandre et al., 2016; Celik et al., 2010) and one quantitative study (Fajemilehin, 2004) used the Facts on Ageing Quiz (Palmore, 1981) to measure perceptions, which was originally developed to measure knowledge. Quantitative studies with validated tools are required to measure perceptions of nurses and nursing students in lower and middle-income countries. Findings regarding perceptions should be interpreted with caution. Most of the quantitative studies did not acknowledge how confounders were handled and sampling approaches for some of the qualitative studies were not explicitly described.

Only one of the five qualitative studies discussed trustworthiness but not reflexivity and positionality of the researcher (Rejeh et al., 2011). The other four studies (Alexandre et al., 2016; Celik et al., 2010; De Guzman et al., 2009a,b,c) neither discussed nor indicated trustworthiness, reflexivity or positionality of the researchers. Despite these perceived methodological challenges, the studies are relevant as they serve as a foundation for future research in gerontological nursing particularly in lower and middle-income countries.

#### 4.2. Limitations of the review

Searches were limited to English language only. It is possible that similar studies or reports may have been published in languages

other than English. Studies on the stakeholder perspectives could not be located in this search. Though categorized as lower and middle-income countries by the World Bank, some of the countries may be more advanced in their health systems than others and caution must be exercised in interpreting the findings. The use of one reviewer is a limitation in this review; nonetheless, the review was done in consultation with expert research team members.

#### 4.3. Implications and recommendations

The review highlights the knowledge gaps among nurses and nursing students with respect to gerontological nursing. Further studies are required to determine the knowledge about the care of older adults among nursing students in lower and middle-income regions especially in sub-Saharan Africa as there was limited data from this region in the review. The influence of culture on attitudes towards older adults needs to be explored further in the African context and compared with other countries. Little is known of the preference for working with older adults among nursing students in the sub-Saharan African region.

Additionally, gaining a deeper understanding of nursing students' preparedness through qualitative inquiry in the care of older adults could help deepen understanding of the knowledge gaps or barriers nursing students encounter in their clinical education experiences with older adults. This may form a foundation for curricular revisions or changes in teaching strategies. No studies in the review examined the curricula of nursing education to ascertain the extent to which gerontological nursing is addressed. More research is required to provide evidence of the perceived limited gerontological content in nursing education curricular in lower and middle-income countries. There was limited data on the perspectives of stakeholders (faculty, employers and regulatory body of nurses) on the preparedness of nurses to provide care for older adults. Understanding the perspectives of stakeholders would help identify stakeholders' readiness for change in gerontological nursing education. This could also indicate the readiness to adjust and improve the working environments of nurses to promote quality nursing care to older adults.

### 5. Conclusion

The self-perceived inadequate preparation of nurses and nursing students and the findings of positive attitudes towards older adults indicate that there is an opportunity to enhance gerontological nursing education in lower and middle-income countries. Though issues of older adults and gerontological nursing education may not be a priority for some lower and middle-income countries (Aboderin and Beard, 2015; Beard et al., 2012), the older adult population will continue to grow and will require adequately prepared generalist and specialty nurses to provide care for them. It is imperative, therefore, to take appropriate steps to prepare for the future.

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#### Conflict of interest

We have no conflict of interest to declare.

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**Appendix A**

**Table A1**  
Concepts of Preparedness Identified as Study Outcomes.

Region	Asia													
Concepts of Preparedness	Author, Year, Country	Cheng et al., 2015, China	De Guzman et al., 2009a,b,c, Philippines	De Guzman et al., 2009a,b,c, Philippines	De Guzman et al., 2013, Philippines	Poreddi et al., 2015, India	Rathnayake et al., 2016, Sri Lanka	Runkawatt et al., 2013, Thailand & Sweden	Shen and Xiao, 2012, China	Varghese et al., 2014, India	Xiao et al., 2013, China	Yu and Petrini, 2007, China	Yuan, 2010, China	Zhang et al., 2016, China
Views/ Perception		*	*	*	*	*	*	*	*	*	*	x+	*	*
Knowledge		*	bx ↓	bx ↓	x	sx ↓	*	*	*	sx ↓	*	* x ↓	sx ↓	x ↓
Attitude		x+	x	*	x+	x+	x+	x+	x+	*	x+	*	*	x+
Preference		x+	*	*	*	*	X	*	*	*	x+	*	*	x+
<b>Middle East</b>														
Author (s)/ Year, Country	Adibelli and Kilic, 2013, Turkey	Ayoglu et al., 2014, Turkey	Celik et al., 2010, Turkey	Haron et al., 2013, Israel	Hweidi and Al-Obeisat, 2006, Jordan	Polat et al., 2014, Turkey	Rejeh et al., 2011, Iran	Usta et al., 2012, Turkey	Uysal et al., 2014, Turkey	Yildirim et al., 2011				
Views/ Perception		*	*	x-	*	*	x-	*	*	*	*	*	*	*
Knowledge		x ↓	*	bx ↓	*	*	*	bx ↓	*	*	*	*	*	*
Attitude		x+	x+	x+	x+	x+	x+	*	x+	x+	*	*	*	*
Preference		*	*	*	x-	*	*	*	*	*	*	*	*	x-
<b>Africa and South America</b>														
Author (s)/ Year, Country	Achalu, 1999, Nigeria	Alexandre et al., 2016, Brazil	Fajemilehin, 2004, Nigeria	Oyetunde et al., 2013, Nigeria										
Views/ Perception		*	x-	x-	*									
Knowledge		*	*	*	x↔									
Attitude		x+	*	*	x+									
Preference		*	*	x-	*									

x--identified/discussed bx--knowledge as a barrier +-Positive ↔ - adequate - -negative, least preferred or misconception.  
\*-- not discussed sx- specialized knowledge ↓-- insufficient.

**Appendix B**

**Table B1**  
Characteristics of Articles.

Author (s)/ Year /Country	Study Design	Aims/ Hypothesis	Theory/ instrument	Inclusion Criteria	Sampling/ Sample Size	Response Rate	Analytic methods	Findings/ Results
Achalu, 1999, Nigeria	Cross-sectional survey	To determine the attitudes of student nurses towards older adult patients in public health care systems in Nigeria	Attitude towards older person's questionnaire was developed and used	Student nurses	Random sampling n=300	100%	Chi-Square test.	Student nurses had a more positive attitude towards older patients. There was a significant relationship between attitude and years of study. 2 <sup>nd</sup> year nursing students, have a more positive attitude towards older patients than 3 <sup>rd</sup> and 1 <sup>st</sup> year students.
Adibelli and Kilic, 2013, Turkey	Cross-sectional survey	To determine nurses' attitudes towards older patients, care and the difficulties they experience	Turkish version of (KAOPS)	Nurses from five public Hospitals	Sampling method not reported n=270	Not Reported	Descript. Stats.	Nurses reported a positive attitude towards old people. Difficulties experienced in the care of older adults included, insufficient logistics and personnel, and inadequate knowledge, skills and experience to care for old people.
Ayoglu et al., 2014, Turkey.	Cross-sectional survey	To evaluate the attitudes of nursing and medical students towards older people and evaluate the relationship between attitude and other variables	Turkish version of (KAOPS)	Nursing and medical students	Convenience sampling n=618,	Not Reported	Descript. Stats.	Overall participants had positive attitudes towards older people. Medical students had a more positive attitude towards older people than did nursing students. There was no significant difference between years of study and attitudes towards older people.

Table B1 (Continued)

Author (s)/ Year /Country	Study Design	Aims/ Hypothesis	Theory/ instrument	Inclusion Criteria	Sampling/ Sample Size	Response Rate	Analytic methods	Findings/ Results
Cheng et al., 2015, China,	Cross-sectional survey	To examine the motivation for choosing gerontological nursing as a career and the associated factors among student nurses	Expectancy value theory, FAQ1, GAS, Nolans sense framework, AAS,	Last semester undergraduate nursing students	Convenience sampling n= 916	71%	Descript. Stats. multi linear regression analysis	Students had a moderate level of expectancy and motivation for choosing gerontological nursing as a career. Experience with older adults and a more positive attitude about geriatrics, were associated with a high expectancy and value for gerontological nursing. Knowledge of geriatric nursing roles did not correlate with intentions to provide geriatric care; it was associated with positive and negative attitude change towards old people. Attitude was an important determinant of intent.
De Guzman et al., 2013, Philippines	Cross-sectional survey	To test a model that describes how nursing students' behavioural intentions towards geriatric care are formed	Theory of planned behavior, MCAQ, KAOP researcher developed tool	3 <sup>rd</sup> or 4 <sup>th</sup> year, Nursing student who had cared for a geriatric patient	Census sampling n= 839	88%	Structural equation modelling	There was a significant difference between nursing and medical students' misconceptions of ageing and caring for older people. Nursing students had a high misconception score. There was no difference regarding the preference to specialize in geriatrics. Geriatrics was the least preferred specialty area for nursing and medical students
Fajemilehin, 2004, Nigeria	Cross-sectional survey	To determine the differences between nursing and medical students in their conceptions and misconceptions about older persons	FAQ1	Medical and nursing students in their clinical years.	Systematic sampling method n = 80	Not Reported	Descript. Stats.	Most students had a low likelihood of choosing geriatric nursing as a career. Students perceived geriatrics as unattractive, that geriatric nurses have low power and low wages. Students with higher positive attitudes were 1.4 times more likely to consider geriatrics as a career than those with less positive attitudes
Haron et al., 2013, Israel	Cross-sectional survey	To gather final year student nurses' views on geriatric nursing as a career choice and identify the factors associated with those views	Self-designed instrument	Final year nursing students	Convenience sampling n= 486	70%	Descript. Stats. logistic regression	Nursing student had a slightly positive attitude towards old people. Males had more positive attitudes compared to females. Senior year students had a more positive attitude compared to junior year students. Most of the students did not prefer to work with older people.
Hweidi and Al-Obeisat, 2006, Jordan	Cross-sectional survey	To identify nursing students' attitudes towards older people and whether attitudes influences care provided to older persons	KAOPS	Nursing students	Convenience sampling n = 250	95.2%	Descript. Stats.	Most of the nurses had a high positive attitude towards the care of older adults. Participants showed adequate knowledge in the ageing process. Almost all the participants agreed that specialized knowledge is required to care for older persons. Participants agreed that hospitals should have separate wards for older patients.
Oyetunde et al., 2013 Nigeria	Cross-sectional survey	To explore the attitudes of nurses towards the care for older persons in two selected hospitals	Researcher designed survey	Nurses	Random sampling n = 130	Not Reported	Descript. Stats	Most of the nurses had a high positive attitude towards the care of older adults. Participants showed adequate knowledge in the ageing process. Almost all the participants agreed that specialized knowledge is required to care for older persons. Participants agreed that hospitals should have separate wards for older patients.

Table B1 (Continued)

Author (s)/ Year /Country	Study Design	Aims/ Hypothesis	Theory/ instrument	Inclusion Criteria	Sampling/ Sample Size	Response Rate	Analytic methods	Findings/ Results
Polat et al., 2014. Turkey	Cross-sectional survey	To determine the perceptions of ageing and the prevalence of ageism among nurses and physicians	Ageism attitude scale (AAS)	Nurses and Physicians	Random sampling n = 167	Not Reported	Descript. Stats.	Most nurses and physicians viewed ageing as inevitable and associated ageing with decreased learning and mental abilities. A majority of the participants had positive attitudes towards older patients.
Poreddi et al., 2015. India	Cross-sectional survey	To assess nursing students' general knowledge and attitudes towards dementia and their competence in working with older adults with dementia	Alzheimer's disease knowledge scale (ADKS), Attitude towards Alzheimer's disease	Third- and fourth-year nursing students	Random sampling n=122	77%	Descript. stats and Pearson correlation	Findings suggest that, nursing students had inadequate knowledge with a mean score of 16.8 (SD ± 3.48) (out of 30) regarding dementia related to Alzheimers disease. Students had a positive attitude toward dementia. Fourth year students had a higher mean knowledge score compared to third year students.
Rathnayake et al., 2016. Sri Lanka	Cross-sectional survey	To examine the attitudes of nursing students towards and their willingness to work with older people	KAOPS	First to fourth year nursing students	Purposive sampling n= 103	89.7%	Descript. Stats.	Participants held a moderately positive attitude towards older people. There were no significant associations between attitudes and years of study. Students who lived with older people had more positive scores compared to those who did not. There was a significant relationship between attitudes and ranking preference to work with old people.
Runkawatt et al., 2013. Thailand and Sweden	Cross-sectional survey	To compare Swedish and Thai nursing students' attitudes towards older people	Thai and Swedish versions of KAOPS	BSN nursing students in Thailand and Sweden	Convenience sampling n = 540	Not Reported	Descript. stats.	Both Thai and Swedish students reported positive attitudes towards old people. Age was positively correlated to Swedish students' attitudes towards old people.
Shen and Xiao, 2012. China	Cross-sectional survey	To explore the factors affecting nursing students' intentions to work with older people	Attitude questionnaire adopted from Johnsons (1992) study, Stevens and Crouch's (1998) career choice tool	All nursing students at Chongqing Medical University	Convenience sampling n= 622	70.1%	Descript. Stats.	Prejudice was a barrier for students choosing to work with old people. Working with children was ranked first, whilst working with old people was second to least preferred field. Age was significantly related to attitudes and preference to working with old people.
Usta et al., 2012. Turkey.	Cross-sectional survey	To define nursing students' attitudes towards ageism and examine related factors.	Ageism attitude scale. (AAS)	Student nurses	Convenience sampling n= 145	78%	Descript. Stats.	Nursing students had positive attitudes toward older adults. Nursing students' gender, previous course in ageing, years of school, and having lived with an older adult relative, had positive attitudes towards ageing. Women had more positive attitudes towards aging.

Table B1 (Continued)

Author (s)/ Year /Country	Study Design	Aims/ Hypothesis	Theory/ instrument	Inclusion Criteria	Sampling/ Sample Size	Response Rate	Analytic methods	Findings/ Results
Uysal et al., 2014. Turkey	Cross-sectional survey	To investigate the attitudes of nursing students towards disability and demographic factors associated with these attitudes	Attitude towards disable people's scale (ATDP)	Undergrad. nursing students	Convenience sampling n=587	97%	Descript. Stats.	Students nurses had moderate attitudes towards disabled people. Age, prior knowledge about disability, and gender, were significantly associated with attitudes of students towards disability. Younger students had more positive attitudes towards disability compared to older students.
Varghese et al., 2014. India	Pre- and post-intervention study	To determine the effectiveness of an educational programme on the identification and management of delirium by nurses in the medical ward of a tertiary hospital in South India	Author designed knowledge questionnaire, Confusion assessment method	Nurses and older patients on admission in the wards	Convenience sampling n = 32	Not Reported	Descript. Stats.	Nurses did not have adequate knowledge on delirium. There was significant improvement of the knowledge level of nurses in the experimental group after the educational program.
Xiao et al., 2013. China & Australia	Cross-sectional comparative survey	To compare Australian and Chinese nursing students' attitudes and intentions to care for older adults and the factors affecting these intentions	Career Choice in nursing Practice, Nursing students' attitudes towards elder's scale	First year BSN nursing students in a university in Australia and a university in China	Convenience sampling n= 556	79.3% Australia 69.3% China	Logistic model.	Chinese students were more likely to work with older adults compared to Australian students. To work with older people was the least preferred by Australian students. Australian students were more prejudiced than Chinese students to work with older persons. Previous work experience with old people and prejudice, were significant predictors of intentions to work with old people among Australian students.
Yildirim Kececi & Bulduk, 2011. Turkey	Cross-sectional survey	To determine the department, area, and position in which nursing students wanted to work after graduation.	Researcher developed tool	Nursing students	Random sampling n= 200	80%	Descript. Stats	Psychiatry, geriatrics and handicap care were the least preferred areas to work. The most preferred areas to work were pediatrics. the operating room and emergency-intensive care unit.
Yu and Petrini, 2007, China	Cross sectional survey	To investigate the current level of nurse knowledge of pain management with respect to older people	Pain in the elderly scale	Registered nurses	sampling method not reported n = 670,	92.69%F	Descript. Stats	A significant knowledge deficit regarding pain management in older people with a mean score of 41.17/93 was reported.
Yuan, 2010. China	Cross-sectional survey	To describe knowledge of urinary incontinence (UI) among community nurses and community- dwelling older people	Urinary incontinence knowledge scale	Community nurses and community dwelling elders	Cluster sampling n = 400	Not Reported	Descript. Stats.	Community nurses had moderate knowledge level of symptoms and impacts of UI but they had insufficient knowledge about risk factors, prevention treatment and management of UI. Knowledge of incontinence was not related to nurses' education

Table B1 (Continued)

Author (s)/ Year /Country	Study Design	Aims/ Hypothesis	Theory/ instrument	Inclusion Criteria	Sampling/ Sample Size	Response Rate	Analytic methods	Findings/ Results
Zhang et al., 2016, China	Cross-sectional survey	To explore the relationship among knowledge of ageing, willingness to care for, and attitudes towards older people, and gratitude	Care willingness, (CW). KAOPS, FAQ and GRAT	Nursing students	n =400 cluster sampling	95.5%	Descript. Stats and multilinear regression	Care willingness, attitude and gratitude to care was medium. Knowledge to care was low with a score of 25/50. Knowledge, attitude and gratitude were significantly correlated with care willingness. Knowledge of ageing was significantly related to gratitude. Attitude was not related to knowledge. Gratitude mediated the relationship between knowledge and care willingness
STUDIES USING QUALITATIVE DESIGNS								
Alexandre et al., 2016, Brazil	Descript. Qual.	To know the conceptions of nursing undergraduate students about the older persons and old age	Not Reported	Nursing students in a geriatric course	Convenience sampling n =30	Not Applicable	Thematic analysis	Students had misconceptions regarding the ageing process. They associated old age with youthfulness and financial stability.
Celik et al., 2010, Turkey.	Descript. Qual.	To examine the views and attitudes of nursing students towards ageing and older people	Not Reported	2 <sup>nd</sup> year BSN nursing students	Sampling method not reported n=42	46.1%	Thematic analysis	More than half of the participants had negative views about the ageing process. Majority of the students had a positive attitude towards older persons.
De Guzman et al., 2009a, Philippines	Phenomenology	To describe the favor and labour of geriatric nurses	Not Reported	Geriatric nurses in a nursing home	Purposive sampling n =9	Not Applicable	Thematic analysis	Nurses' favors are transactional, transformational and transcendental. Nurses' labor are relating to their feelings of doubt and uncertainty in their competency level to provide effective care to older adults.
De Guzman et al., 2009a, Philippines	Phenomenology	To capture the lived experiences of Filipino nursing students' dilemmas in geriatric care from the perspectives of student nurses and clinical instructors	Not Reported	Nursing students and clinical faculty instructor	Purposive sampling n =8	Not Applicable	Thematic analysis	A limited level of knowledge regarding the care of older patients was reported. Uncertainty and fear regarding care for older patients was reported. Student identified communication difficulties as influencing their attitudes and perceptions affecting their interaction with older adults.
Rejeh et al., 2011, Iran	Descript. Qual.	To explore Iranian nursing students' perspectives regarding caring for older patients	Not Reported	Senior nursing students	Purposive sampling n =25	Not Applicable	Thematic content analysis	Barriers to care were organizational policies, inadequate preparation to care for older patients, and inappropriate physical environment. Students were not confident to provide care with the fear of likely making a mistake. Facilitators to care were previous exposure to caring for older patients, religious and cultural norms and role modelling.

FAQ- Facts on Ageing Questionnaire KAOP- Kogan's Attitude Towards Older People MCAQ-Modified Caring Attributes Questionnaire.  
GAS- Geriatrics Attitudes Scale GRAT- Gratitude Scale.

Table B2

Table B2  
MEDLINE Search.

Searches	Results	
1	Students, Nursing/	21397
2	stud* nurs*.tw,kf.	4949
3	nurs* stud*.tw,kf.	13945
4	education, nursing, baccalaureate/ or education, nursing, continuing/ or education, nursing, graduate/ or nursing education research/	46538
5	grad* nurs*.mp. [mp = title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	2052
6	undergrad* nurs*.mp. [mp = title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	2619
7	train* nurse.tw,kf.	737
8	Hospital Administrators/	6307
9	nurs* superv*.tw,kf.	634
10	nurs* direct*.tw,kf.	660
11	health services/ or community health services/ or health services for the aged/ or medical errors/ or nursing care/ or nursing services/ or patient care/ or personal health services/ or preventive health services/	137509
12	health servic*.tw,kf.	104306
13	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12	299985
14	prepare*.tw,kf.	397071
15	readine*.tw,kf.	12939
16	Aptitude/	3666
17	abili*.tw,kf.	799281
18	professional competence/ or clinical competence/ or self-evaluation programs/	104822
19	clinic* compete*.tw,kf.	2980
20	clinic* compete*.mp. [mp = title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	83178
21	perception/ or social perception/ or space perception/	74703
22	percep*.tw,kf.	255736
23	knowledge/	9846
24	exp Health Knowledge, Attitudes, Practice/ or exp Knowledge Management/ or exp Patient Medication Knowledge/	95612
25	knowled*.tw,kf.	582331
26	attitude/ or "attitude of health personnel"/	153170
27	attitu*.tw,kf.	132600
28	behavior/ or communication/ or social behavior/ or spatial behavior/ or stereotyped behavior/	159779
29	behavio*.tw,kf.	1089038
30	confide*.mp. [mp = title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	463210
31	Stress, Psychological/	107364
32	experien*.tw,kf.	960432
33	self concept/ or diagnostic self evaluation/ or self efficacy/	70694
34	14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33	4370821
35	exp Aging/ or exp Aged/ or exp "Aged, 80 and over"/ or exp Middle Aged/	4696834
36	seniors care*.tw,kf.	20
37	aged care*.tw,kf.	2260
38	age* care*.mp. [mp = title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	2644
39	elder* care.tw,kf.	1704
40	Geriatrics/	28637
41	gerontol*.tw,kf.	7118
42	exp Geriatric Nursing/	13194
43	geriatr*nurs*.tw,kf.	1
44	gerontol* nurs*.tw,kf.	1033
45	Frail Elderly/	9382
46	35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45	4717254
47	((low or lower or middle or developing or poor) adj2 (country or nation or region or economy)).mp. [mp = title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	18313
48	(afghanistan or albanai or algeria or angola or argentina or armenia or america samoa or azerbaijan or bangladesh or belarus or belize or benin or bhutan or bolivia or bosnia or botswana or brazil or bulgaria or burkina faso or burundi or cape verde or cambodia or cameroon or central africa or chad or china or colombia or comoros or congo or costa rica or cote d'Ivoire or cuba or djibouti or dominca or dominican republic or ecuador or egypt or equatorial guinea or el salvador or eritrea or ethopia or fiji or gabon or gambia or georgia or ghana or guyana or grenada or guatemala or guinea or guinea bissua or haiti or india or indonesia or honduras).mp. [mp = title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	751863
49	(iran or iraq or jamaica or kazakhstan or kenya or kiribati or DPR korea or kosovo or kyrgyz or lao or lebanon or libya or liberia or lesotho or macedonia or madagascar or malawi or malaysia or maldives or mali or marshall islands or mauritania or mauritius or mexico or micronesia or moldova or mongolia or montenegro or morocco or mozambique or myanmar or namibia or nepal or nicaragua or niger or nigeria or parkistan or palau or peru or panama or papua new guinea or paraguay or philippines or romania or russia or rwanda or samoa or sao tome or senegal or serbia or sierra leone or solomon islands or somalia or south africa or south sudan or sri lanka or sudan).mp. [mp = title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	402006
50	(suriname or swaziland or syria or tajikistan or tanzania or thailand or timor-leste or togo or tonga or tunisia or turkey or turkemenistan or tuvalu or uganda or ukraine or uzbekistan or vanuatu or venezuela or vietnam or west abank or yemen or zambia or zimbabwe).mp. [mp = title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	170527
51	47 or 48 or 49 or 50	1266361
52	13 and 34 and 46 and 51	3167

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