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Original Article

Staff characteristics and care in Chinese nursing homes: A systematic literature review

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ABSTRACT

The need for institutional long-term care (LTC) services, including nursing homes (NHs), is increasing in Mainland China in part due to the aging population and changing family structures. In developing NH staff training programs, a review is needed to synthesize knowledge about staff and resident characteristics, and care provided in NHs. This systematic review aims to describe, in Chinese NHs, 1) NH staff characteristics and the care they provide, 2) resident characteristics and care needs, and 3) the role of family members. The 45 articles included in this review covered both urban and rural areas of Mainland China. We found that staff in Chinese NHs were older and had lower education levels in comparison with those in western countries. Most direct caregivers in urban areas were migratory workers from rural area. Chinese NHs had few qualification standards for staff preparation for their roles in NHs. Also, functional levels of residents in Chinese NHs were higher compared to NH residents in western countries. In addition, family members played important roles in caring for NH residents. These findings suggest a need for staff development programs that tailor for lower educated NH staff and care needs of residents with widely varying levels in function from independent to bedbound in Mainland China. The findings also suggest that staff qualification standards require critically policy development to improve the capacity of Chinese NHs to provide competent and safe care.

1. Introduction

By 2050, the number of people aged 60 years and older in China is expected to reach 450 million, accounting for 33% of its total population [1]. Among this rapidly aging population, the group of elders aged 80 and older, known as "oldest old", is the fastest growing, leading to an increasing demand for long-term care (LTC) services [2]. However, increasing migration from rural to urban areas, especially among young people, and the shrinking average family size due to China's one-child policy have overwhelmed traditional, informal family-based caregiving model for older adults, especially the "oldest old" [1,2]. These factors have created a great demand for formal

LTC services in China, including nursing homes (NHs), —a need that has emerged recently and is in the initial stages of development [3]. There is no standardized definition for NHs in Mainland China. Different terms are used, such as old age home, retirement apartment, residential care facilities, welfare institutes, and geriatric hospital. For this paper, NHs were defined as residential LTC facilities in Mainland China that mainly admit people who are 60 years and older. Thus, as defined in this paper, NHs include various types of institutions that provide LTC services for older adults with different functional levels [4]. This definition was used because we aimed to provide an understanding of the current situation of various formal residential LTC services in Mainland China.

Because LTC facilities are a newly emerging care option in Mainland China, the workforce is poorly developed and under-prepared. For example, studies about Chinese NHs consistently report an extreme lack of qualified NH workers at all levels, including direct caregivers, administrators and nursing and medical professionals [5–7]. In one review, Chinese NHs not only were insufficient in quantity in comparison with developed countries, but also varied a lot in quality of care provided [6]. Most direct caregivers in Chinese NHs received little training in nursing and caregiving skills or no training at all [5,8]. In addition, Chinese NHs had few qualification standards for staff preparation for their roles in NHs [5,9–11]. Formal LTC is an emerging industry in China, thus the opportunity exists to develop staff training programs from the ground up using patient (resident) centered care approaches [12,13], using the most advanced knowledge from other countries.

In order to develop staff training programs, we need to synthesize the literature for what is known about characteristics of staff who are providing care, and what services they provide in Chinese NHs. The characteristics of NH staff have been extensively researched in other countries in studies of staff demographics and educational preparation and how these characteristics influence resident outcomes in NHs. For example, an interventional study in 3 NHs in the U. S. found that resident oral health was improved after training certified nurse aide about mouth care [14]. A qualitative study about end-of-life care in NHs in UK found that staff expertise about end-of-life care and their strong relationships with residents facilitated end-of-life care for residents with dementia [15]. Also, an interventional study involving education and problem-solving support for Registered Nurses in 45 NHs in German was reported to reduce the use of physical restraints in NH residents [16]. Knowing the characteristics of NH staff in Mainland China will direct areas for future research to improve resident outcomes.

Staff characteristics also have been linked to work outcomes in NHs. For example, a survey of 572 NH staff in Sweden found that direct caregivers who received no education about care, medicine, or social support reported higher workload, more communication obstacles, poorer sleep, and more stress symptoms compared with those who completed at least 10–20 weeks of education on care, medicine, and social support [17]. A survey of 804 staff in 21 Swiss NHs found that staff use of recommended measures in response to residents' aggressive behaviors was related to their training on aggression management, employment level, and professional

experience [18]. So it is important to know about characteristics of NH staff and the care they provide to develop training programs for NH staff and ultimately improve both resident and staff outcomes.
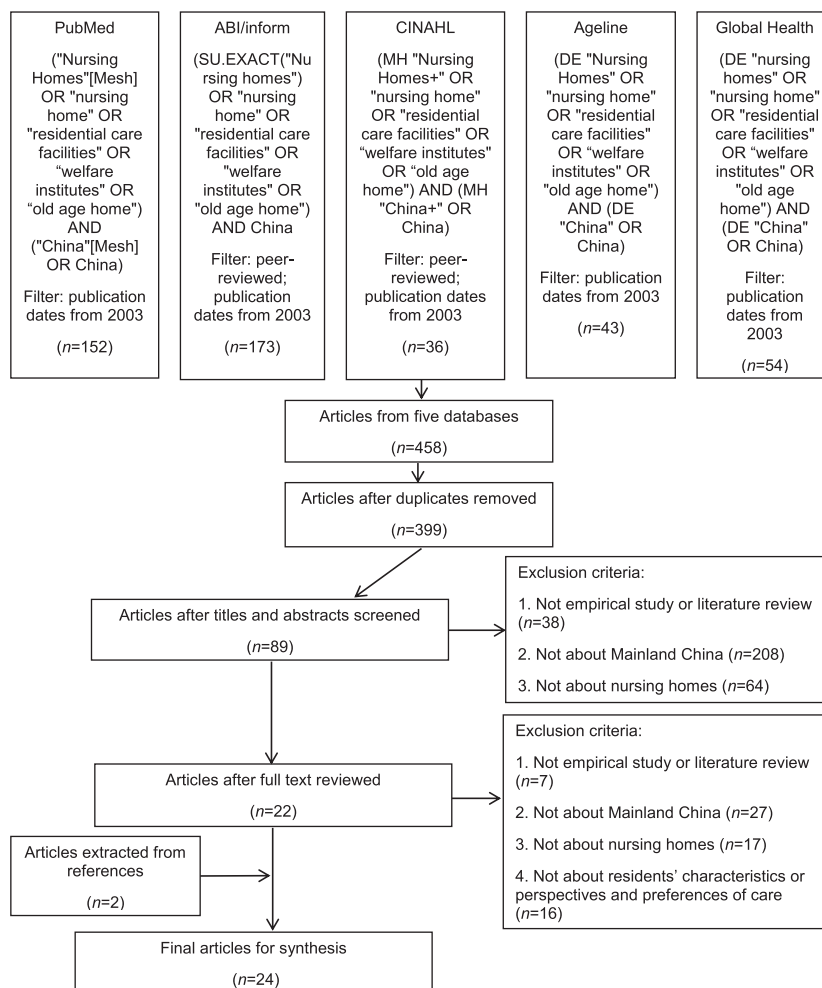
Similarly, it is also timely and necessary to synthesize evidence about characteristics of residents, their care needs, and the types and levels of care that should be provided in NHs, in order to guide studies to develop empirically supported, resident-focused care strategies to inform staff training programs. Understanding resident's characteristics and synthesizing knowledge about resident care need are also key components to knowing how to guide future research for developing resident-centered care approaches in Mainland China.

Finally, we need to understand how NHs currently involve families and/or the role of family members in providing NH care for residents so that these relationships might be incorporated into workforce training and NH system planning. Studies from other countries reported various roles that family members play in resident care in NHs. For example, a qualitative study found that family members assumed roles as advocates for residents in NHs because of their fears of poor quality of care, or negative experiences with NHs [19]. Synthesizing knowledge about roles of family members in Chinese NHs is also important to facilitate family members' psychological well-being. For example, a qualitative study suggested that involving family members as partners in resident care would facilitate family members' adaptation to residents' institutionalization [20].

This literature review, therefore, aims to provide a systematic understanding of characteristics of the current workforce and care they provide in Chinese NHs, as well as residents' characteristics and care needs, and family roles in providing resident care. Knowledge gained in this literature review will guide future research of Chinese NH workforce development, and guide the development of workforce training programs to prepare the workforce to provide competent and safe care in Chinese NHs.

2. Method

As depicted in the flow chart (Fig. 1), PubMed, ABI/inform, CINAHL, Ageline, and Global Health were searched, using "nursing home", "residential care facilities", "welfare institutes", "old age home" and "China" as search terms. Seeking a broad search of the literature, we used both controlled vocabulary and text keywords as search terms. We limited publication dates to 2003–2013 because this is the era in which NHs began to proliferate in China and changes in the NH care sector have been very rapid, deeming older research less relevant. The "peer-reviewed" filter was applied in ABI/inform and CINAHL. We did not apply a language filter because all retrieved articles were written in English or Chinese, both of which the first author is able to understand. A total of 458 articles were obtained from five databases. After duplicates were removed, 399 articles remained. By reviewing titles and abstracts, we excluded articles that were not empirical studies or literature reviews or that were not about NHs in Mainland China. We excluded Hong Kong and Macao

PubMed	ABI/inform	CINAHL	Ageline	Global Health
("Nursing Homes"[Mesh] OR "nursing home" OR "residential care facilities" OR "welfare institutes" OR "old age home") AND ("China"[Mesh] OR China) Filter: publication dates from 2003 (*n*=152)	(SU.EXACT("Nursing homes") OR "nursing home" OR "residential care facilities" OR "welfare institutes" OR "old age home") AND China Filter: peer-reviewed; publication dates from 2003 (*n*=173)	(MH "Nursing Homes+" OR "nursing home" OR "residential care facilities" OR "welfare institutes" OR "old age home") AND (MH "China+" OR China) Filter: peer-reviewed; publication dates from 2003 (*n*=36)	(DE "Nursing Homes" OR "nursing home" OR "residential care facilities" OR "welfare institutes" OR "old age home") AND (DE "China" OR China) Filter: publication dates from 2003 (*n*=43)	(DE "nursing homes" OR "nursing home" OR "residential care facilities" OR "welfare institutes" OR "old age home") AND (DE "China" OR China) Filter: publication dates from 2003 (*n*=54)

Articles from five databases
(*n*=458)

Articles after duplicates removed
(*n*=399)

Articles after titles and abstracts screened
(*n*=89)

Exclusion criteria:
1. Not empirical study or literature review (*n*=38)
2. Not about Mainland China (*n*=208)
3. Not about nursing homes (*n*=64)

Articles after full text reviewed
(*n*=22)

Exclusion criteria:
1. Not empirical study or literature review (*n*=7)
2. Not about Mainland China (*n*=27)
3. Not about nursing homes (*n*=17)
4. Not about residents' characteristics or perspectives and preferences of care (*n*=16)

Articles extracted from references
(*n*=2)

Final articles for synthesis
(*n*=24)

Note: ABI/inform=American business index, CINAHL= Cumulative Index to Nursing and Allied Health Literature.

Fig. 1 – Flow diagram of inclusion and exclusion of articles.

(also named Macau) because their development of LTC is quite different from that of Mainland China; they were influenced deeply by western cultures during the extended colonial period and have retained a high degree of autonomy under the "one country, two systems" arrangement since their reunification with China in the 1990s. We also excluded Taiwan because the healthcare systems are quite different between Taiwan and Mainland China. Included articles were screened in more detail by scanning full text, and again we eliminated articles that were not empirical studies or literature reviews, or that were not about NHs in Mainland China. Also, we excluded articles that were not about residents' characteristics or that were not about care in NHs. The first author made the initial determination of which articles to include or exclude. To verify, the second and third authors reviewed all of the inclusion and exclusion decisions. Disagreements were discussed and resolved among authors. At the end of this search process, we retained 22 articles. We then reviewed the reference lists of all the retrieved articles using a snowballing technique that returned 2 additional articles for this paper, resulting in 24 articles for the review.

To get a complete understanding of staff and resident characteristics and NH care in Mainland China, we also searched the Chinese database the China National Knowledge Infrastructure (CNKI), using *yanglaojigou, yanglaoyuan, laoniangongyu, fuliyuan*, jinglaoyuan, *huliyuan*, and *laonianyiyuan* (residential care facilities, elder care home, apartment for the elderly, welfare institute, home of respect for the elderly, nursing home and geriatric hospital respectively) as search terms (see Fig. 2). We again limited publication dates to 2003–2014. We also limited the search to core Chinese journals, a criteria for quality of journals that is commonly used in Mainland China, in order to ensure the high quality of articles included into this review [21]; a total of 299 articles were obtained. By reviewing titles and abstracts, we excluded articles that were not empirical studies or systematic literature reviews, and 90 articles remained. Included articles were screened in more detail by scanning full text. We eliminated articles that were not empirical studies or systematic literature review, that were not about resident characteristics or NH care, or that had insufficient description of the research methods to determine study design and analyses (i.e. having

Note: CNKI= the China National Knowledge Infrastructure.

Fig. 2 – Flow diagram of inclusion and exclusion of articles from one Chinese database.

only limited information on methods section and/or variable selection). The first author made the initial determination of which articles to include or exclude, and the last author verified the inclusion and exclusion decisions. Disagreements were discussed and resolved among authors. At the end of this search process, we retained 21 articles in Chinese. Altogether, 45 articles were included into the review.

We analyzed the retained articles using the matrix method [22]. The first author thoroughly read the articles, abstracted them into a matrix with 9 headings: titles, years of publication, authors, aims, terms used for NH, methods, sample/setting, themes and findings. This matrix was analyzed to identify themes among articles. All decisions were reviewed and verified by the other authors. Then we synthesized the findings by theme. Table 1 summarizes the study design, sample, setting and themes for each included article.

3. Results

Our synthesis of the reviewed articles about resident characteristics and care in Chinese NHs is presented in three themes:

staff characteristics and care provided, resident characteristics and care needs, and care by family members.

3.1. Staff characteristics and care provided

3.1.1. Staff demographics
Nine studies reported demographic characteristics of staff in Chinese NHs, including age, gender, education level, and sources of staff. The age of NH direct caregivers generally ranged from 40 to 60 years of age and older; they are primarily women and have little formal education. Hao et al. [5] found that the mean age of direct caregivers was 52 years and 73% of them were female. Wu and Caro [9] reported that almost all direct caregivers were in their 40s–50s and some were in their 60s. This study also found that 70% of NH administrators only had junior high school degrees [9]. For direct caregivers, 76% of them were illiterate or had only primary school education [5]. One study describing the quality of care for residents with dementia found that none of the sixty direct caregivers had an education level higher than middle school [23]. However, two studies presented very different findings, including a younger age range of 30–53 [24,25] and a higher education level (e.g., bachelor degree) [24]. These findings among studies likely

Table 1 – Summary of articles.

Author	Research design	Data sources/sample	Setting	Themes
Zhan, Liu [29]	Secondary data analysis	265 residents	67 NHs; Tianjin	Staff characteristics and care provided: care by NH staff
				Residents' characteristics and care needs: age
Gu, Dupre [34]	Secondary data analysis	CLHLS: three waves (1998, 2000 and 2002)	Half of counties/cities within 22 provinces	Residents' characteristics and care needs: age, chronic diseases and functional status
				Care by family members
Li and Buechel [31]	Survey	101 Chinese and 63 American family members of NH residents	Mainland China and greater Cincinnati areas, U.S.	Staff characteristics and care provided: care by NH staff
				Residents' characteristics and care needs: functional status
				Care by family members
Wang, Shi [35]	Survey	379 residents	A provincial-level NH; Guangzhou	Residents' characteristics and care needs: age and psychological well-being
Wu, Mao [30]	Interview, review of policy documents and literature	Elderly residents, administrators, policy-makers and Governmental officials and researchers	12 NHs; rural areas of Hubei and Shanghai	Staff characteristics and care provided: care by NH staff
				Residents' characteristics and care needs: functional status
Li, Zhang [62]	Secondary data analysis	CLHLS: first two waves (1998, 2000)	Half of counties/cities within 22 provinces	Residents' characteristics and care needs: functional and cognitive status and psychological well-being
Wu and Caro [9]	Interview, review of policy documents and literature	30 elderly residents, 12 NH staff and 12 NH administrators	12 NHs; rural areas of Hubei and Shanghai	Staff characteristics and care provided: staff demographics and staff qualification standards
				Residents' characteristics and care needs: age, chronic diseases and functional status
Wu, Mao [3]	Literature review	Number of included articles not provided	Rural China	Staff characteristics and care provided: staff demographics and care by NH staff
				Residents' characteristics and care needs: functional status
Wu, Low [57]	Assessment and interview	149 residents and their informal caregivers	1 NH, Shanghai; 3 ethno-specific Chinese NHs, Sydney; 4 mainstream NHs, Sydney	Residents' characteristics and care needs: cognitive status and psychological well-being
Chen [67]	Interview	11 elderly residents	1 NH; Shanghai	Care by family members
Cheng, Rosenberg [59]	Interview	27 elderly residents, 16 family members and 5 RCF managers	6 NHs; Beijing	Residents' characteristics and care needs: functional status and psychological well-being
				Care by family members
Feng, Zhan [10]	Secondary data analysis	Interviews with NH administrators and query of local Government websites	140 NHs; urban area of Nanjing	Staff characteristics and care provided: staff demographics, staff qualification standards and care by NH staff
				Residents' characteristics and care needs: functional status
Lin, Wang [61]	Survey	133 residents	2 NHs; Shanghai	Residents' characteristics and care needs: cognitive status
Wang, Hou [47]	Physical examination, lab measures	240 residents	2 NHs; Wenzhou	Residents' characteristics and care needs: chronic diseases
Zheng, Hua [64]	Survey (questionnaire)	464 residents	20 NHs; Xi'an	Residents' characteristics and care needs: psychological well-being

Table 1 – (continued)

Author	Research design	Data sources/sample	Setting	Themes
Feng, Liu [6]	Review of policy documents and literature	N/A	Both urban and rural China	Residents' characteristics and care needs
Guo, Gao [63]	Interviews, medical history review and clinical physical examination	264 residents	4 NHs and 2 veteran care homes; Xi'an	Residents' characteristics and care needs: cognitive status
Hao, Wu [5]	Survey (questionnaire)	Residents, nursing staff and manager	10 nursing agencies; Chengdu	Staff characteristics and care provided: staff demographics, staff qualification standards and care by NH staff Residents' characteristics and care needs: age, chronic diseases, functional and cognitive status
Liu, Dupre [36]	Secondary data analysis	CLHLS: three waves (1998, 2000, 2002)	Half of counties/cities within 22 provinces	Residents' characteristics and care needs: age, chronic diseases, cognitive status and psychological well-being Care by family members
Wu, Li [11]	Qualitative (focus groups)	49 participants, including 10 residents	Jinan	Staff characteristics and care provided: staff qualification standards and care by NH staff
Zhou and Ma [37]	Survey	160 residents	1 NH; urban area of Shanghai	Residents' characteristics and care needs: age and psychological well-being
Liu, Chu [39]	Survey	317 residents	15 of 27 NHs; Urumuqi	Residents' characteristics and care needs: age
Song, Wang [55]	Survey	230 residents	11 NHs; Chongqing	Residents' characteristics and care needs: cognitive status
Sun, Fu [38]	Survey	427 residents	Tianjin	Residents' characteristics and care needs: age, and functional and cognitive status
Ge, Zhang [50]	Qualitative interview	44 residents	7 NHs; Beijing	Residents' characteristics and care needs: age and chronic diseases
Liu, Dou [51]	Survey	1396 residents	44 NHs; Xinjiang	Residents' characteristics and care needs: demographics and chronic diseases
Li, Song [24]	Survey	252 staff	38 NHs; West of Liaoning Province	Staff characteristics and care provided: staff demographics and qualification standards
Zhu, Wang [60]	Survey	546 *wubao* elders	2 NHs; Hubei	Residents' characteristics and care needs: demographics and psychological well-being
Zhang, Lv [40]	Survey	1193 residents	18 NHs; Hengshui, Hebei	Residents' characteristics and care needs: demographics, chronic diseases, physical function, and psychological well-being
Chen, Tang [56]	Survey at two time points	1036 residents	Urban and rural Guangzhou	Residents' characteristics and care needs: demographics, and cognitive status
Hua, Xu [41]	Survey	298 residents	9 NHs; Xuzhou	Residents' characteristics and care needs: demographics
Zhao, Ma [45]	Survey	163 residents	4 NHs; Shanghai	Residents' characteristics and care needs: demographics, physical function, and cognitive status
Liu, Zhou [58]	Survey	2059 residents	32 NHs; Shanghai	Residents' characteristics and care needs: demographics and psychological well-being
Zhang, Cen [48]	Survey	289 residents and 526 community-dwelling older adults	10 NHs; Kunming	Residents' characteristics and care needs: demographics, physical function, cognitive status, and psychological well-being

Yi, Yan [42]	Survey	206 residents and 620 community-dwelling older adults	25 NHs; Shenzhen	Residents' characteristics and care needs: demographics, chronic diseases, and psychological well-being
Xu, Cong [49]	Survey	665 residents	21 NHs; Nanjing	Residents' characteristics and care needs: chronic diseases
Xu, Cong [80]	Survey	665 residents	21 NHs; Nanjing	Residents' characteristics and care needs: demographics
Zhang, Lu [43]	Survey and health examination	241 residents	1 NH; Weifang	Residents' characteristics and care needs: demographics, chronic diseases, and physical function
Li, Xu [33]	Survey	106 NH direct caregivers	2 NHs	Staff characteristics and care provided: staff demographics and care by NH staff
Zhang, Liang [44]	Survey	242 residents	2 NHs; Guangzhou	Residents' characteristics and care needs: demographics
Wu, Dong	Survey	356 residents and 60 NH staff	10 NHs; Chengdu	Residents' characteristics and care needs: cognitive status
				Staff characteristics and care provided: staff demographics, qualification standards, and care by NH staff
Gu, Liu [81]	Secondary data analysis	1205 residents and 23530 community-dwelling older adults	CLHLS: three waves (1998, 2000 and 2002)	Residents' characteristics and care needs: demographics
Wu, Li [26]	Focus group	9 Government officials, 10 NH managers, 10 NH staff, 10 residents, and 10 community-dwelling older adults	Jinan	Staff characteristics and care provided: staff demographics, psychological well-being, qualification standards, and care by NH staff
Xiao, Algase [32]	Survey and video recording	NH staff and 20 residents	2 NHs; Beijing and Guangzhou	Residents' characteristics and care needs: demographics and cognitive status
				Staff characteristics and care provided: care by NH staff
Huang, Zhang [25]	Survey	556 direct caregivers and 16 nurses	30 NHs; Liaoning	Staff characteristics and care provided: demographics and qualification standards

NH = nursing home.

result from inclusion of diverse types of NHs (e.g., geriatric hospital versus apartment for elderly) or inclusion of NH staff with different job titles. In terms of sources of NH staff, most direct caregivers in urban areas were migratory workers from rural area [3,5,10,26]. In rural areas, direct caregivers were from local areas, which were very likely the same village or community with residents [3,9]. Also, for NHs of rural areas, many current administrators used to be direct caregivers [3,9]. One of the nine studies addressed staff responses to working conditions, reporting that most direct caregivers knew little about psychological problems that might develop from their working conditions and suggesting more attention on helping staff detect and manage potential psychological problems, although it was not stated who should take the responsibility [26]. The problem of psychological well-being of staff has been found to influence quality of patient care in other countries [27].

In terms of the quality of this group of studies, they included NHs in both rural and urban areas and in both developed and less developed regions of China. Two studies used cluster random sampling method to select NHs, in order to establish representative data [5,24]. However, NHs in the other seven studies used convenience sampling; findings, therefore, might not generalize to other NHs in the same geographic region or to Mainland China. Also, the nine studies covered only limited characteristics of NH staff; In addition, none of the studies explored the relationship between staff characteristics and resident or family outcomes.

In summary, the studies provided some evidence about staff demographic characteristics in Chinese NHs such as age and gender, education, and sources of staff. Further descriptive research is needed to establish representative data on a variety of staff characteristics, including their physical and mental health status. This is important to identify challenges that NH staff might have in providing resident care, and to target workforce training programs to NH staff of specific characteristics. Also, more studies are needed to describe characteristics of not only direct caregivers but also staff of other job positions.

3.1.2. Staff qualification standards

Eight of the 24 studies addressed job qualifications for NH staff and reported that the few existing standards for qualifications varied widely across cities in China. Wu and Caro [9] found no specific requirements for workforce training, or monitoring of quality of care. Most of the NH staff received little professional training in elder care [5,23–25]. Newly recruited direct caregivers were trained mainly by more experienced staff which did not follow standardized or knowledge-based training plans [11,26]. Existing training programs, regardless of being led by NHs, Government agencies, or Bureau of Civil Affairs, focused on providing daily care and basic knowledge about common diseases among older adults [25]. Wu and Caro [9] also reported regional differences of staff training, in which few staff in Hubei had received any training, while some staff in Shanghai in participating NHs received training and working certificates. Feng et al. [10] found that less than one-third of the participating 140 NHs in Nanjing employed professional nurses or physicians. Despite this widespread lack of training, some evidence suggests that staff welcome more

care knowledge and skills; one study found that 96% of enrolled staff were willing to participate in training and desired training in basic knowledge about common diseases among older adults, and knowledge about psychological care and daily care [25].

In terms of the quality of this group of studies, they provided strong evidence that NHs had few job qualification standards for staff and there was little consistency in how staff was prepared for roles in NHs. The studies used both quantitative and qualitative designs. The four studies that used quantitative designs reported using random sampling [5,9,24,25]. Also, the eight studies provided data on staff training levels of both Government-owned and private-owned NHs, as well as NHs in both urban and rural China. However, articles reviewed on training levels were mainly limited to direct caregivers; only one study mentioned the extreme lack of medical and nursing professionals in NHs [10].

These findings suggested that training standards and qualifications is a high priority area of research and policy development. Using western standards about qualifications of NH staff, we suggest that the qualifications of staff are not sufficient in Chinese NHs [28], but research is needed to support what will optimize staff and resident outcomes in China. Research is also suggested to set standards about what constitutes the necessary qualifications for unlicensed direct caregivers and how these might be obtained in both urban and rural China. The synthesis of the eight articles suggests research is needed to describe and evaluate existing staff training programs. In addition, because little is known about barriers to developing a qualified workforce, we suggest additional research to understand perspectives of NH administrators, nursing leaders, and Government officials about facilitators and barriers of NH staff training, in order to develop training programs for unlicensed direct caregivers

3.1.3. Care by NH staff

Eleven of the 24 articles reported findings about resident care provided by staff in Chinese NHs and reported that a range of care services were provided, but care was not individualized. Basic services were provided, including personal care, basic medical care, room cleaning, meals, and laundry [5,11,23,26]. Wu et al. [3] found four different care levels in participating NHs; they classified residents by the level of independence, ranging from totally independent to totally dependent in daily living. Studies found that care was lacking in both quantity and quality; there were few differences in skill levels of staff caring for residents who required different levels of assistance [29]. Lack of competent staff also was identified as a contributing factor to NHs denying admission to older adults who had functional dependency, cognitive impairment, or infectious disease [3,23]. Each NH in rural China had a small clinic with a few non-prescription drugs that were used to treat most of residents' illnesses [30]. However, some residents' chronic conditions were neglected [30]. Wu et al. [11] found that NHs differed from each other in amenities provided, instead of types and levels of care provided. None of the 10 surveyed NHs in Chengdu had a nutritionist to design individualized diet plans for residents [5]. Also, less than one third of all NHs in the city of Nanjing employed nurses or physicians [10]. Nonetheless, Li and Buechel [31] found that family members

had a high level of overall satisfaction towards residents' life in Chinese NHs, in terms of accessibility of nurses and quality of care, even higher than that in the U.S. NHs. Four studies reported challenges at different levels that NH staff had in providing care for residents; these included agitation behaviors of residents with dementia [32], lack of time [33], intense relationship of staff with family members of residents [26], and lack of respect and support from society [26].

In terms of the quality of this group of studies, these eleven studies include both quantitative and qualitative designs and include NHs of both rural and urban China. However, the overall strength of evidence was relatively low. For example, only one of the eight studies that used quantitative designs randomly selected participants [5]; the other seven studies used purposive or convenience sampling to select NHs or participants, thus results might not generalize to NHs in the geographic region or Mainland China [10,29,31]. For the three studies that used qualitative designs, none stated explicitly how qualitative rigor was assured [11,26,30]. Also, evidence about care provided by NH staff was very limited. For example, no studies examined residents' perspectives about care provided by NH staff. Only one study investigated family members' level of satisfaction towards care provided by NH staff, but no study explored the correlation between quality of resident care by NH staff and family members' level of satisfaction towards the care.

In summary, these eleven studies provided limited evidence about types of care provided by NH staff. Studies provided some evidence that care was lacking in both quantity and quality. However, in one study, family members had high level of satisfaction for resident care by NH staff. Thus, as a whole, these studies might indicate variation in quality of care provided by NH staff. Additional descriptive research is needed to describe in more detail types and levels of care by NH staff of different care roles, involving residents' and family members' descriptions and preferences of resident care by NH staff. Also, research is needed to link care by NH staff with resident or family outcomes, in order to navigate and evaluate workforce training programs.

3.2. Resident characteristics and care needs

Three sets of resident characteristics were reported in this literature: 1) age, 2) chronic diseases, and 3) functional and cognitive status and psychological well-being.

3.2.1. Age
Twenty two of the 45 articles reported about the age of residents and again, the reports varied; percentages of participants who were 80 years and older, known as the oldest old, ranged from 22% to 100% [5,9,29,34–44]. Thus, we have little definitive knowledge about ages of NH residents in China. Two studies reported characteristics of residents who were 80 years and older [34,36]. They found that, in comparison with residents living in the community, "institutionalized oldest old are more likely to be younger, have lower family caregiving resources and exhibit poorer health" [34,36], and these institutionalized older adults were reported to have more chronic diseases, less cognitive impairment and better psychological well-being in terms of positive affect, loneliness and quality of life than those living in the community [36].

In terms of study quality, six studies addressed selection bias of enrolled NH or resident participants; four studies used a random sampling method for participants [9,41,44]. Zhao et al. [45] included all eligible residents. Liu et al. [36] restricted analysis to newly enrolled older adults for each of the three waves of Chinese Longitudinal Healthy Longevity Survey (CLHLS) data, which used random sampling in its original research design. However, the other sixteen articles did not address the issue of selection bias when selecting NH residents, making it uncertain whether the participants were representative of the population in each NH.

In summary, these findings indicated wide variability in percentages of the oldest old age group among NHs. Additional epidemiological studies are needed to establish representative data of the age of residents in Chinese NHs, including the percentage of oldest old.

3.2.2. Chronic diseases
In this review, we defined chronic diseases as "diseases of long duration and generally slow progression" [46]. Thirteen of the twenty one articles reported about chronic diseases among Chinese NH residents.

Nine of the twelve articles reported specific data in the percentage of residents with one or more chronic illnesses which varied widely, ranging from 50% to 94% [5,9,40–43,47–49]. The chronic diseases with highest prevalence were hypertension, coronary heart disease, stroke, and arthritis [40,42,43,48,49]. Two of the thirteen articles did not provide specific data about the rates of chronic illness but reported about chronic diseases only in general terms. Gu et al. reported that, in comparison with community-dwelling older adults, more NH residents reported having at least one chronic disease and Liu et al. [36] reported that NH residents "had significantly more chronic diseases". In addition, two articles reported management of chronic diseases by residents. Ge et al. [50] reported that most female residents with urinary incontinence did not seek medical care, mainly because they did not consider this as a chronic condition that needs medical intervention. Liu et al. [51] reported a low level of health literacy that might hinder effective self-care of chronic diseases.

This set of studies had both strengths and weaknesses. Nine articles provided specific data to describe diseases and prevalence among NH residents. Also, the enrolled NHs covered various ownership types, including Government-owned, collective-owned and private-owned. However, three of the twelve articles did not define chronic diseases in their studies [5,9,41]. Only three of the twelve articles addressed the issue of selection bias when selecting resident participants, making it uncertain whether findings from the other nine articles represented residents enrolled in NHs [36,40,41]. Further, studies used different data collection methods of chronic diseases among residents. For example, seven articles used self-report by residents [9,34,36,41,42,48,49], and three used diagnosis by medical professionals [5,43,47]. Using these different sources of data provides some understanding of resident prevalence of chronic diseases, but it is not possible to compare results across studies, weakening what we know about prevalence of chronic diseases in NHs.

In summary, these studies presented widely varied results in their reports of prevalence of chronic diseases in Chinese

NHs. Because research has yet to provide clear information about prevalence of chronic diseases, additional epidemiological studies are needed in order to plan for care needs. Also, we suggest that future studies use the same diagnosis standards and clear participant selection criteria to enable deeper understanding of prevalence of various types of chronic diseases among Chinese NH residents. Knowledge gained will inform content of workforce training programs to help with chronic disease management of NH residents.

3.2.3. Functional and cognitive status and psychological well-being

In this review, *functional status* was defined using dependence level of activities of daily living (ADL), that is, "activities that people perform habitually and universally;" [52] *cognitive function* was defined as "the process by which an individual perceives, registers, stores, retrieves and uses information" [53, p.91]; and *psychological well-being* was defined as mental wellness in six aspects including self-acceptance, environmental mastery, purpose in life, positive relations with others, personal growth, and autonomy [54]. Twenty eight of the 45 articles reported data about resident physical and cognitive function and psychological well-being in Chinese NHs.

Eighteen articles provided specific and varied data about physical or cognitive function or psychological well-being among NH residents. Many residents were found to have a high functional level [3], higher than residents in the US [31]. In terms of physical function, the percentage of residents with ADL limitations ranged from 15% to 81% [5,9,10,34,40,48], and one study found that NH residents were 1.9 times more likely to be ADL disabled than community-residing older adults [34]. Wu et al. [30] reported that usually less than 10% of older adults in their sample were bedridden or semi-bedridden and that not all NHs accepted such residents.

In terms of cognitive status of residents, studies reported the percentage of residents with cognitive impairment ranging from 13% to 66% [5,34,45,55], and one study found that NH residents were 1.6 times more likely to be cognitively impaired than community-residing older adults [34]. More specifically, the percentage of residents with mild cognitive impairment ranged from 16% to 17% [38,55]; the percentage of residents with moderate to severe cognitive impairment was 50% [55]; the percentage of residents with dementia ranged from 8% to 37% [10,38,48]. Also, three studies focused on the more specific population of residents with dementia. Xiao et al. [32] described common agitation behaviors of residents with dementia. Chen et al. [56] reported that the 8-year survival rates for residents with mild cognitive impairment and dementia were 17% and 4% respectively; severity of cognitive impairment was the influencing factor of 8-year survival rate. Wu et al. [57] found that Shanghai NH residents with dementia had higher rates of behavioral symptoms compared to ethno-specific Chinese NH residents in Sydney, Australia.

In terms of psychological well-being, studies reported prevalence of depression which varied widely, ranging from 30% to 66% [35,42,58,36]. One study found that some residents reported significant improvements in psychological well-being after institutionalization, while others felt isolated and depressed [59]. Studies also reported various influencing factors of psychological well-being, such as loss of spouse, illnesses, and satisfaction of care [40,60].

In terms of the quality of this set of studies, the twenty eight articles in this theme provided moderately strong evidence about physical and cognitive function among NH residents in both urban and rural China. Both descriptive and correlational research designs were used. However, only ten of the twenty eight studies used random sampling to select participants, thus findings from the other eighteen studies might not generalize to the geographic region or Mainland China. Also, considerable inconsistency existed between studies in the measures of physical or cognitive function, limiting the comparability of results. For example, physical function was measured using a modified Barthel Index [61], the Katz Index of ADL [34,62,63] or SF-36 [37,64]. Although most studies used the Mini-Mental State Examination (MMSE) [38] to measure cognitive function, only 3 studies described their cut points for scores indicating cognitive impairment and dementia [34,62,63]. In addition, few of the articles explicitly stated definitions of psychological well-being variables, making comparisons between studies questionable.

In summary, this set of studies reported a relatively high functional level among NH residents in China as compared to functional levels of NH residents in western countries [65,66]. This might result from different admission criteria, for example, individuals with pre-existing cognitive impairment or functional limitations might be denied admission, for Chinese NHs as compared to criteria used in western countries; this is an area for further study. More research is also needed to identify the best measures for physical function in order to compare results among studies. Also, longitudinal studies are needed to provide data about residents' trajectories of physical and cognitive function and psychological well-being in NHs, in order to inform what training and qualification is required for workforce.

3.3. Care by family members

Four articles examined family members' roles in caring for NH residents; children played an important role in caring for NH residents. Most children continued to provide physical care, financial and emotional support to NH residents, as well as monitor and check the quality of care provided by NH staff [59], and residents reported no differences in relationships with their children before and after institutionalization [67]. Liu et al. [36] found that associations between institutionalization and better psychological health were moderated by the number of children, proximity and visits. However, in comparison with community-residing elders, NH residents had fewer family caregiving resources, indicated by lower percent of currently married, fewer number of living biological children and lower proximity with children [34].

In terms of the quality of this set of studies, the studies provided relatively strong evidence that family members played important roles in caring for NH residents. For example, both qualitative and quantitative designs were used. The two studies that used quantitative designs were both secondary data analysis of a nationally representative data set, thus findings could generalize to Mainland China [34,36]. Of the other two studies that used qualitative designs, they did

not provide any evidence about how qualitative rigor was assured [59,67]. Also, one study explored descriptions of the care provided by family members from various stakeholders' perspectives, including residents, family members and NH staff [59], but did not present perspectives of the stakeholders separately, making it impossible to understand the commonalities and uniqueness of the three perspectives.

In summary, the four articles demonstrated the important roles that family members played in caring for NH residents. Qualitative studies describing family members' rational for why they provide so much care after a family member is admitted to a NH are needed to better understand how to support them. Also, qualitative studies involving the perspectives of residents are necessary to understand residents' experiences and explore their preferences of family support after institutionalization. Qualitative research is needed to explore staff experiences of family members' care for residents, in order to identify challenges they encounter with resident care by family members. Given the positive effects of care by family members on residents, family members and NH staff [68–70], knowledge about current NH resident care by family members will inform staff training programs to effectively incorporate care by family members into NH care in order to provide high-quality resident care in NHs.

4. Discussion

Studies found that most NH staff ranged from 40 to 60 years of age and older and they had little formal education; most direct caregivers in urban areas were migratory workers from rural area. Findings also indicated that direct caregivers were older, and had lower education levels in comparison with those in other countries. For example, using data of the U. S. National Nursing Assistant Study, Price-Glynn et al. [71] reported that the average age of nursing assistants was 37, and most of them had high-school degree. Chan et al. [72] found that more than half of NH staff in Hong Kong had secondary level education (grade 7–12). The differences in age and education level of NH staff between Mainland China and other countries suggest a need for different staff training programs that address the specific characteristics of staff in Chinese NHs, because age and education level of trainees have been reported to influence the participation and uptake of training programs [73–75]. For example, a meta-analysis found that age both influenced motivation to learn and moderated the relationship between motivation to learn and transfer of training [74].

Studies provided strong evidence that Chinese NHs had few qualification standards for staff training and there was little consistency between NHs and regions in how staff were prepared for their roles. The findings showed that the level of staff qualifications did not meet western standards, and more research is needed to determine what level of staff preparation is appropriate given the demand of care and the current constraints of resources in Mainland China. For example, the U.S. Federal Government mandates that all direct caregivers receive 75 hours of training before being certified to work in Medicaid/Medicare certified NHs [28]. Germany requires that at least 50% of all care staff are Registered Nurses who have had 3-year geriatric training [76]. Considering the significant role of workforce in healthcare delivery [77] and the influence of workforce training on resident outcomes and staff working experiences [14,78], the sub-optimal staff qualification in Chinese NHs suggests this is a critical area for policy development to improve the capacity of Chinese NHs to provide competent and safe care.

Studies reported that the percentage of residents with ADL limitations ranged from 15% to 81%; they provided strong evidence that functional level of residents in Chinese NHs was higher as compared with functional level of NH residents in western countries. For example, a longitudinal study involving 377 NHs in Minnesota, United States found that the prevalence of NH residents who were totally independent in ADL was less than 10% [65,66]. The huge difference in NH residents' functional level between Mainland China and western countries indicates that residents need different LTC services and thus training programs from other countries should be adopted with caution. However, the lack of longitudinal studies means there is little data for knowing the trends in functional level and if, as the NH system matures, it will admit residents with lower functional levels. Thus additional research is needed to know more about residents' need for LTC services in Chinese NHs in order to guide content-based workforce development programs.

A weakness of this set of studies was that they were limited to relatively developed cities in Mainland China, such as Shanghai and Xi'an. For example, eight of the included 45 studies sampled NHs in Shanghai and four sampled those in Guangzhou. Given the large proportion of elder population living in rural China [79] and differences in the availability of LTC services between rural and urban China [6], additional studies are necessary to explore needs for LTC services among older adults in rural China. Thus, the evidence accrued in this literature review provides only a glimpse of the challenges that lie ahead for development of Chinese NHs but the evidence suggested numerous areas for future research.

5. Limitations of the literature review

One limitation of this review is that it is possible that we did not include all of the possible search terms because multiple terms are used to refer to NHs in China. To address this limitation, we used several terms including "nursing home", "residential care facilities", "welfare institutes" and "old age home" in English databases. In addition, we used both controlled vocabulary and text keywords as search terms in order to seek a broad search of the literature. In the Chinese database, we used several search terms including *yanglaojigou, yanglaoyuan, laoniangongyu, fuliyuan,* jinglaoyuan, *huliyuan,* and *laonianyiyuan.* Despite this limitation of this review, this analysis provides a necessary first step in synthesizing available knowledge about resident characteristics and care needs in Chinese NHs and thus will inform the next steps of research.

6. Conclusions and implications for research

The lack of qualification standards of NH staff presented an urgent area for additional research into resident characteristics

in Chinese NHs to help policy-makers establish qualification standards of staff to provide competent and safe care for NH residents in Mainland China. Several research questions have been derived from this literature review to suggest areas for additional research: (1) What are the characteristics of NH residents in Mainland China in comparison with those of NH residents in western countries, in terms of age, prevalence of chronic diseases, functional and cognitive status and psychological-wellbeing? (2) What types and levels of care are preferred by residents and/or their family members? (3) What are staff characteristics in Chinese NHs, including direct care-givers, administrators and care professionals (such as physicians and nurses)? (4) In Chinese NHs that employ nurses, what is their role in providing care for residents? (5) What is the relationship between quality of care and nurses' demographics, education, and leadership behaviors in Chinese NHs? (6) What are the barriers of nurse's being employed in Chinese NHs? (7) What types and levels of care are provided in Chinese NHs as described by residents, their family members and NH staff? (8) What are the relationships between staffing characteristics/care by NH staff/care by family members and resident outcomes? (9) What are the staff training programs currently in place? How effective are these training programs in improving resident and/or staff outcomes?

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Authors' contributions

All four of the authors contributed to the conception and design of the paper. Y. Song undertook data collection, analysis, synthesis, and drafting of the paper. She is a Ph.D. student at Duke University. R. Anderson, and K. Corazzini reviewed all the articles for inclusion and exclusion using the criteria; they also reviewed and critiqued the initial synthesis and the subsequent drafts. B. Wu reviewed all the articles from the Chinese database for inclusion and exclusion using the criteria; she also reviewed and critiqued the synthesis and drafts after including articles from the Chinese database. All authors have critically reviewed and approved the final paper.

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