

Nurses' Views on Infection Control in Long-Term Care Facilities in South Korea: A Focus Group Study



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Purpose: Nurses' infection prevention and control responsibilities have been emphasized owing to the increasing infection rate in long-term care facilities in South Korea. The aim of this study was to explore nurses' perspectives on challenging situations and the areas of improvement related to their role in infection management. **Methods:** An exploratory descriptive qualitative study was conducted with a purposive sample of 15 nursing staff from five long-term care facilities. A focus group interview with semi-structured questions was conducted between January and May 2017. The study participants' discussions were analyzed using conventional content analysis with line-by-line coding. **Results:** The participants discussed the breadth of challenges interfering with their ability to provide optimal infection care, from practical human resource management issues to organizational and environmental barriers, and laid a foundation based on which lacking areas can be improved. The analysis produced key themes centered on healthcare personnel-related professionalism, professional role boundaries, daily workflow and management, interdisciplinary collaboration, standards and protocols, and technological infrastructure. **Conclusion:** Although participants expressed negative feelings toward the constraints in long-term care facilities, they demonstrated the willingness to create a positive change and offered suggestions for improvement and support to improve resident safety and care management. Therefore, special attention should be paid to nurses' perspectives on their work and roles regarding infection control practices and supporting them with available sources.

Key Words: Focus groups, Long-term care, Infection control, Nurses, Perception

INTRODUCTION

Healthcare-Associated Infections (HAIs) are widely recognized as common and important causes of morbidity among residents in Long-Term Care Facilities (LTCFs) [1]. A recent study has reported that the risk of HAIs within these communal living environments is increasing in South Korea (hereafter "Korea") in parallel with the country's growing number of LTCFs [2]; such circumstances not only threaten the health status of residents but also place a considerable burden on healthcare workers in terms of workload and responsibilities.

HAIs have been considered to be mostly avoidable

through adherence to Infection Prevention and Control (IPC) practices [3]. In LTCFs, nurses are at the frontline of the provision of direct hands-on care, and they play a key role in effective IPC activities such as assessing and identifying signs of infection [4]. In addition, the perceptions of nurses provide avenues for the effective implementation of infection prevention, ultimately reducing infection rates and facilitating the delivery of safe care to residents [5]. Subsequently, one source of data on current infection control practices in LTCFs comes from nurses, who are central to this process. However, despite such a potentially significant role of nurses, there has been no study documenting their perceptions regarding IPC practices in LTCFs in

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Korea. In particular, evidence acknowledging the aspects of structures affecting IPC processes hardly exists.

LTCFs in Korea are generally regarded as under-resourced, under-staffed, and uncaring environments, especially where nurses are concerned [6]. Thus, understanding their perceptions regarding challenges or considering their suggestions for improvement in relation to their role in IPC practices may be beneficial for advocating for nurses and maximizing optimal outcomes for LTCF residents. Qualitative methods are known to be an ideal approach to understanding the perceptions of various stakeholders (e.g., nurses, physicians) regarding the interrelationships of complex issues affecting infection control practice [7]. In Western societies, there have been large-scale qualitative studies on IPC to address the perspectives of healthcare providers regarding barriers, suggestions, and resources [5,8-11]. However, only limited research has been conducted in LTCFs. Further, these studies have not sufficiently accounted for how nurses perceive IPC practices in their daily working environment. In Korea, some studies have explored qualitative approaches to nursing practices related to LTCFs, and several of the factors identified have been shown to interfere with the provision of healthcare services in what were described as “unsupportive institutional conditions” [6,12,13]. However, these studies have limited themselves to describing current nursing practices without focusing on features of infection control, offering no explanation of nurses' perceptions of conditions regarding their management of infection control in LTCFs.

Therefore, this study addresses gaps in our knowledge by examining nurses' perceptions related to challenges and suggestions for improvement in their role in IPC practices. The specific aims of this study are the following: (a) describing what nurses perceive as situations interfering with infection control, which highlight challenging areas in their roles in IPC; and (b) exploring the perceptions of nurses regarding the possible solutions and related areas for improvement that may optimize their roles in IPC.

METHODS

1. Study Design

We conducted an exploratory descriptive qualitative study using focus group interviews for data collection.

2. Setting and Samples

Recruitment for the focus group was achieved by a purposeful sampling technique to choose information-rich

cases. Each facility head was contacted by the first author via telephone or e-mail for access to nursing staff. For inclusion, participants were required to have work experience as a registered nurse in LTCFs and the ability to understand the purpose and processes of the study. Accordingly, a sample of 15 nursing staff was recruited from five LTCFs; 11 were from facilities in metropolitan areas with eight from one facility in Seoul, and four were from one facility in Gyeonggi province.

Particularly, in this study, the definition of LTCFs broadly includes long-term stay units, community-based residences, and palliative care units. When describing the personnel in LTCFs, Healthcare Personnel (HCP) include registered nurses and physicians, and unlicensed HCP include care and social workers.

3. Data Collection/Procedure

Between January and May 2017, three focus group interviews with semi-structured questions (Table 1) were conducted at three different locations that were regularly used for staff meetings. Discussions involved three/four/eight members of the nursing staff; one moderator and two facilitators in each group. The moderator (corresponding author) is skilled at leading focus group discussions, eliciting information from the participants by asking topical questions and possessing considerable expertise on the topic. The facilitators (the first and third authors) have sufficient experience in leading group interviews. They served as timekeepers and recorded the field data while ensuring that everyone felt comfortable.

Participants described and discussed the issues and topics that arose during daily practice. The discussion was moderated so that all participants had equal time to respond, allowing for all questions to be answered. Each interview was audio-taped, while detailed and comprehensive field notes were chronologically recorded along with additional information such as reflections on the interview. Each interview took approximately one to two hours.

4. Ethical Considerations

The Institutional Review Board (IRB) of Seoul National University approved the study protocol (IRB; No.1612/002-002). It was explained that participation was voluntary and that it could be terminated at any time. This information was provided in both written and oral form. Data collected were stored in compliance with IRB standards.

Table 1. Interview Guide

Starting question	<ul style="list-style-type: none"> • How do you feel infection affects you as a nurse staff?
Main question	<ul style="list-style-type: none"> • What factors generate the most difficulty when caring for residents? • What barriers do you personally face with your colleagues to comply with infection control practices? <ul style="list-style-type: none"> - Probe: Are there any hospital standards (i.e. policy or guidelines) that you are aware of? - Probe: What barriers and challenging situations are present when conducting infection control practices in LTCFs in terms of tools and equipment? - Probe: What are the barriers to infection control and prevention in terms of workload? - Probe: Are there environmental barriers when managing infection in LTCFs?
Conversion questions	<ul style="list-style-type: none"> • What areas in infection management among residents should be the focus of improvement and support? <ul style="list-style-type: none"> - Probe: Are there administrative procedures which need to be changed or improved for better management of infection? • What should be done to facilitate effective infection control?
Summary questions	<ul style="list-style-type: none"> • Is there any other feedback you can give us related to our topic? • What else is important to help infection control management?

LTCFs=long-term care facilities.

5. Data Analysis and Reporting

All interviews were transcribed verbatim and validated by the research team after the focus groups interviews were conducted. Any identifiers (i.e., names, work units) were deleted from the transcript and confidentially replaced with generic labels through a cleaning process. Two authors participated in the analysis of our de-identified transcripts.

Conventional content analysis [14]-a method of inductive coding to understand understudied phenomena-was utilized, since existing Korean research or preconceived theories on this topic are limited. At first, the authors immersed themselves in the data by reading it several times to become familiar with the participants' responses and achieved initial understanding. Next, line-by-line analysis was conducted independently to derive key words based on the research question across responses. Key words were then coded, and identified codes were structured through a collaborative consensus process. The authors then clustered codes into meaningful units, which generated overarching themes. In the subsequent step, the authors discussed potential associations among themes, which, in turn, constituted broader categories. After considering the expressions of the latent content of the texts, the authors reached agreement on the synthesized findings. Based on the final list, the materials were copied into a text document under the appropriate main category and themes.

We addressed the trustworthiness of the results by adopting several reflexive practices [15]. First, the authors

went through a consensus-based discussion with adequate informant feedback, which served as a member check to provide additional insights into the data, improving the accuracy of the study. Second, the authors made an audit trail through various stages of the analysis process, as well as maintaining diaries and research memos within the software to maintain objectivity and consistency in the study findings. Third, the authors provided deep and thorough descriptions of the participants, process, and research setting to allow for transferability to other research applications. Finally, the authors held frequent debriefing sessions and met with professionals who held an impartial view of the current study to avoid preconceived beliefs or biases, ensuring the collection of valid information.

RESULTS

Participant demographics and characteristics of LTCFs are provided in Table 2 and Table 3. Rich data were obtained by allowing the participants to describe a substantial number of their experiences, and this generated 15 meaningful units, six main themes, and three categories, which are summarized in Table 4.

1. Personnel Parameters

1) HCP-related professionalism

A lack of knowledge regarding key IPC concepts among care workers, with their varying backgrounds and differing perceptions of residents, were perceived to impede nurses' efficacy in adhering to IPC roles.

Table 2. Characteristics of Participants in Focus Group Interview (N=15)

ID	Gender	Age (year)	Years of experience as nurse (year)	Clinical experiences in LTCFs (year)
1	W	57	18	4
2	W	36	8	2
3	W	42	19	7
4	W	55	13	2
5	W	27	1	0.5
6	W	65	10	4
7	W	48	22	8
8	W	45	9	6
9	W	55	30	10
10	W	51	30	12
11	W	53	20	15
12	W	64	26	18
13	W	52	25	1
14	W	51	15	8
15	W	61	35	0.5

F=female; LTCFs=long-term care facilities.

They [care workers] had learned the procedure but not necessarily why, maybe the emphasis is not enough (Gr2, B).... They have varying educational levels (Gr2 A).... They have different perceptions about patients [from nurses] (Gr1, F).

Besides, participants acknowledged that the lack of leadership of the facility manager in articulating or communicating organizational culture well to staff presented challenges to nurses' IPC processes. They also stated that this was further complicated if the leader did not have a nursing background, and thus emphasized the need for its improvement.

Table 3. Characteristics of Long-Term Care Facilities (N=5)

Variables	M±SD
Facility capacity, (number of items)	
Beds	90.00±48.28
Current residents	89.60±47.99
Residents admitted and discharged annually	21.90±12.53
Workforce size per facility, (number of items)	
Nursing staffs	3.60±3.36
Nurse aides	1.60±2.51
Care workers	37.60±20.01

Table 4. Nurses' Views on Challenging Situations and the Areas of Improvement related to Their Role in Infection Prevention Management

Meaningful units	Main-themes	Categories
<ul style="list-style-type: none"> • Barriers to training unlicensed-HCP • A need for improvement in the facility manager's leadership in motivating preventative work 	HCP-related professionalism	Personal parameters
<ul style="list-style-type: none"> • Unclear separation of duties between nurses and unlicensed-HCP • A lack of nursing record and documentation • A lack of understanding of the differences in nurses' roles in prevention activities between community health settings and geriatric hospitals 	Role boundaries	Task parameters
<ul style="list-style-type: none"> • Family noncompliance with resident visitation regulations • High workload caused by great turnover and infection breakout • A need for improvement in staffing and employee support 	Daily workflow and management	
<ul style="list-style-type: none"> • Challenges in communication and cooperation among HCP • Disagreement with external organizations and inter-institutional regulations 	Interdisciplinary collaboration	Organizational/physical environmental parameters
<ul style="list-style-type: none"> • A lack of clinical guideline specific to LTCF • The absence of standardized transmission reduction practices • A need for performance evaluation 	Standards and protocols	
<ul style="list-style-type: none"> • No surveillance data system • A need for medical technology support 	Technological infrastructure	

HCP=healthcare personnel; HCP=registered nurses, physicians; Unlicensed-HCP=care workers, social workers; LTCFs=long-term care facilities.

If they [administrators] are nurses, they are more obsessive [in preventing infections] (Gr2, A).... They should recognize that we play important roles in their facilities' patient safety; they don't have a mindset [to implement change] (Gr3, C).

2. Task Parameters

1) Role boundaries

The results suggested that there are unclear boundaries between tasks and the distribution of responsibilities, complicating nurses' workload. Some nurses stated that such a situation can worsen because of the lack of healthcare records specific to nursing workflow. Infection control practices were also found to be complicated by an unclear distinction between practices in LTCFs and those in geriatric hospitals.

[Although] Nurses should perform the screening process, in our facilities, the social worker takes on this role (Gr1, E).... We don't have nursing records, evidence of our actions, while others record even the smallest things (Gr 1, E).... Geriatric hospitals and our facilities are totally different; just throwing patients who need strong antibiotics in here, where the physician is not present, and compel us to provide care does not make any sense (Gr1, H).

2) Daily workflow and management

The participants noted that family visitors, who were frequently intransigent and unwilling to follow the rules of LTCFs, restricted time for care, impeding effective IPC practices.

The pressure involved in going about my work increases because of visitors who come in and out frequently (Gr3, A).... We can only control them when there is a national epidemic event (Gr2, C).

They also expressed that institutional factors such as the high turnover of workers in LTCFs affected their management and adherence to effective IPC practices.

As there is a great turnover among care workers, it is our job to help them adapt to different circumstances over and over (Gr2, C).

Moreover, they expressed the need for allowing sufficient discussion between nurses about adequate staffing. They also described the importance of maintaining ad-

equated levels of substitute staffing for the smooth workflow in IPC and the implementation and evaluation of professional policies.

The wards should ensure more staff and more assistant staff who can cover our rest days (Gr 2, C).... The law should consider our break days, and guarantee replacement (Gr 3, B).

3. Environmental Parameters

1) Interdisciplinary collaboration

Participants described the communication challenges regarding roles related to prevention activities with other HCPs. Some participants offered information related to a disagreement with a larger institution regarding administrative duties, expressing the necessity for interorganizational cooperation.

We want to implement strict rules for [the] screening process, but other professionals [physicians] told us that we are so sensitive (Gr1, E).... When MERS broke out, we tightened the control within our institution quickly, but they [public health center] don't have updated control policies and procedures or outbreak control measures; they did not give us real help... they are always one step behind (Gr2, B).... We require institutional collaboration to develop protocols (Gr1, E).

2) Standards and protocols

Most participants stated that there were currently no specific clinical guidelines to ensure the consistent practice of assured care goals in LTCFs, and that they thus often sought information from external sources. They also recognized that applying hospital guidelines to the LTCF setting was often unrealistic, and that LTCF-specific guidelines were needed.

We do not have our own guidelines (Gr3, B).... We use the one from the Centers for Disease Control and Prevention, but we feel that the information is sporadic (Gr1, E).... We don't know how other facilities run their work (Gr1, D).... LTCFs are not medical facilities; we need differentiated guidelines appropriate to our situations (Gr1, E).

Similarly, participants also expressed that there were no standardized rules for isolating potentially infectious residents, coupled with a lack of availability of isolation spaces.

In the hospital, the distance between patients should be over two meters. But in our case, it is less than one meter; we only isolate them with a curtain (G1, E)···. [If there is a suspicion of infection], we have no choice but to use [a] hospice room, a special room for isolation (Gr3, A).

At times, a few nurses recognized that evaluation criteria should also be part of IPC practices as part of their feedback role in assessing the performance of unlicensed HCP.

If there is an appropriate index of evaluation, we will really endeavor to get [an] A grade, try hard to educate our staff more, and even provide formal training quarterly (Gr 3, C).

3) Technological infrastructure

Some participants expressed concerns regarding the absence of a surveillance data system, which could be used for planning infection control efforts based on the systematic collection of HAI data and analysis. Participants also mentioned the need for medical service resources such as X-ray procedures.

We don't gather infection statistics used to make clinical judgments (Gr1, E)···. Most importantly, we want all the residents to take an X-ray at least once a year (Gr3, B).

DISCUSSION

Our work allowed participants to provide qualitative accounts of interfering factors and areas of improvement in the context of the rising rates of infections in LTCFs. The interpretive framework for our findings corresponded with that described by Krein et al. [16]. In their study, common infection control management challenges were grouped into several domains closely aligned with our key themes: structure, politics, culture, education, emotions, and physical or technological infrastructure.

In agreement with prior studies, significant gaps in care workers' knowledge and their varying educational backgrounds were perceived as a barrier by nurses when providing IPC process instructions [9,17]. Staff training and IPC professional experience are known to be essential to meet regulatory requirements in LTCFs [8,9]. In particular, an urgent need to enhance infection prevention knowledge among unlicensed HCPs has been emphasized to improve safety and quality of care [18]. Therefore, providing train-

ing and educational resources to an unlicensed workforce is warranted in this setting. Besides, our findings elucidated the need to create tailored resources accounting for educational level when intervening within this population. This will be of the utmost importance especially in LTCFs in Korea, where a large proportion of workers are unlicensed HCPs.

The findings also highlighted the need for improvement in motivational leadership throughout the organization, as nurses acknowledged that the management did not inspire, motivate, or energize their staff to work toward preventing HAIs. Saint et al.[19] found that successful leaders cultivate a culture of clinical excellence, effectively communicate with staff, focus on overcoming barriers, inspire their employees, and form partnerships across disciplines in order to effectively deal with issues that impede the prevention of HAIs. In addition, Spires et al.[20] emphasized the overcoming of daily leadership hurdles as an effective infection control intervention. Thus, it will be important for facility managers as well as nursing staff to foster and encourage internally motivated initiatives among personnel.

A few statements revealed that a lack of clarity regarding the boundaries of nursing roles increased workload and greatly hampered prevention efforts. The explicit distribution of work might take the burden of the responsibility of care away from nurses, ultimately reducing bureaucracy. Thus, consolidating different work cultures is needed within the organization [21]. For these goals to be realized, it is important that nurses maintain the necessary records, which can be a vital tool to ensure the clarity of roles. This is essential for effective IPC. In the US, some national programs encourage electronic health record implementation for health information exchanges among personnel within LTCFs to improve care coordination activities and communication [22]. Thus, institutional initiatives to assist the use of electronic health records in LTCFs should be considered to enhance care and clarify the distribution of duties.

Family visitation rates and staffing levels were also found to affect infection management by encroaching upon nurses' time for care. More frequent visits by family under less stringent control have been associated with a higher incidence of HAIs in LTCFs [20,23]. Thus, ensuring that families act according to facility rules regarding visitation is necessary. Another challenge identified in the current study is labor supply and demand in LTCFs. Travers et al.[9] showed that the length of time a care worker had been employed at the facility or tenure in the profession influenced barriers to IPC knowledge and

training. In Korea, a higher turnover caused by a low pay structure and harsh working environments was shown to impede care workers from pursuing continuing education [24]. As such, there is a requirement for approaches that ensure the stability of the workforce. Besides, most participants felt that an informal schedule caused by the shortage of nurses and substitute workers was also a contributory factor. Limited staffing is a prevalent issue in LTCFs [9] and is only expected to worsen in the future. To circumvent this issue, the appropriate authorities need to develop policies and control measures related to staffing regulation.

Communication was viewed as a challenge by participants. Participants expressed difficulty in collaborating in development, delivery, and evaluation related to IPC while interacting tactfully with other HCPs. Besides, some participants stressed that LTCFs do not receive well-defined support from surrounding administrative institutions and experience hardships related to organizational structure, particularly in negotiating strategies concerned with infection management. Therefore, strategy coordination among personnel, stakeholders, and other institutions must be explored [8,25]. Furthermore, interagency partnerships, which facilitate the sharing of information and coordination of field operations, should be emphasized to increase efficiency in all care components.

Issues regarding standards and protocols have been critical in infection prevention activities. First, most participants described that there should be standards and guidelines specific to LTCFs. Although many present practices in LTCFs in Korea are consistent with guidelines developed in Western countries [23], there is wide variation in IPC processes across institutions, often using unfounded and differing external information resources. This clearly suggests a need to develop specific and evidence-based guidelines that offer country-specific perspectives to reduce infection risk in this care setting [26]. Second, the results also show the need for environmental controls; the absence of explicit rules for isolating residents and the lack of private rooms were a serious concern. A previous study showed that a lack of isolation techniques was a barrier to IPC practices in LTCFs [27]. In addition, Choi [28] demonstrated that the number of multi-patient rooms is higher than that of single-patient room. Thus, standards for isolating suspected infectious residents are essential, and the need for facilities to improve the environment in LCFs should be acknowledged. Third, participants considered process evaluation measures for the performance of unlicensed HCP key to ensuring successful compliance with IPC regulations. Process evaluation measures have been

useful in determining areas for improvement in practice and assisting in updating infection-related policies and procedures [23]. Therefore, appropriate evaluation tools should be available for monitoring staff compliance in such care settings.

Some participants expressed a need for technological systems such as an infection surveillance system for HAIs. Currently, there are no widely adopted national infection surveillance systems for LTCFs in Korea. This is obviously contrasted to circumstances in the US, where the National Healthcare Safety Network LTCF Component, a web-based surveillance system for tracking infection incidence available to all LTCFs, was launched in 2012 [29]. The availability of this system offers an opportunity to evaluate infection trends over time and estimate HAI burden. It thereby improves HAI awareness among staff and allows for the implementation of controls to reduce infection rates [30]. Therefore, such a system is desirable in Korea for nurses to act upon evidence-based sources by understanding the HAI epidemiology in this setting. In addition, LTCFs are generally lower-technology environments, where resources are more constrained when compared to acute care facilities [26]. It was noted that nurses require more medical and technological support, such as for treating residents at risk for infectious signs and symptoms. However, the extent and current capabilities of health technology in LTCFs is limited owing to diverse organizational environment systems. As a result, gaining an understanding of its limits should be a prioritized objective, while an integration of sophisticated health technology systems into long-term care should be further emphasized [31].

Despite this study's methodological rigor, some limitations deserve attention. First, most participants were recruited from a metropolitan area, possibly altering our results to reflect the preferences and needs of this particular group. Therefore, further research is warranted to achieve consensus on these opinions across different groups throughout the country. Second, even though the researchers encouraged the involvement of all participants to ensure coverage of all points of view, those with more work experience tended to contribute more to the discussion than the less-experienced respondents. As a part of this process, other participants may have tailored their voices to be in line with those of the more vocal and persuasive participants, ultimately skewing the results. Thus, in the future, researchers should endeavor to fully address the opinions of each member of each group to gather representative feedback on and perceptions of the given topic.

CONCLUSION

The study was critical to gain an understanding of work-life challenges and corresponding needs of nurses in relation to IPC practices. It not only emphasized the importance of including nursing input in this process but also provided a voice and means of action to speak up about their work. In addition, it suggested channels to provide quality care and effective intervention, and can inform the implementation and evaluation of future policies.

Based on the findings, this paper concludes with the following implications. First, there is still a dearth of literature documenting the situations of nurses with regard to IPC practices in LTCFs in Korea, although much has been published regarding descriptive epidemiology or the microbiology of LTCFs' infection and isolation protocols. Therefore, more research from a nursing perspective is warranted. Second, with the increasing prevalence of the high infection risk in LTCFs, the aging population in Korea will increase the demand for services in this setting. Thus, increased efforts are needed to prevent and control infection in LTCFs. Lastly, it is essential to offer nurses adequate support and resources.

CONFLICTS OF INTEREST

The authors declared no conflict of interest.

AUTHORSHIP

Study conception, drafting and critical revision of the manuscript - LCY, LMH, and PYH; Data collection, analysis and interpretation of the data, and drafting and critical revision of the manuscript - LCY, LMH, and LSH.

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REFERENCES

- Eriksen HM, Koch AM, Elstrom P, Nilsen RM, Harthug S, Aavitsland P. Healthcare-associated infection among residents of long-term care facilities: a cohort and nested case-control study. *The Journal of Hospital Infection*. 2007;65(4):334-40. <https://doi.org/10.1016/j.jhin.2006.11.011>
- Hwang I, Kim H, Son Y, Jeong H, Kim M, Lee S, et al. Rate of antimicrobial resistant urinary pathogens and associated risk factor in older adults living in long-term care facilities in Seoul. *Korean Journal of Family Practice*. 2017;7(6):864-9. <https://doi.org/10.21215/kjfp.2017.7.6.864>
- Healthy People.gov. Healthcare-associated infections [Internet]. Washington: Healthy People.gov; 2018 [cited 2018 September 22]. Available from: <https://www.healthypeople.gov/2020/topics-objectives/topic/healthcare-associated-infections>
- Yang M, Vleck K, Bellantoni M, Sood G. Telephone survey of infection-control and antibiotic stewardship practices in long-term care facilities in Maryland. *Journal of the American Medical Directors Association*. 2016;17(6):491-4. <https://doi.org/10.1016/j.jamda.2015.12.018>
- Shah N, Castro-Sánchez E, Charani E, Drumright LN, Holmes AH. Towards changing healthcare workers' behaviour: a qualitative study exploring non-compliance through appraisals of infection prevention and control practices. *The Journal of Hospital Infection*. 2015;90(2):126-34. <https://doi.org/10.1016/j.jhin.2015.01.023>
- Park YH, Bang HL, Kim GH, Oh S, Jung YI, Kim H. Current status and barriers to health care services for nursing home residents: perspectives of staffs in Korean nursing homes. *Korean Journal of Adult Nursing*. 2015;27(4):418-27. <https://doi.org/10.7475/kjan.2015.27.4.418>
- Cole M. Qualitative research: a challenging paradigm for infection control. *British Journal of Infection Control*. 2006;7(6):25-30.
- Cohen CC, Pogorzelska-Maziarz M, Herzig CTA, Carter EJ, Bjarnadottir R, Semeraro P, et al. Infection prevention and control in nursing homes: a qualitative study of decision-making regarding isolation-based practices. *BMJ Quality & Safety*. 2015;24(10):630-6. <https://doi.org/10.1136/bmjqs-2015-003952>
- Travers J, Herzig CTA, Pogorzelska-Maziarz M, Carter E, Cohen CC, Semeraro PK, et al. Perceived barriers to infection prevention and control for nursing home certified nursing assistants: a qualitative study. *Geriatric Nursing*. 2015;36(5):355-60. <https://doi.org/10.1016/j.gerinurse.2015.05.001>
- Ngam C, Hundt AS, Haun N, Carayon P, Stevens L, Safdar N. Barriers and facilitators to Clostridium difficile infection prevention: a nursing perspective. *American Journal of Infection Control*. 2017;45(12):1363-8. <https://doi.org/10.1016/j.ajic.2017.07.009>
- Seibert DJ, Speroni KG, Oh KM, DeVoe MC, Jacobsen KH. Preventing transmission of MRSA: a qualitative study of health care workers' attitudes and suggestions. *American Journal of Infection Control*. 2014;42(4):405-11. <https://doi.org/10.1016/j.ajic.2013.10.008>
- Lee JS, Hwang R, Lim MK. A study on working conditions and factors related to job satisfaction of nurses in the long-term care facilities for the elderly. *Journal of Korean Public Health Nursing*. 2015;29(3):551-64. <https://doi.org/10.5932/JKPHN.2015.29.3.551>
- Choi H. A concept mapping study of good service experience

- among the elderly residents of long-term care facilities. *Korean Journal of Adult Nursing*. 2016;28(6):669-79.
<https://doi.org/10.7475/kjan.2016.28.6.669>
14. Hsieh HF, Sarah ES. Three approaches to qualitative content analysis. *Qualitative Health Research*. 2005;15(9):1277-88.
<https://doi.org/10.1177/1049732305276687>
 15. Shenton AK. Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*. 2004;22(2):63-75. <https://doi.org/10.3233/EFI-2004-22201>
 16. Krein SL, Damschroder LJ, Kowalski CP, Forman J, Hofer TP, Saint S. The influence of organizational context on quality improvement and patient safety efforts in infection prevention: a multi-center qualitative study. *Social Science & Medicine*. 2010;71(9):1692-701.
<https://doi.org/10.1016/j.socscimed.2010.07.041>
 17. Jump RLP, Heath B, Crnich CJ, Moehring R, Schmader KE, Olds D, et al. Knowledge, beliefs, and confidence regarding infections and antimicrobial stewardship: a survey of Veterans Affairs providers who care for older adults. *American Journal of Infection Control*. 2015;43(3):298-300.
<https://doi.org/10.1016/j.ajic.2014.11.017>
 18. Trautner BW, Greene MT, Krein SL, Wald HL, Saint S, Rolle AJ, et al. Infection prevention and antimicrobial stewardship knowledge for selected infections among nursing home personnel. *Infection Control & Hospital Epidemiology*. 2017;38(1):83-8. <https://doi.org/10.1017/ice.2016.228>
 19. Saint S, Kowalski CP, Banaszak-Holl J, Forman J, Damschroder L, Krein SL. The importance of leadership in preventing health-care-associated infection: results of a multisite qualitative study. *Infection Control & Hospital Epidemiology*. 2010;31(9):901-7.
<https://doi.org/10.1086/655459>
 20. Spires SS, Talbot HK, Pope CA, Talbot TR. Paramyxovirus outbreak in a long-term care facility: the challenges of implementing infection control practices in a congregate setting. *Infection Control & Hospital Epidemiology*. 2017;38(4):399-404.
<https://doi.org/10.1017/ice.2016.316>
 21. Kim HJ, Kim HY. Emotional labor, job stress and professional quality of life among nurses in long-term care hospital. *Korean Journal of Adult Nursing*. 2017;29(3):290-301.
<https://doi.org/10.7475/kjan.2017.29.3.290>
 22. Alexander GL, Rantz M, Galambos C, Vogelsmeier A, Flesner M, Popejoy L, et al. Preparing nursing homes for the future of health information exchange. *Applied Clinical Informatics*. 2015;6(2):248-66.
<https://doi.org/10.4338/ACI-2014-12-RA-0113>
 23. Smith PW, Bennett G, Bradley S, Drinka P, Lautenbach E, Marx J, et al. Shea/ Apic guideline: infection prevention and control in the long-term care facility. *Infection Control & Hospital Epidemiology*. 2008;29(9):785-814.
<https://doi.org/10.1086/592416>
 24. Park EJ, Lim YJ, Cho BH, Sin IJ, Kim SO. A survey on performance of infection control by workers in nursing homes for the elderly. *Journal of Korean Gerontological Nursing*. 2011;13(2):79-90.
 25. Kim HJ, Kim HY. Experience of job stress among nurses working in long-term care hospital: a phenomenological approach. *Korean Journal of Adult Nursing*. 2016;28(5):572-84.
<https://doi.org/10.7475/kjan.2016.28.5.572>
 26. Park YH, Lee SH, Lee YM, Lee CY, Lee MH. Development of evidence-based guidelines for nursing home's infection control in Korea. *Korean Society of Muscle and Joint Health*. 2018;25(2):135-47. <https://doi.org/10.5953/JMJH.2018.25.2.135>
 27. Kreman T, Hu J, Pottinger J, Herwaldt LA. Survey of long-term-care facilities in Iowa for policies and practices regarding residents with methicillin-resistant staphylococcus aureus or vancomycin-resistant enterococci. *Infection Control & Hospital Epidemiology*. 2005;26(10):811-5.
<https://doi.org/10.1086/502498>
 28. Choi HW. An analysis of the current conditions of the patient rooms of the long-term care facilities in Seoul city. *Asia-pacific Journal of Multimedia Services Convergent with Art, Humanities, and Sociology*. 2017;7(8):751-62.
<https://doi.org/10.14257/ajmahs.2017.08.18>
 29. Centers for Disease Control and Prevention. Tracking infections in long-term care facilities [Internet]. USA: Centers for Disease Control and Prevention; 2012 [cited 2018 September 28]. Available from:
<https://www.cdc.gov/nhsn/ltc/index.html>
 30. Herzig CTA, Dick AW, Sorbero M, Pogorzelska-Maziarz M, Cohen CC, Larson EL, et al. Infection trends in US nursing homes, 2006-2013. *Journal of the American Medical Directors Association*. 2017;18(7):635, e9-20.
<https://doi.org/10.1016/j.jamda.2017.04.003>
 31. Alexander GL, Madsen RW. A report of information technology and health deficiencies in U.S nursing homes. *Journal of Patient Safety*. 2017.
<https://doi.org/10.1097/PTS.0000000000000390>