

Multidisciplinary nursing practice in a low-resource setting in Southeast Brazil

Bruno Henrique Souza Izidório,¹ Kátia Eliane Santos Avelar,¹ Flávia dos Santos Lugão de Souza,² Patricia Maria Dusek,¹ Agnaldo José Lopes,^{1,3}

¹Local Development Post-Graduation Program, Augusto Motta University Center (UNISUAM), Rio de Janeiro;

²Faculty of the Future, Manhuaçu, Brazil; ³Rehabilitation Sciences Post-Graduation Program, Augusto Motta University Center (UNISUAM), Rio de Janeiro, Brazil

Correspondence: Agnaldo José Lopes, Local Development Post-Graduation Program, Augusto Motta University Center - Rua Dona Isabel, 94, Bonsucesso, 21032-060, Rio de Janeiro, Brazil.
Tel.: +552125762020
E-mail: agnaldolopes.uerj@gmail.com

Key words: motivation, nurse-patient relations, nursing, professional training, specialization

Contributions: BHSI, conceptualization, data curation, formal analysis, investigation, methodology, project administration, writing – original draft, writing – review & editing; KESA, PMD, FLS, formal analysis, writing – original draft, writing – review and editing; AJL conceptualization, funding acquisition, investigation, supervision, visualization, writing – original draft, writing – review and editing.

Funding: the Conselho Nacional de Desenvolvimento Científico e Tecnológico [CNPq; Grant numbers #301967/2022-9 and #401633/2023-3], Brazil, the Fundação Carlos Chagas Filho de Amparo à Pesquisa do Estado do Rio de Janeiro [FAPERJ; Grant number #E-26/200.929/2022], Brazil, and the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior [CAPES, FinanceCode 001, 88881.708719/2022-01, and 88887.708718/2022-00], Brazil.

Conflict of interest: the authors declare no conflict of interest.

Ethics approval and consent to participate: the study was approved by the Research Ethics Committee of the Centro Universitário Augusto Motta under the number CAAE-50714121.2.0000.5235, and all participants signed the consent form. The study followed the recommendations for research in humans as per the Declaration of Helsinki.

Patient consent for publication: written informed consent was obtained for anonymized patient information to be published in this article.

Availability of data and materials: all data generated or analyzed during this study are included in this published article.

Acknowledgments: the authors would like to express their gratitude to the respondents of this study for their valuable support and to the Conselho Nacional de Desenvolvimento Científico e Tecnológico, the Fundação Carlos Chagas Filho de Amparo à Pesquisa do Estado do Rio de Janeiro, and the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior for providing funding for this research.

Received: 10 January 2024.

Accepted: 14 March 2024.

Early access: 28 March 2024.

This work is licensed under a Creative Commons Attribution 4.0 License (by-nc 4.0).

©Copyright: the Author(s), 2024
Licensee PAGEPress, Italy
Healthcare in Low-resource Settings 2024; 12:12376
doi:10.4081/hls.2024.12376

Publisher's note: all claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article or claim that may be made by its manufacturer is not guaranteed or endorsed by the publisher.

Abstract

The various specializations available to nurses represent an investment geared toward providing more qualified patient care. However, little is known about the attitudes of specialized nurses toward multidisciplinary. The purpose of this study was to investigate nurses' perceptions of multidisciplinary in the field of specialist nurses, as well as to determine how specialization is associated with improved patient care and nurses' age in a low-resource setting in Southeast Brazil. This cross-sectional study included 70 nurses aged ≥ 18 years with at least one nursing specialty working at the Regional Health Superintendence of Manhuaçu, Minas Gerais, Brazil. The study participants responded to questions about specialization and its importance in the field of health care. The majority of nurse specialists (84.3%) were between the ages of 20 and 40, and 31.4 percent worked in family health. Eighty percent of nurse specialists agreed that nursing specialization was important. More than 75% agreed that specialization promotes higher quality care and that multidisciplinary is critical for improving patient care. Seventy percent of participants distrusted online health information. There is a relationship between the importance of having a specialty and better patient care ($\tau b=0.293$, $p=0.002$), and between being a specialist nurse and age ($\tau b=-0.272$, $p=0.004$). Nurses have embraced the concept of multidisciplinary as a way to improve healthcare. However, they were concerned about the qualifications for nursing specialties.

Introduction

Based on tools and principles, knowledge is understood as the act of knowing, having an idea, or getting a sense of something through information to increase the effectiveness and value of services.¹ In addition, knowledge is the driving force of today's world, being a critical point for creating value for institutions, including those in the healthcare field.² Continuing education in nursing offers nursing professionals the opportunity to become trained and licensed in a variety of specialties, where each specialty increases their abilities to provide improved patient care.³ The improvement of prior knowledge and the development of new knowledge are essential for professional training in a low-resource setting and, consequently, contribute to the continuous improvement of service quality.⁴ This training is aimed at promoting and maintaining health, preventing diseases, and encouraging adaptability through physical, mental, and social aspects of life.³ The various post-degree specialization programs available for nurses are an investment in their professional identities and better patient care.^{5,6} In 2020, the World Health Organization (WHO) highlight-

ed the need for greater amplification and recognition of all nurses' actions to better meet patient care needs.⁷ International healthcare delivery continues to face several problems, including population growth that is not accompanied by increases in health care and a shortage of financial resources in developing countries.⁸ The intrinsic factors affecting this correlation, in most cases, are workload, training, and internships, which are modifiable factors that elucidate the profile of the professional for the exercise of the function.⁹ As part of a multidisciplinary team (MDT), nurses propose their productive capacity as ideal, enabling them to act on a management model.^{10,11} In this way, nurses seek to guarantee their labor rights and job satisfaction, based on production and quality of care (QoC). Through more appropriate resource allocation, the MDT approach has increasingly been seen as one of the most valuable working models for the possibility of allocating resources more appropriately and contributing to better outcomes. A shift to the practice of MDTs in nursing care occurred in response to skill mix changes in both primary care and critical care settings.^{12–15} However, there is a need for greater involvement of nurses in all fields as members of MDTs, as this will directly affect QoC and patient safety.

In recent years, research using diverse methodological approaches has led to significant progress in healthcare research.^{13–15} Teamwork must involve people with diverse skills and knowledge to facilitate the achievement of the team's and institution's goals. In the context of nursing, both multidisciplinary and inter-professional work should ultimately aim to refine nurse education standards and improve patient safety.^{16–18} Importantly, the WHO emphasizes that MDTs are of paramount importance in health care reform that calls for comprehensive and cost-effective care.¹⁹ Understanding and emphasizing the importance of MDTs in the public and private sectors will contribute to more effective use of knowledge activities in teamwork, which will result in higher QoC.¹⁴ Based on the idea of MDT, there is a growing demand among nurses for specialized training and certification because of the need to obtain skills for qualified development of patient care.²⁰ These skills can provide confidence in the execution of nurses' tasks in practice and contribute to their competitiveness in the job market. In the search for a better job, nurses are motivated to add specialties to their curriculum vitae to increase their potential salaries and to be eligible for a greater number of positions.²⁰ It should be noted that nurses, through the indices and curricular guidelines, feel the need for continuing education focused on specialization so they can acquire the knowledge and skills to meet the needs of various areas of patient care, and thus be able to act within the scope of the public health system in an ethical, reflective, and critical way.⁹

A study with 19 nurses in the United Kingdom showed some difficulties in implementing teamwork, including varying degrees of competence to act as a team member and divergent individual perceptions about teamwork.²¹ Thus, the evaluation of nurses' perceptions about MDT is important to understand how they look at teamwork since nurses are the ones who provide most of the patient care.¹¹ More specifically, the perceptions of specialist nurses can contribute greatly to understanding the process of multidisciplinary team evolution, considering that they have greater knowledge and the possibility of implementing that knowledge.¹² Thus, the present study aimed to explore nurses' perceptions of multidisciplinary in the field of specialist nurses and to evaluate how specialization is associated with better patient care and nurses' age in a low-resource setting in Southeast Brazil.

Materials and Methods

Study design and participants

In the period between November 2021 and March 2022, a cross-sectional study using questionnaires was carried out to assess the perceptions of specialized nurses. Nurses aged ≥ 18 years of both sexes who had at least one specialization in nursing and worked at the Regional Health Superintendence of Manhuaçu located in Zona da Mata Mineira, Minas Gerais, Brazil, were included. The Zona da Mata Mineira is a geographic region that covers an area of approximately 35.7 thousand km² and a population of more than 2 million inhabitants. Those who did not return the questionnaire (n=11) and provided incomplete survey responses (n=4) were excluded.

Variable, instrument, and data collection

A questionnaire containing sociodemographic information and nurses' areas of activity was used. In addition, the participants answered 10 questions focused on specializations, MDTs, and their importance in the field of health. The questions were constructed based on the research objectives. We used a five-point Likert scale containing the following options: i) extremely important, very important, important, slightly important, not necessary; ii) very unlikely, unlikely, neutral, likely, very likely; or iii) strongly agree, agree, neutral, disagree, strongly disagree.²²

Before submission, we contacted the Regional Health Superintendence of Manhuaçu to ask for potential participants' email addresses. An online questionnaire (Google Forms) was sent as a link in an initial email, which contained an invitation to participate in the research. Professionals could choose to participate in the research or decline after reading the consent form, which guaranteed anonymity. If they accepted, the online survey was available to them. This method was chosen as being inexpensive, time-saving, and achievable without much effort.²³

Data analysis

The results were tabulated via Excel, and data analysis was performed through a preliminary analysis of the participants' profiles and, secondarily, the creation of associations between the answers given by them. The inferential analysis was performed using Kendall's tau-b (τ_b) correlation coefficient to analyze the association between nurses' responses to multidisciplinary. This coefficient is a nonparametric dependence measure used in cross-tabulation to measure the association between two ordinal variables; moreover, Kendall's τ_b has several advantages over Pearson and Spearman's r , including maintaining adequate control of type I errors and providing a clear interpretation.²⁴ The values of τ_b vary between -1 and 1, and the closer to -1 or 1, the stronger the association between the two variables. The significance determination criterion adopted was a $p < 0.05$. SAS 6.11 software (SAS Institute, Inc., Cary, NC, USA) was used for statistical data analysis.

Ethical clearance

The study was approved by the Research Ethics Committee of the Centro Universitário Augusto Motta under the number CAAE-50714121.2.0000.5235, and all participants signed the consent form. The study followed the recommendations for research in humans as per the Declaration of Helsinki.

Results

Seventy specialty nurses were enrolled in the study, and most were aged between 20-40 years ($n=39$, 84.3%), women ($n=42$, 60%) and white ($n=33$, 47.2%). Most participants were single ($n=37$, 52.9%) and had no children ($n=36$, 51.4%). Most specialty nurses worked in a hospital unit ($n=35$, 50%) and the field of family health ($n=22$, 31.4%). The general characteristics of the participants are shown in Table 1, while the distribution of the participants regarding the area of nursing practice is shown in Figure 1.

Regarding the importance of having specialization in nursing, 80% of the participants ($n=56$) answered that it was extremely or very important. When nurses were asked if they were opinion formers for the population, more than half of them ($n=36$, 51.4%) responded "very likely" and, at the other extreme, less than 10% of them ($n=6$) responded "very unlikely." Regarding the statement that nurses should meet certain qualifications to provide patients with a higher QoC, more than 75% of the participants ($n=53$) responded that they strongly agreed with this statement. When the participants were asked whether multidisciplinary in nursing is essential to the treatment and continued care of the patient, more than 75% of the participants ($n=53$) also responded that they strongly agreed with this statement. Regarding the prompt about the unreliability of health information on the internet, 70% of the participants ($n=49$) answered that they agreed or strongly agreed.

Regarding the statement that unqualified nurses are self-indulgent and cause distrust among patients, 50% ($n=35$) said they were neutral or disagreed, and 50% ($n=35$) agreed or completely agreed. Regarding the statement that there is a considerable difference between specialized nurses and nonspecialized nurses, more than half of the participants ($n=37$, 52.8%) disagreed or completely disagreed. Regarding the statement that specialized nurses can provide better patient care because they are more qualified, more than 70% of the participants ($n=51$) answered that they agreed or strongly agreed. Regarding the statement that nonspecialized nurses cannot meet the necessary demands required at work, almost 80% ($n=55$) responded that they disagreed or completely disagreed. Regarding the statement that the work team needs a nurse capable of exercising leadership and that he or she must have specialization for this performance, 60% of the participants ($n=42$) answered that they disagreed or completely disagreed. The distribution of participants' assessments of specialization and multidisciplinary in nursing is shown in Table 2.

Table 3 shows a significant association between the importance of having specialization in nursing and the fact that specialized nurses can provide better patient care because they are more qualified using Kendall's τ_b ($\tau_b=0.293$, $p=0.002$); this implies that having specialization in nursing facilitates better patient care according to the respondents. Table 4 shows a significant association between the considerable difference between specialist nurses vs. non-specialist nurses and the age range of respondents using Kendall's τ_b ($\tau_b=-0.272$, $p=0.004$); this implies that younger respondents tend to agree that there are considerable differences between specialist nurses and nonspecialist nurses, while older respondents tend to disagree that there are considerable differences between specialist nurses and nonspecialist nurses.

Discussion

The main findings of the present study were that among specialized nurses, there was a high prevalence of young nurses who

were female, single, without children, and working in the area of family health. Eighty percent of them believe in the importance of specialization in nursing, while more than half strongly believe it provides support for opinion formation among the population. More than 75% of specialized nurses say that they can provide higher QoC and that MDTs are essential for improvement in patient care. Seventy percent of specialized nurses believe that health information on the internet is not very reliable. However, most of this group of nurses disagreed that there is a considerable difference between specialized and nonspecialized nurses and that specialization is essential for the exercise of leadership. There is a relationship between the importance of specialization and better patient care and between valuing the fact of being a specialized nurse and age group.

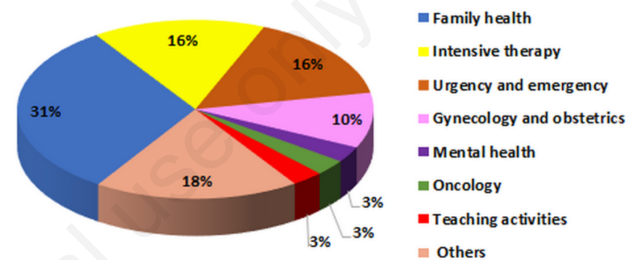


Figure 1. Distribution of participants according to the area of nursing practice.

Table 1. General characteristics of the participants ($n=70$).

Variable	Number (%)
Age group	
20-30 years	28 (40)
31-40 years	31 (44.3)
41-50 years	10 (14.3)
51-60 years	1 (1.4)
Sex	
Male	28 (40)
Female	42 (60)
Race/ethnicity	
White	33 (47.2)
Brown	22 (31.4)
Black	15 (21.4)
Marital status	
Single	37 (52.9)
Married	33 (47.1)
Number of children	
None	36 (51.4)
One	25 (35.7)
Two	9 (12.9)
Field of activity	
Hospital unit	35 (50)
Family health strategy	15 (21.4)
Basic health unit	11 (15.7)
Emergency service	4 (5.7)
Ambulance station	3 (4.3)
Other	2 (2.9)

Table 2. Distribution of participants' assessments of specialization and multidisciplinary in nursing.

Variable	Number (%)
Having a specialization in nursing	
Extremely important	28 (40)
Very important	28 (40)
Important	12 (17.1)
Little important	2 (2.9)
Not necessary	0 (0)
Nurses are opinion formers for the population	
Very unlikely	6 (8.6)
Unlikely	10 (14.3)
Neutral	7 (10)
Likely	11 (15.7)
Very likely	36 (51.4)
Nurses should meet certain qualifications to provide patients with a higher quality of care	
Strongly agree	53 (75.7)
Agree	17 (24.3)
Neutral	0 (0)
Disagree	0 (0)
Strongly disagree	0 (0)
The multidisciplinary in nursing is essential to the treatment and continued care of the patient	
Strongly agree	53 (75.7)
Agree	17 (24.3)
Neutral	0 (0)
Disagree	0 (0)
Strongly disagree	0 (0)
The unreliability of health information on the internet	
Strongly agree	20 (28.6)
Agree	29 (41.4)
Neutral	7 (10)
Disagree	10 (14.3)
Strongly disagree	4 (5.7)
Unqualified nurses are self-indulgent and cause distrust among patients	
Strongly disagree	0 (0)
Disagree	25 (35.7)
Neutral	10 (14.3)
Agree	23 (32.9)
Strongly agree	12 (17.1)
There is a considerable difference between specialized nurses and nonspecialized nurses	
Strongly disagree	15 (21.4)
Disagree	22 (31.4)
Neutral	9 (12.9)
Agree	21 (30)
Strongly agree	3 (4.3)
Specialized nurses can provide better patient care because they are more qualified	
Strongly agree	21 (30)
Agree	30 (42.9)
Neutral	5 (7.1)
Disagree	14 (20)
Strongly disagree	0 (0)
Nonspecialized nurses cannot meet the necessary demands required at work	
Strongly disagree	28 (40)
Disagree	27 (38.6)
Neutral	8 (11.4)
Agree	7 (10)
Strongly agree	0 (0)
The work team needs a nurse capable of exercising leadership and he or she must have specialization for this performance	
Strongly disagree	15 (21.4)
Disagree	27 (38.6)
Neutral	11 (15.7)
Agree	15 (21.4)
Strongly agree	2 (2.9)

In our study, there was a higher prevalence of nurses in the 20-40 age group, which indicates that younger nurses are increasingly seeking to specialize. We also observed a predominance of females in a ratio of 6:4. In this sense, it is important to highlight the phenomenon of “feminization”, which is understood as a situation composed of the relative increase in females in a given area of work, occurring mainly in health-oriented professions.²⁵ Evaluating strategies to improve quality of life (QoL) at the end of life in an MDT, Zadeh *et al.*²⁶ also showed a predominance of young nurses in their sample. According to Yanoullas,²⁵ this phenomenon is partly explained by the transformation of the idea of work, thus adhering to the principle of qualified labor focused on social prestige that currently tends to remodel the work system. Our findings also showed that almost a third of the participants were in the area of family health. According to Corrêa *et al.*,²⁷ primary care focused on care opens up a range of possibilities for nurses based on knowledge about the work and the population. In a way, the health–disease approach, within the scope of nurses’ knowledge, offers ways to improve patient care, especially through the family health strategy that continuously improves ethical practices for health care. In line with our findings, a Spanish study showed that among specialized nurses, 50.2% worked in primary care, 24.9% in hospitals, and 22.7% in mental health.²⁸ In relation to chronic and complex care, Wilkes *et al.*²⁹ showed that primary care nurses in multidisciplinary teams can achieve a more effective interdisciplinary approach. By becoming specialists in their area of expertise, nurses demonstrate QoC (as they have deeper theoretical knowledge) and modify the conditions of the territory, bringing local and sustainable development with their professional evolution.³⁰ In our study, most participants believed in the importance of specialization in nursing and that it provides support for forming the population’s opinion. In this sense, there is a need to modify and improve situations aimed at building an integrated, complex, polysemic, multifaceted, and innovative vision.³¹ Along the same lines, two-thirds of our participants stated that specialized nurses can provide higher QoC and, therefore, improve nurse-patient rela-

tions.³² Notably, having an MDT has a positive effect on job satisfaction, team efficiency, and care delivery. In addition, nurse leaders can drive aspects of highly functional teams by improving team orientation, trust, and supportive behaviors.¹¹

The vast majority of respondents in our study believe that MDTs are essential for improving the continuum of QoC. From the analyses, one can have a better idea of the importance of the specialty, especially when it is focused on MDT, modeling the nurses’ profile so that its consistency goes beyond the old ideal of being just another profession. In this sense, there is a growing demand for the multidisciplinary of professional nurses who, through qualification, increase their value as MDT members.³¹ The multidisciplinary evolution of nursing through specialties also enhances patient care practices.³³ Evaluating 84 patients diagnosed with terminal cancer, Liu *et al.*³⁴ recently showed that, compared to routine nursing, an MDT associated with palliative care reduced patients’ psychiatric disorders and improved their QoL. Along the same lines, another recent study showed that the MDT model with nursing leadership for transplant recipients reduced complications, reduced hospital stays, and saved costs.³⁵ Thus, promoting, emphasizing, and continuing professional training qualifies the work of specialist nurses and enables the development of more humanized care for the patient.^{30,36} Establishing a teamwork training (TT) program is a crucial approach, although the fundamentals for TT are well known and its need is obvious in the nursing environment. TT is a critical part of any comprehensive security plan as it improves teamwork and communication to achieve the best possible results.³⁷

Despite all the appreciation that the participants pointed out about specialization, most of them disagreed that there is a considerable difference between the specialized nurse and the nonspecialized nurse and that specialization is essential for the exercise of leadership. Patient care in its entirety must seek harmony between the biological-psychological-social dimensions, the transfer of knowledge and teamwork, and constant health surveillance.³⁸ Taken together, these factors may explain, at least in part, our

Table 3. Association between the importance of having specialization and the fact that specialized nurses can provide better patient care.

Variable	Specialized nurses can provide better patient care because they are more qualified				p
	Strongly agree Number (%)	Agree Number (%)	Neutral Number (%)	Disagree Number (%)	
Having specialization in nursing					
Extremely important	12 (57.1)	13 (43.3)	1 (20)	2 (14.3)	0.002
Very important	7 (33.3)	11 (36.7)	4 (80)	6 (42.9)	
Important	2 (9.5)	4 (13.3)	0 (0)	6 (42.9)	
Little important	0 (0)	2 (6.7)	0 (0)	0 (0)	

Table 4. Association between specialist nurses vs. non-specialist nurses and the age range of respondents.

Variable	Age group				p
	20-30 years Number (%)	31-40 years Number (%)	41-50 years Number (%)	51-60 years Number (%)	
There is a considerable difference between specialist nurses vs non-specialist nurses					
Strongly disagree	5 (17.9)	8 (25.8)	2 (20)	0 (0)	0.004
Disagree	4 (14.3)	11 (35.5)	7 (70)	0 (0)	
Neutral	4 (14.3)	4 (12.9)	0 (0)	1 (100)	
Agree	12 (42.9)	8 (25.8)	1 (10)	0 (0)	
Strongly agree	3 (10.7)	0 (0)	0 (0)	0 (0)	

results. Notably, teamwork protocols can help define the importance of specialization and interventions in the professional network.¹⁵ When the associations were evaluated, we observed that nurses understand the importance of a multidisciplinary specialization and, through this, perform better work, based on the idea that the chosen area improves their performance. With such an association, it is necessary to understand the constant need for professional improvement, which allows nurses to perform their work with more dexterity and safety.³⁹ It is worth mentioning that many specialists find it difficult to exercise their profession accordingly due to the lack of job descriptions and identification of competencies during the recruitment and promotion processes. Therefore, it is essential to create a catalog of specific positions for each of the specialties to meet nurses' expectations and enhance progress in QoC and patient safety. We experience a more technological world, where professionals seek to qualify themselves every day, in the job market. We observed an association between the need for specialization and younger age groups. Young nurses already carry the burden of being in a competitive job market, and they seek to improve their marketability through specialization in nursing. Thus, the younger the nurse, the more he or she understands the need to specialize and that a specialist nurse, through the practice acquired in training, has the necessary qualifications to care for the patient. This relationship also implies that the older the professional is, the less he or she understands the need for specialization in the field of nursing.⁴⁰ Some limitations of our study should be noted. First, the number of participants was relatively small, although we only included specialist nurses. Secondly, our assessment was made subjectively using a questionnaire; therefore, the use of objective measures in future studies may deepen knowledge about the importance of MDTs in the field of nursing work and how MDTs interfere with nurses' motivation. Based on the profile of nurses working in a region in the interior of Brazil, our study can serve as a starting point for a better understanding of the difficulties of these health professionals, especially concerning specialization in nursing.

Conclusions

Our study shows a current tendency for specialized nurses to be young, female, and single, with a predilection for the area of family health. In general, they believe in the importance of specialization, especially in the possibility of providing a higher QoC and job performance. There is an association between the importance of having specialization and the best patient care, and the younger the nurse is, the greater the appreciation of the nursing specialization. By defending the idea of MDT, we enter into a typical debate in the work scenario of a nurse, evidenced by the QoC proposed by the professional who qualifies through a specialty. Based on the analysis of our questionnaire, the answers started from the idea that there will always be a need for constant updating of job skills and knowledge. It is understood, therefore, that the better qualified the professional is, the better their performance of humanized patient care in a low-resource setting.

References

- Girard J, Girard J. Defining knowledge management: toward an applied compendium. *Online J Appl Knowl Manag* 2015; 3:1-20.
- Li M, Liu H, Zhou J. G-SECI model-based knowledge creation for CoPS innovation: the role of Grey knowledge. *J Knowl Manag* 2018;22:887-911.
- Subtil CL. Concerns and uncertainties under the view of the nursing history. *Cult Cuid* 2017;21:16-22.
- Kejžar A, Dimovski V, Colnar S. The impact of knowledge management on the quality of services in nursing homes. *Front Psychol* 2023;13:1106014.
- Wilson R, Godfrey CM, Sears K, et al. Exploring conceptual and theoretical frameworks for nurse practitioner education: a scoping review protocol. *JBI Database System Rev Implement Rep* 2015;13:146-55.
- de Meneses AS, Sanna MC. Accessibility and content of electronic information about specialization courses in nursing administration. *Rev Esc Enferm USP* 2011;45:356-62.
- World Health Organization. State of the World's Nursing Report 2020-Investing in education, jobs and leadership [Internet]. *Health Workforce 2020*. Available from: <https://www.who.int/publications/i/item/9789240003279>
- Shortell SM, Wu F, Lewis V, et al. A taxonomy of accountable care organizations for policy and practice. *Health Serv Res* 2014;49:1883-99.
- Fernandes JD, Silva RMO, Silva ACP, et al. Profile of nursing specialization courses in the city of Salvador, Bahia, Brazil. *Rev Baiana Enferm* 2017;31:e16660.
- Oliveira EB, Carvalho RAC, Teixeira E, et al. Factors involved in the training of resident nurses: view of alumni from a residency program. *Rev Min Enferm* 2017;21:e-1064.
- Kaiser JA, Westers JB. Nursing teamwork in a health system: a multisite study. *J Nurs Manag* 2018;26:555-62.
- Cioffi J, Ferguson L. Team nursing in acute care settings: nurses' experiences. *Contemp Nurse* 2009;33:2-12.
- Manser T. Teamwork and patient safety in dynamic domains of healthcare: a review of the literature. *Acta Anaesthesiol Scand* 2009;53:143-51.
- Schilling S, Armaou M, Morrison Z, et al. Understanding teamwork in rapidly deployed interprofessional teams in intensive and acute care: a systematic review of reviews. *PLoS One* 2022;17:e0272942.
- O'Reilly P, Lee SH, O'Sullivan M, et al. Assessing the facilitators and barriers of interdisciplinary team working in primary care using normalisation process theory: an integrative review. *PLoS One* 2017;12:e0177026.
- Baker DP, Day R, Salas E. Teamwork as an essential component of high-reliability organizations. *Health Serv Res* 2006;41:1576-98.
- Leathard A. *Going inter-professional working together for health and welfare*. London, New York: Routledge: 1994.
- Petrie H. Do you see what I see? The epistemology of interdisciplinary inquiry. *J Aesthet Educ* 1976;10:29-42.
- World Health Organization. Primary health care: Now more than ever [Internet]. Geneva: World Health Organization. 2008 [cited 22 Dec 20]. Available from: <https://reliefweb.int/report/world/world-health-report-2008-primary-health-care-now-more-ever>
- Silva RMO, Fernandes JD, Maurício DMALD, et al. Motivations for the transitional experience of students in the nursing specialization degree. *Revista de Enfermagem Referência* 2020;5:e20021.
- Atwal A, Caldwell K. Nurses' perceptions of multidisciplinary team work in acute health-care. *Int J Nurs Pract* 2006;12:359-65.
- Feijó AM, Vicente EFR, Petri SM. The use of Likert scales in

- accounting research. *Revista Gestão Organizacional* 2020;13:27-41.
23. Singh G, Quraishi S. COVID-19 lockdown: challenges faced by Indian students. *Psychol Stud* 2021;66:303-7.
 24. Arndt S, Turvey C, Andreasen NC. Correlating and predicting psychiatric symptom ratings: Spearman's r versus Kendall's tau correlation. *J Psychiatr Res* 1999;33:97-104.
 25. Yanoullas S. Feminization or feminilization? Notes on a category. *Temporalis* 2011;11:271-92.
 26. Zadeh RS, Eshelman P, Setla J, Sadatsafav H. Strategies to improve quality of life at the end of life: interdisciplinary team perspectives. *Am J Hosp Palliat Care* 2018;35:411-6.
 27. Corrêa VAF, Acioli S, Tinoco TF. The care of nurses in the Family Health Strategy: practices and theoretical foundation. *Rev Bras Enferm* 2018;71:2767-74.
 28. Gutiérrez-Rodríguez L, García Mayor S, Cuesta Lozano D, et al. Competences of specialist nurses and advanced practice nurses. *Enferm Clin* 2019;29:328-35.
 29. Wilkes L, Cioffi J, Cummings J, et al. Clients with chronic conditions: community nurse role in a multidisciplinary team. *J Clin Nurs* 2014;23:844-55.
 30. Izidório BHS, Silva HGO, Lopes AJ. Acting nursing: specialties for care. *International Journal of Development Research* 2021;11:51818-23.
 31. Frota MA, Wermelinger MCMW, Vieira LJES, et al. Mapping nursing training in Brazil: challenges for actions in complex and globalized scenarios. *Cien Saude Colet* 2020;25:25-35.
 32. McCrae N. Whither nursing models? The value of nursing theory in the context of evidence-based practice and multidisciplinary health care. *J Adv Nurs* 2012;68:222-9.
 33. Duffy JR. The clinical leadership role of the CNS in the identification of nursing-sensitive and multidisciplinary quality indicator sets. *Clin Nurse Spec* 2002;16:70-6.
 34. Liu Y-J, Wu L-P, Wang H, et al. The clinical effect evaluation of multidisciplinary collaborative team combined with palliative care model in patients with terminal cancer: a randomised controlled study. *BMC Palliat Care* 2023;22:71.
 35. Zhang W, Feng X, Deng X, et al. Application of a specialist nurse-led multidisciplinary team model in the perioperative care of patients undergoing simultaneous pancreas and kidney transplantation: randomized controlled trial. *Gland Surg* 2023;12:619-27.
 36. Bostwick WB, Rutherford JN, Patil CL, et al. Envisioning a more expansive future for multidisciplinary nursing scholarship and education. *Nurs Outlook* 2021;69:507-9.
 37. Deering S, Johnston LC, Colacchio K. Multidisciplinary teamwork and communication training. *Semin Perinatol* 2011;35:89-96.
 38. Francisco AM, Costa MCG, Hamamoto CG, Hafner MLMB. Evaluation of formation of nurses: effect of methods of teaching-learning curriculum and assumptions in professional practice. *Avaliação: Revista da Avaliação da Educação Superior* 2016;21:479-502.
 39. Souza AMA, Cuevas-Budhart MÁ, Pérez Raya F, et al. The implementation of nursing specialties in Spain, 2005-2018: a documental study. *Clin Nurse Spec* 2020;34:75-84.
 40. Millberg LG, Berg L, Brämberg EB, et al. Academic learning for specialist nurses: a grounded theory study. *Nurse Educ Pract* 2014;14:714-21.