Infection prevention and control in households: nursing challenges and implications

Prevenção e controle das infecções no domicílio: desafios e implicações para enfermagem

Andréia Rodrigues Moura da Costa Valle[1]
Denise de Andrade[1]
Álvaro Francisco Lopes de Sousa[1]
Priscila Rodrigues Moura de Carvalho[2]

Keywords
Infection/prevention & control; Home nursing; Professional competence; Primary care nursing

Descritores
Infecção/prevenção & controle; Assistência domiciliar; Competência profissional; Enfermagem em atenção primária

Submitted
February 24, 2016

Accepted
May 19, 2016

Abstract

Objective: Identify the theoretical competences of nurses for the prevention and control of infections in home care based on the opinion of experts.

Methods: A quasi-experimental study based on the Delphi method, conducted in Basic Health Units of a capital in the Northeast region of Brazil and universities of four Brazilian regions. In total, 19 nurses from Family Health Strategy teams and 15 investigators recruited through snowball sampling participated in this study.

Results: After an evaluation and consensus among participants, a list was developed containing the competences that would allow the analysis of conceptual, procedural and contextual aspects for the prevention of infection in households.

Conclusion: Practices of infection prevention and control in home care are theoretical competences recognized by nurses; however, the theoretical bases should be reviewed and adapted at the healthcare and teaching levels. The categories listed in this study represent an instrument for future analysis and consideration for infection control in households.

Resumo

Objetivo: Identificar as competências teóricas do enfermeiro para atuação na prevenção e controle das infecções em atenção domiciliar a partir da opinião de especialistas.

Métodos: Estudo quase-experimental baseado na Técnica Delphi, realizado em Unidades Básicas de Saúde de uma capital do Nordeste brasileiro e Universidades de quatro regiões do País. Participaram 19 enfermeiros atuantes nas equipes da Estratégia Saúde da Família e 15 pesquisadores recrutados pelo método *snow-ball*.

Resultados: A partir da avaliação e consenso dos participantes, elaborou-se uma lista de competências, que permitiram analisar aspectos conceituais, procedimentais e contextuais quanto à prevenção da infecção no ambiente domiciliar.

Conclusão: As práticas de prevenção e controle das infecções na Atenção Domiciliar são competências teóricas reconhecidas pelos enfermeiros, contudo as bases teóricas necessitam de revisões e adaptações no âmbito assistencial e do ensino. As categorias elencadas configuram-se em um instrumento de futuras análises e de reflexão no controle das infecções no ambiente domiciliar.

Corresponding author
Álvaro Francisco Lopes de Sousa
Avenida dos Bandeirantes, 3900,
14040-902, Ribeirão Preto, SP, Brazil.
alvarosousa@usp.br

DOI
http://dx.doi.org/10.1590/1982-0194201600033

[1]Universidade de São Paulo, Escola de Enfermagem de Ribeirão Preto, SP, Brazil.
[2]Centro Universitário UNINOVAFAPI, Teresina, PI, Brazil.

Conflicts of interest: there are no conflicts of interest to declare.

Introduction

Home care is an important out-of-hospital health care strategy, which in general results in health care deinstitutionalization and self-care promotion, avoiding unnecessary hospitalization. This health care model ensures new technological arrangements for health care and has a high innovative potential.[1,2]

According to Ministerial Directive 2.527, of October 2011, home care is a "category of health care that replaces or complements the existing health care categories, characterized by a number of actions for health promotion, prevention and treatment of diseases and rehabilitation provided in households, with guarantee of care continuity, integrated with the health care systems". No official statistics are available of the population benefitted by home care in Brazil, nor about the risks involved.[3]

Regarding the prevention and control of diseases in households, risk of infection is a challenge to caregivers, health professionals and researchers worldwide.[4] For this reason, infectology experts agree this field lacks investments, infection data for infections acquired in out-of-hospital environments and, particularly, in households. In addition, professionals working in communities find limitations to prevent and control infection in households, especially due to social, cultural and environmental conditions varying from one home to another.[4-6]

Besides these challenges, studies should be conducted to improve the understanding of the problem, find answers and help professionals make decisions towards better practices for biologically safe household environments.

In addition, national and international regulatory and normative bodies, such as the Brazilian Health Surveillance Agency (ANVISA, as per its acronym in Portuguese) and the Centers for Disease Control and Prevention (CDC), have warned about the importance of infection control in out-of-hospital healthcare environments. The inclusion of patient safety actions, in all healthcare environments, is a multidisciplinary task in terms of practices and regulations, especially in the nursing field.[1,3,4]

Given the complexity of this theme, the objective of this study was to identify the knowledge of nurses to allow proper actions for infection prevention and control in households, helping identify risk factors, based on considerations about the training process to fulfill new health care requirements.

Methods

This is a quasi-experimental study based on the Delphi method. The main characteristic of this investigation is that researchers can control and handle the conditions of their interest. In a simplistic approach, the intention is to apply a change to an independent variable (opinion of experts) and observe the effect of this change on another dependent variable (competences).[7]

This method was selected especially due to the absence of studies analyzing the competences of nurses in infection prevention and control in home care, and for the possibility of involving professionals from different regions of Brazil to value regional diversities.

This study included 19 nurses (group 1) from 30 Basic Health Units (BHU), which offer type 1 home care service through the Family Health Strategy (FHS), located in a capital city in the Northeast region of Brazil. Besides the BHU, this study included 13 other study sites, i.e., higher education institutions from the South, Southeast, Northeast and Central West regions of Brazil which had, among their professors, researchers in infection prevention and control and public health with emphasis on home care (group 2).

The researchers participating in the study should have relevant scientific production in infection prevention and control, with publications in important journals of international circulation. In addition, a consensus criterion was defined in the beginning of this study, and was based on a validated scale.

Participant selection considered the experience and knowledge of FHS nurses or experts (professors and/or researchers) in the areas of infection prevention and control and public health. Group 1 had 19 nurses from the FHS, who participated in the second phase of the study called the Delphi panel. For the second group, the snowball sampling method was used, in which the first participant nominated other participants until a network was created with 15 investigators representing four different regions of the country.

Data collection was conducted through the Delphi method in three phases named rounds.[8,9] The first round aimed to create an initial list of competences, and the information from data collection instruments sent by email to the participants of both groups resulted in the description of 214 competences - 111 general and 103 specific competences, which were processed by Alceste 4.8. This software uses co-occurring words to organize and summarize more relevant information and a logical conceptual approach from lexical dimensions.[10]

The software-based processing produced 48 competences - 26 general and 22 specific competences, which were used in the second round; when the importance of every competence was assessed using a Likert scale.[11] The consensus criterion established that a competence would have to achieve at least 75% of "important" or "very important" scores; otherwise, it would be excluded. In the third round, the final list of competences was produced, excluding those which did not achieve the levels defined in the prior round.

The final list of competences was submitted to the nurses of group 1 in the second phase (the Delphi panel), allowing a discussion on the applicability and impact on the nursing practice.

The manuscript is part of the doctoral dissertation entitled: "Competências do enfermeiro para ações preventivas na atenção domiciliar com ênfase nos riscos de infecção", submitted to the Fundamental Nursing Program of the Escola de Enfermagem de Ribeirão Preto, Universidade de São Paulo.

The study was registered in *Plataforma Brasil* under the Certificate of Presentation for Ethics Assessment - *Certificado de Apresentação para Apreciação Ética* (CAEE) 05872412.9.0000.5393.

Results

The theoretical attributes supporting the knowledge of nurses to act with competence on infection prevention and control in the context of home care were structured and analyzed according to their conceptual, procedural and contextual dimensions (Chart 1).

Discussion

The limitations of this study are related to the Delphi method, in terms of inclusion criteria, number of participants, and consensus criteria.

Although hospitals are considered the main environment of infection dissemination, the risk factors for infection in households or any other place involve the complexity and challenges of infection control, particularly to vulnerable people, given the associated physiological, immunological, environmental and socioeconomic aspects, the latter three with an important role in primary health care provision. However, national public initiatives for home care are insufficient, given the fact that specific training is required for this activity, particularly when complex devices and appliances have to be used in the households.[5,12]

These characteristics require adaptations to make this service feasible; once nursing does not have a normative character to guide this practice. This fact justifies the present study, which is original and can contribute to establish activities according to the categories from the conceptual, procedural or context knowledge dimensions.[13]

Establishing the conceptual bases of household infection risks should necessarily keep its specificity and not be based on the principles of hospital

Chart 1. Practice prevention and control of infection in the context of Care Homecare

Conceptual knowledge (CK) dimension
The theoretical competence to build knowledge of infection prevention and control in home care was synthesized in six conceptual groups:
CK I - Master knowledge of signs and symptoms of bacterial, fungal, viral and parasite infections, transmission mechanism and treatment;
CK II - Master and coordinate knowledge of microbiology with physiology, immunology, pathology, pharmacology (aspects of antimicrobial therapy) that may contribute to clinical diagnosis and support nursing interventions in infection prevention and control in home care;
CK III - Master knowledge of hospital infection and distinguish it from healthcare-associated infections;
CK IV - Master knowledge of the epidemiological surveillance system, its concepts and diseases of compulsory notification;
CK V - Master knowledge of microbial resistance and its implications, such as the policy for the rational use of antimicrobials.
Procedural knowledge (PK) dimension
The competences listed below highlight the need of nurses to master technical and scientific aspects of infection prevention and control procedures in home care for patients, their families, health professionals, community/environment, public policies:
PK I - Master knowledge of personal protective equipment, its use, handling and disposal of home care waste, including secretions, products and materials, as well as biosafety measures according to regulations and ministerial directives for home care;
PK II - Master knowledge of nursing techniques and care with biological risk in direct care provision (medication preparation and administration, use of indwelling catheters, nasogastric tubes and other catheters);
PK III - Master knowledge of maintenance procedures for a biologically safe home environment through surface cleaning and disinfection (starting from less contaminated to more contaminated areas, among other principles);
PK IV - Master knowledge of principles of asepsis and techniques of cleaning, decontamination, disinfection and sterilization of items used in home care, such as catheters, tweezes, scalpel blades;
PK V - Master knowledge of immunization schedule of the family and other situations requiring vaccine intervention, as well as vaccine-preventable diseases and adverse events following immunization.
Contextual knowledge (XK) dimension
Contextual knowledge is related to knowledge of specific characteristics of the public health system and framework, especially about home care and its insertion in the Brazilian Unified Health System (SUS, as per its acronym in Portuguese), its complexities, boundaries, potentialities, users and expectations in this context:
XK I - Master knowledge of home care policies, service categories, resources available, healthcare teams according to the level of complexity, specific competences and responsibilities of each service category;
XK II - Master knowledge of the factors that influence the individual and that can change daily situations in health processes of cultural, social, economic, spiritual and emotional nature.

infection. This discussion goes beyond the academic dimension, it also involves home conditions and topography to generate epidemiological data and indicators related to home care patients and their families.[12,13]

Strategies of infection prevention and control should be expanded to include all health care scenarios.[6,7] Household environments have their own specificity in relation to hospitals, thus requiring specific actions of infection prevention and control.[4]

Nonetheless, occupational risks in home care represent an area with insufficient investments especially in cross-infection and accident prevention. It includes exploring standard precautions that should be applied to health care provided to all patients, in the presence of any risk of contact with blood, body fluids, secretions and excretions, skin with injury and mucosae.[14]

Besides knowing the procedures in home care, it is necessary to master the theoretical bases that support the practice for possible adaptations to eliminate or minimize as much as possible the risk of microbial transmission.[15] The most important prevention factor is the attitude each individual adopts, which is often the result of cultural aspects and/or education/training processes. However, the literature is full of evidences of nurses' awareness and cognitive deficit in terms of safe practices, as well as observational studies showing negligence in the use of personal protective equipment and material disposal.[16,17]

Effective infection control and prevention in home care requires contamination-free products and materials, clean environments, as well as professionals aware of the adoption of the principles of asepsis, with emphasis on the standards of biosafety and hand hygiene by application of alcoholic solutions in situations where there is a lack infrastructure for simple handwashing with soap and water.[18]

Although more complex home care categories are not available in Brazil, procedures are habitually performed that go beyond the responsibility of the FHS teams, such as complex dressings and endovenous medication administration.[19]

Despite the slow changes observed, nursing training in Brazil follows a traditional standard

based on theoretical knowledge, with basic disciplines, stages based on clinical methods, in a markedly hospital-based context. In this standard, the scientific knowledge conveyed in the basic cycle is not contextualized and appears as a neutral, linear and cumulative conception of knowledge, in comparison to a building, which cannot have a roof without a foundation.[20,21]

The use of antimicrobials and its standardization seem to be another challenge which deserve urgent investments to reduce the use of antimicrobials, establish a surveillance system and procedures to prevent contamination and transmission of multidrug-resistant strains in households and communities.[22]

Considering the originality that characterizes the actions of home care nurses, particularly due to the absence of an infection control program in this context, the competences listed in this study highlight aspects that should be analyzed also in teaching environments. Essential reflections should be promoted towards the organization and development of a nursing work process aiming to value individual and collective awareness and social and professional commitment, based on responsibility, ethics, values and principles required to ensure a safe environment.

Conclusion

Practices of infection prevention and control in home care are theoretical competences recognized by nurses; however, their theoretical bases should be reviewed and adapted at the health care and teaching levels. The categories listed in this study represent an instrument for future analysis and consideration for infection control in households.

Collaborations

Valle ARMC, Andrade D and Sousa AFL contributed to the study design, analysis, data interpretation, article writing, relevant critical review of its intellectual content and final approval of the version to be published. Carvalho PRM contributed to data collection, article writing and final approval of the version to be published.

References

1. Silva AR, Souza CV, Viana ME, Sargentelli G, Serpa MJ, Gomes MZ. Health care associated infection and hospital readmission in a home care service for children. Am J Infect Control. 2012; 40(3):282-3.
2. Black N, Mays N. Public inquiries into health care in the UK: a sound basis for policy-making? J Health Serv Res Policy 2013; 18(3):129-31.
3. Brasil. Ministério da Saúde. Caderno de atenção domiciliar 1. Brasília: Ministério da Saúde; 2012.
4. Sousa AF, Queiroz AA, Oliveira LB, Valle AR, Moura ME. Social representations of community-acquired infection by primary care professionals. Acta Paul Enferm. 2015; 28(5):454-9.
5. Shang J, Ma C, Poghosyan L, Dowding D, Stone P. The prevalence of infections and patient risk factors in home health care: a systematic review. Am J Infect Control. 2014; 42(5):479-84.
6. Marwick C, Santiago VH, McCowan C, Broomhall J, Davey P. Community acquired infections in older patients admitted to hospital from care homes versus the community: cohort study of microbiology and outcomes. BMC Geriatr. 2013; 13:12.
7. Linstone HA, Turoff M. The Delphi Method: techiniques and applications. California: University of Southern California, 2002.
8. Landeta J, Barrutia J, Lertxundi A. Hybrid Delphi: A methodology to facilitate contributions from experts in professional contexts. Technol Forecast Soc Change. 2011; 78(9):1629-41.
9. Stewart BT, Gyedu A, Quansah R, Addo WL, Afoko A, Agbenorku P, et al. District-level hospital trauma care audit filters: Delphi technique for defining context-appropriate indicators for quality improvement initiative evaluation in developing countries. Injury. 2016; 47(1):211-9.
10. Reinert M. Alceste: une méthode statistique et sémiotique d'analyse de discours; Application aux. Rêveries du promeneur solitaire. Rev Française Psychiatr Psychol Méd. 2001; (49):32-6.
11. Li Q. A novel Likert scale based on fuzzy sets theory. Expert Syst Appl. 2013; 40(5):1609-18.
12. Aguilar-Duran S, Horcajada JP, Sorlí L, Montero M, Salvadó M, Grau S, et al. Community-onset healthcare-related urinary tract infections: Comparison with community and hospital-acquired urinary tract infections. J Infect. 2012(5); 64:478-83.
13. Horcajada JP, Shaw E, Padilla B, Pintado V, Calbo E, Benito N, Gamallo R, Gozalo M, Rodríguez-Baño J. Healthcare-associated, community-acquired and hospital-acquired bacteraemic urinary tract infections in hospitalized patients: a prospective multicentre cohort study in the era of antimicrobial resistance. Clin Microbiol Infect. 2013; 19(10):962-8.
14. Markkanen P, Galligan C, Laramie A, Fisher J, Sama S, Quinn M. Understanding sharps injuries in home healthcare: The Safe Home Care qualitative methods study to identify path ways for injury prevention. BMC Public Health. 2015; 15(1):359.
15. Kim KM, Oh H. Clinical Experiences as related to standard precautions compliance among nursing students: a focus group interview based on the theory of planned behavior. Asian Nurs Res. 2015; 9(2):109-14.
16. Quan M, Xuyao W, Hualian W, Xiaoli Y, Dan L, et al. Influencing factors on use of standard precautions against occupational exposures to blood and body fluids among nurses in China. Int J Clin Exp Med. 2015; 8(12):22450-9.
17. Carvalho NP, Nogueira PC, Godoy S, Mendes IA. Measures of knowledge about standard precautions: a literature review in nursing. Nurse Educ Pract. 2013; 13(4):244-9.

18. Farsi D, Zare MA, Hassani SA, Abbasi S, Emaminaini A, Hafezimoghadam P, et al. Prevalence of occupational exposure to blood and body secretions and its related effective factors among health care workers of three Emergency Departments in Tehran. J Res Med Sci. 2012; 17(7):656-61.

19. Boas ML, Shimizu HE, Sanchez MN. Clinical and epidemiological profile of patients from the home care program of Federal District Brazil. J Public Health Epidemiol. 2015; 7(6):189-97.

20. Gould D, Drey N. Student nurses' experiences of infection prevention and control during clinical placements. Am J Infect Control 2013; 41(9):760-3.

21. Jacksona C, Lowton K, Griffithsc P. Infection prevention as "a show": A qualitative study of nurses' infection prevention behaviours. Int J Nurs Stud. 2014; 51(3):400-8.

22. Gibbs RS, Wieber C, Myers L, Jenkins T. A continuing medical education campaign to improve use of antibiotics in primary care. J Biom Educat. 2014; (2014):1-6.