UNIVERSIDAD DE ANTIOQUIA
1803

Investigación y Educación en

Enfermería

–Nursing Research and Education–

Vol. 36 No. 2, • June 2018 • ISSNp: 0120-5307 • ISSNe: 2216-0280

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Publication date: June 15th 2018.

Short title: Invest. Educ. Enferm.

ISSNp: 0120-5307, **ISSNe:** 2216-0280

Published by: Facultad de Enfermería de la Universidad de Antioquia, Colombia

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Editorial

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Formation in Social Responsibility of Nursing Professionals: a Brazilian Perspective

Rosa Maria Godoy Serpa da Fonseca[1]
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Emiko Yoshikawa Egry[3]

The Brazilian Nursing Association (Associação Brasileira de Enfermagem in portuguese ABEn), since its creation 91 years ago, has been dedicated to the defense of education in nursing at all levels. Given that it is a scientific-cultural entity, it is also responsible for the transmission of the profession's *ethos*, which in modern societies has also been done through formal education. Additionally, the Association participates strongly on the formulation of public policies in education and health, with representation in numerous instances of government decision. We postulate that nursing education should envision much more than the technical-scientific preparation of the professional graduating from our teaching institutions: its purpose must be that of educating political social subjects capable of acting responsibly and transforming reality, especially in reducing the vast inequalities of the society in which we live, like, for example, lack of access to the healthcare system by a good part of the population.(1)

For the ABEn, formation in nursing needs to have a new meaning for professional action, making it compatible with the transformation of society in ethical, political, and economic terms, that is, beyond the technical training.

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How to cite this article: Fonseca RMGS, Barbosa DA, Egry EY. Formation in Social Responsibility of Nursing Professionals: a Brazilian Perspective. Invest. Educ. Enferm. 2018; 36(2):e01.

DOI: 10.17533/udea.iee.v36n2e01

Technical-scientific excellence cannot be discarded; on the contrary, it has to be inserted, and even subsumed, within the ethical-political and moral formation. We have postulated that we must educate for the citizenship, for responsible leadership, for the ethical practice of the profession and, thus, educate to comply with our social responsibility.

We agree with Moraes[2:1] in that "education, as a permanent process of transforming action is, undoubtedly, one of the most important instruments (...) to restore values and enable new social insertion opportunities, of promoting the ethics of solidarity, diversity, responsibility, and commitment with the triangle of life represented by the relationships among the individual, society, and nature". Directly related with social responsibility we find ethics, which seeks to reflect on human behavior, from the point of view of the notions of good and bad, of the just and unjust, encompassing the moral and legal norms. In the field of nursing, ethical behaviors are closely related to the practices and care offered, prevailing among most nursing professionals understanding through common sense, which perceives ethics as a set of norms or guides contained in codes. That is, for these professionals, acting in ethical manner is simply complying with the code referred.

Daily experiences and the context in which interpersonal relations and care occur – nurses, professionals from other action fields, patients and relatives – are rarely understood as conflict-generating sources. Ethics is situated within the field of practical knowledge, of knowledge about what is contingent. Ethics belongs to the domain of moral judgments or value judgments, sensitive to persuasion, subject to the influence of emotions, susceptible to prejudice, and subjected to the complexity of interests. [3] Besides ethics, another concept that is related directly with social responsibility is the concept of *citizenship*. Although stemming as a condition of the human being linked to rights and duties toward the society in which we live, in modern times, citizenship is linked to more solidary and responsible ways of living in society.

Faced with the serious economic and social crisis being experienced by society, the concept of citizenship must be taken as a "mediating concept of the minimum requirements of justice and of the sense of community belonging; hence, meaning equality in dignity and compromise with that which is public, today an absolutely fundamental value. Citizenship constitutes the *raison d'être* of civility, fostered by the fact that citizens share an ideal of justice, as well as a set of values, attitudes, behaviors, and commitments, whose common denominator resides in the fact that, beneath all our cultural, social, and economic differences there is the same air we breathe and a single source that permits life and which also governs the laws of collective living".[2:2] Regarding the citizenship of women, it is fitting to highlight that much still needs to be done, given that men and women must have the best living conditions and enjoy equal rights; and it is known that the crisis mentioned has been affecting and putting in check the survival of our civilization, impacting much more seriously upon women.

Currently, in Brazil and other countries in Latin America and Africa, some phenomena that have deteriorated the lives of women have been accentuated and, consequently, have affected their condition of citizenship. These are some examples of the subaltern reality of women in the field of social relations:[4] the feminization of poverty, which brings as consequence of the increasing numbers of women heads of household, constituting the highest number of impoverished families in society; the overload caused by multiple working hours; violence in relationships of intimacy; discrimination in work relations and in social relations generally; lack of power of decision over their own bodies; inequality of power in the field of sexuality, among others.

In term of the social responsibility of nursing, *what does this have to do with the work of women and women's right to citizenship?* The answer is everything because we understand that nurses' know-how is directly linked to women's know-how. If we admit that the contradictions experienced by nursing, largely have to do with the contradictions experienced by women in general; the struggle by nurses must necessarily be allied with the struggle by women for their social rights.[5]

Regarding the formation for social responsibility, it becomes urgent to find paths for students (in formation) and professionals (on qualification) to be able to comprehend the vastness and the issues underlying this responsibility and participate decidedly in all stages of the processes to broaden critical consciousness and empowerment. Educational institutions and their professors must propitiate in the students the acquisition of knowledge and experiences, in addition to technical-scientific excellence, for the purpose of educating to practice nursing committed with its social responsibility in full exercise of citizenship.

Lastly, we wish to leave as a motto: *empowered women form empowered professional citizens for ethical, critical, and socially responsible professional practice. Empowered women will be first-class women in any profession.*

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Original article

Communities of practice: influences on pedagogical reasoning and action of nursing professors

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Communities of practice: influences on pedagogical reasoning and action of nursing professors

Objective. To analyze how the practice shared in communities of teaching practice in public and private universities influences the pedagogical reasoning and action of nursing professors based on Wenger's concepts of community, negotiation of meaning, and learning. **Methods.** Case study conducted with two professors teaching nursing in a public and a private university in Brazil. Data collection included triangulation of sources and was conducted from April 2014 to July 2015. Data were organized in ATLAS.ti and analyzed using the constant comparative method, which generated three meta-categories. **Results.** In both cases the program's project is shared repertoire and grounds negotiation of meaning in the practice that takes place in the pedagogical reasoning and action phases but negotiation is different between communities and cases. Learning is either solitary or has the influence of at least one other member but does not

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Conflicts of interest: None.

Funding: Bolsa de Doutorado do Conselho de Desenvolvimento Científico e Tecnológico (CNPq). Bolsa de Doutorado Sanduíche da Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) processo 99999.008590/2014-01.

Received: February 19th, 2018.

Accepted: May 31st, 2018.

How to cite this article: Menegaz JC, Backes VMS, Medina JL. Communities of practice: influences on pedagogical reasoning and action of nursing professors. Invest. Educ. Enferm. 2018; 36(2):e02.

DOI: 10.17533/udea.iee.v36n2e02

occur on an institutional basis. **Conclusion.** Nursing schools could offer more than program's project to the negotiation of meaning and improve learning on practice in their communities as police of teachers education to improve pedagogical reasoning.

Descriptors: higher education; learning; schools, nursing; teacher training; faculty, nursing.

Comunidades de práctica: influencia en el razonamiento pedagógico y en la acción de los profesores enfermeros

Objetivo. Analizar cómo la práctica compartida en comunidades de práctica docente de universidades públicas y privadas influye en la acción y razonamiento pedagógico de profesoras de enfermería a partir de los conceptos de comunidad, negociación de significado y aprendizaje de Wenger. **Métodos.** Estudio de caso realizado con dos profesoras de enfermería de universidades públicas y privadas en Brasil. La recolección de datos incluyó la triangulación de Fuentes, la cual se realizó de abril de 2014 a julio de 2015. Los datos se organziaron en el ATLAS.ti y se analizaron a partir del método de comparaciones constantes, generando tres metacategorías. **Resultados.** En ambos casos el proyecto pedagógico de curso es el repertorio compartido y base para la negociación de significado que ocurre en las fases de la acción y raciocinio pedagógico, pero la negociación es distinta entre comunidades y casos. El aprendizaje ocurre de forma solitaria o por influencia de por lo menos un miembro, no de forma institucional. **Conclusión.** Las escuelas de enfermería pueden ofrecer más que el proyecto pedagógico del curso para la negociación de significado y fomentar el aprendizaje en la práctica en sus comunidades como política de formación docente para promover el razonamiento pedagógico.

Descriptores: educación superior; aprendizaje; facultades de enfermería; formación del profesorado; docentes de enfermería.

Comunidades de prática: influências no raciocínio pedagógico e ação de professoras de enfermagem

Objetivo. Analisar como a prática compartilhada em comunidades de prática docente de universidades pública e privada influencia a ação e raciocínio pedagógico de professoras de enfermagem a partir dos conceitos de comunidade, negociação de significado e aprendizagem de Wenger. **Método.** Estudo de caso conduzido com duas professoras de enfermagem de universidades pública privada no Brasil. A coleta de dados incluiu a triangulação de fontes e foi conduzida de abril de 2014 a julho de 2015. Os dados foram organizados no ATLAS.ti e analisados através do método das comparações constantes, gerando três meta-categorias. **Resultados.** Em ambos os casos o projeto pedagógico de curso é o repertório compartilhado e base para a negociação de significado que ocorre nas fases da ação e raciocínio pedagógico, mas a negociação é distinta entre comunidades e casos. A aprendizagem ocorre de forma solitária ou por influência de pelo menos um membro, não de forma institucional. **Conclusão.** Escolas de enfermagem podem oferecer mais do que o projeto pedagógico de curso para a negociação de significado e fomentar aprendizagem na prática em suas comunidades como política de formação docente para promover raciocínio pedagógico.

Descritores: educação superior; aprendizagem; escolas de enfermagem; capacitação de professores; docentes de enfermagem.

Introduction

Brazilian higher education institutions have two administrative categories: public and private. Public institutions are created, maintained and administered by the State, while private institutions are maintained and administered by individuals or private legal entities. There were 2 391 institutions in 2013: 12.59% of which were public and 87.41% private. Of the total of teaching institutions, 84.31% are colleges, 8.15% are universities, 5.85% are referred to as university centers, and 1.6% is technological education institutions or federal centers.[1] Public institutions are characterized by the integration of teaching, research and extension[2] and have at least one third of their faculty members with a Master's degree or PhD, working full-time. These are however, minimum parameters for universities and there are institutions that meet these parameters and others even exceed them, resulting in multiple configurations.

The nursing field follows the country's trend, expanding the supply of undergraduate programs in public and private institutions. There are currently 1 054 undergraduate programs in the nursing field in Brazil, 81.4% of which are provided by private institutions.[3] Hence, there is currently a concern regarding the quality of teaching provided by private institutions. Nursing teaching, whether public or private institutions provide it, is regulated by current educational legislation and mediated by professors who reflect upon it during the teaching process. The starting point is, in general, the content embedded within a discipline that makes up the curriculum. Reflection in the practice of professors is addressed by the Model of Pedagogical Reasoning and Action (MPRA). MPRA has six processes: "comprehension, transformation, instruction, evaluation, reflection, and new comprehension".[4]

Even though teaching is based on content, it is not only knowledge of such content that is displayed in the teaching practice seen through MPRA, but also a set of sources and knowledge bases used to teach that suggest the breath and characteristics of such reflection.[5] There are four sources of knowledge base: "scholarship in content disciplines (academic training in the subject), formal education scholarship, educational material and structures, and wisdom of practice. In addition, there are seven categories of knowledge: content, pedagogical content, general pedagogical, curriculum, educational contexts, purposes, and knowledge of learners and their characteristics".[4] In summary, we can say that the sources support categories of the knowledge base, which in turn, are connected to the Model's processes. There was particular interest in this study regarding the *educational material and structures* source and the *knowledge of educational contexts* category, because teaching practice is developed within institutions with different administrative and academic formats and within these institutions the professor teaches and learns his/her practice together with other professors.

Wenger[6] considers a community of practice as a group of people who share a concern or a passion for something they do and learn to do better when they interact

regularly. Three dimensions characterize such community: *mutual engagement, joint enterprise and shared repertoire.* We understand that there is a powerful analogy to the nursing program and its professors,[7] because they are responsible for the training of nurses (joint enterprise), work collectively (mutual engagement) to put the program's project (shared repertoire) into practice, also while learning the craft during the process. In a community of practice, having a *mutual engagement* means that practice is not an abstract concept. It exists because members take part. One depends on another for the *common object* to be attained, which is established by the community members and, therefore, reflects mutual engagement.[8] *Shared repertoire* refers to the community resources that contribute to the achievement of the mutual engagement and joint enterprise.[9]

Even though there are elements of cohesion in a community of practice, practice is different among members and is established in elements that are individually negotiated. These elements are meaning, understanding of community, and learning.[6] MPRA characterizes the practice of professors at the level of higher education of nursing, unveiling the intrinsic reflection process. Investigating this process would already produce knowledge that is relevant to understanding the teaching practice, but it is the reflection produced by professors inserted in different communities of practice with different formats of mutual engagement, joint enterprise and shared repertoire, negotiated through meaning, understanding of community and individual learning and its potential influence on pedagogical action and reasoning that is the focus of interest in this article.

As the MPRA is seen as the essence of practice, which is differently configured in the communities of teaching practice through negotiation of meaning, community and learning, we assume that the practice in a private university is different from the practice in a public university and that it influences the development of MPRA's processes. Adopting MPRA, considering the nursing programs as communities of practice that negotiate meaning and learning and professors are its members, we ask: what is the influence of practice in public and private nursing schools on the reasoning and action of nursing professors? The purpose of this aim is to analyze the influence of practice in communities of teaching practice in a public university and a private university on the pedagogical reasoning and action of nursing professors based on Wenger's concepts of community, negotiation of meaning and learning.

Methods

Qualitative case study[10] in which cases cover the pedagogical reasoning and action[4] of two nursing professors from a public and a private university in the South of Brazil. This design was chosen because case studies are a relevant tool to investigating complex phenomena in their contexts.[11] An intentional sample, with criteria for the choice of setting and cases, was used. Criteria for choosing the setting included: same geographic region; with institutions of different administrative categories but the same academic organization; with undergraduate programs having ten or more years of accreditation. The programs of two universities in the south of Brazil were chosen; Community A is a private institution and Community B is a public institution, with undergraduate programs that are 22 and 41 years old, respectively.

After establishing the study setting, we contacted the coordinators of the undergraduate nursing programs to initiate data collection. At our request, based on one criterion, the coordinators identified the subjects of the cases. They were contacted by email and consented to participate in the study. Data were collected from April 2014 to July 2015 and involved the triangulation of sources. Documents, interviews and observation were combined into three phases designed to enable the exploration of concepts of sources of knowledge, knowledge base and MPRA processes. Overall, we analyzed four documents, held 14 interviews and recorded 32 sessions of non-participant observation.

Phase 1 (from April to July 2014) involved the analysis of documents and interviews. The projects of the programs were analyzed and interviews were held with the coordinators, while interviews 1 and 2 were conducted for each case. Phase 2 (from August to December 2014) involved interviews and observations. Interviews 3 and 4 were held for each case, along with other two in-depth interviews. We also observed sessions in the courses. The private case taught an undergraduate course and the public case administered both undergraduate and graduate courses; 17 and 15 sessions were observed, respectively. Finally, phase 3 (from January to July 2015) involved the validation of case analysis, analysis and interview 5 with the cases. Considering the objective of this article, we needed to part of the same basis. So, as the private case only imparted classes at undergraduate nursing school we didn't use on the construction of this article the documents and the observation of the graduate course imparted by the public case. Only the material collected from the undergraduate course was included.

Data were transcribed and validated according to the cases at each phase. After validation, data were entered in Atlas Ti version 7.1 in different hermeneutic units to be analyzed by the constant comparative method.[12] In the open coding phase, a total of 616 units of meaning were produced in the private case and 1 342 units of meaning were produced in the public case, which were respectively organized into 27 codes and 28 codes. In the selective phase, the codes were grouped into four categories. In this article we mainly present the categories Model of Pedagogical Reasoning and Action and context, though not all codes that compose them are presented. There are eight codes explored in this article, which are linked to Wenger's concepts[6] of the negotiation of meaning, community and learning in selective coding: 1. comprehension process, 2. transformation process, 3. teaching process, 4. evaluation process, 5. reflection process, 6. new comprehension process, 7. knowledge of the educational contexts, and 8. context interferences.

This link between codes and Wenger's concepts[6] resulted in the meta-categories presented in this article: community – mutual engagement, joint enterprise, and shared repertoire of communities A and B, MPRA processes, such as negotiation of meaning and reflection and new comprehension as means of learning. The study was approved by the Institutional Review Board of Federal University of Santa Catarina (report No. 711540). The cases were informed of the nature of the study and consented to participate by signing free and informed consent forms. The universities and subjects were given fictitious names. To ensure confidentially, we denote them community professor A in the case of the private institution and community professor B in the case of the public institution. The recordings presented in the results section refer to community (A or B) or case (public or private), source (interview, observation or document), and order in which they were listed and coded in Atlas Ti.

Results

Cases

Private case has been a professor for 16 years. She acquired a Master's degree in nursing 10 years ago; has worked as a nurse and occupied a management position as a government employee in the State Department. In Community A, a private university managed by a communitarian foundation, nursing school was created in the 90's and has their program's project changed four times. She started working per hour only at the nursing school but now is working also per hour in nursing, dentistry and cosmetology programs. She was not involved in the university with activities beyond those concerning her workload in the classroom. The course observed, First Aid, had a workload of 60 hours and was administered in the second semester. A total of 14 students attended this class. Public case has been a professor for 32 years. She acquired her doctoral degree 20 years ago. In Community B, a federal public university, she is a government

employee, working full time only in the nursing department. Undergraduate nursing school was created in the 70's and was the first school on the state. She developed teaching activities in the undergraduate and graduate programs, worked with educational management, developed research and has established relationships with researchers affiliated with Brazilian and international institutions. She has never worked in nursing care. The undergraduate course observed, Nursing Practice, had a workload of 378 hours, and was administered in the third semester. She coordinated the undergraduate discipline with a total of 11 professors and 36 students.

Community: mutual engagement, joint enterprise, and shared repertories of communities A and B

Objective and commitment were negotiated in communities A and B based on the instrument provided as shared repertoire, the program's project. The program's project, an institutional document that presents objectives, curricular structure, relationships among courses, teaching methodology, and evaluations, was the starting point the communities provided for the cases, serving not only as a declaration of the joint enterprise, but also through it, mutual engagement is established through practice: *To train nurses committed to the health needs of individuals and of the collective* (Community A, program's objective, document 1); *To train nurses, professionals in the health field, with a generalist education and critical, reflexive and creative abilities. Qualified for the nursing work in the care, management, education and research dimensions based on ethical principles, specific and interdisciplinary knowledge* (Community B, program's objective, document 1).

The communities had different curricular organizations. Community A provided a program with a workload of 4 020 hours distributed in a curriculum linked to fundamental (2 430 hours), complementary (480 hours), elective (60 hours) and specific (1 050 hours) certifications intended to develop competencies. Each fundamental certification had a set of units of learning with their respective workloads and content. A portion of learning units was administered in a group of other programs to provide students with an interdisciplinary approach. The program curriculum provided by Community B had 4 860 hours of workload linked by a fundamental axis, additional courses, and complementary experiences. The fundamental axis focused on the development of nurses' specific competencies considering different concentrations in human development (child, adolescent, adult, elderly; family, group and community) and different settings in which health and nursing care is provided (home, school, community, primary health care units, hospitals). Additional courses are those provided by different departments within the university and complementary experiences refer to the promotion of experiential learning with an interdisciplinary approach. The cases participated in achieving the joint enterprise by means of the practice of their courses, First Aid, fundamental axis of Community A, and Nursing Practices, fundamental axis of Community B, the objectives of which, program content, and position in the curriculum were previously established by the programs' project.

MPRA processes as negotiation of meaning

Mutual engagement is required for a community to exist. The program's project as the repertoire was the means through which meaning was negotiated for this commitment to become true. Negotiating meaning is an individual process that involves the interaction of the other two processes: participation and reification. Participating means taking part in something, connecting, interpreting and acting. The cases participated when they assumed responsibility for the courses in the community and guided them pedagogically. Reification means converting an abstract concept into something concrete, material, a teaching plan, for instance.

The cases in the communities of practices A and B negotiated meaning through pedagogical reasoning and action, visualized in the *comprehension, transformation, teaching and evaluation* processes. Therefore, each process, but more specifically the comprehension process, shows how the cases negotiated joint enterprises and commitment. The curriculum of communities A and B presented training based on competencies according to the Brazilian curricular guidelines established for nursing undergraduate programs. The cases, however, verbalized comprehension concerning the courses that transcended the curriculum. The cases used the program's project as a repertoire for achieving the objective (competence), but it was through negotiation of meaning that they acted, expanding their comprehension regarding the objective itself and consequently directing the transformation, teaching and evaluation processes: I use content to develop skills, attitudes, values, you know? *I use content. "Ah, but what if they don't learn this?" If I manage to arouse responsibility and commitment in the students for when they have an investigation to undertake, they will make do, and won't do without seeking knowledge, they'll learn by themselves* (Public Case, Interview 3, 4:125).

Reflection and new comprehension as means of learning

Means of new learning need to be developed for the members for a community to exist. Learning is related to the ability to have mechanisms that enable mutual engagement, help understanding joint enterprises and develop the repertoire[6]. Hence, it is an ongoing process, approximating the cycle suggested by Shulman[4] in MPRA, in which the processes concerning reflection and new comprehension are highlighted. The reflection process is when the professors revise, reconstruct, represent and critically analyze the experience. New comprehension is the process in which the professor manifests new understanding of objectives, subjects, students and teaching. In these processes, the professor learns or even reconstructs his/her own practice.

We observed that the collective moments within Community A that enabled reflection and new comprehension intended to strengthen joint enterprises and mutual compromise were occasional, while there were situations arising from the organization of work that interfered in this process. Because the private case works per hour, the courses she administers vary considerably, which hinders the establishment of mutual engagement and clarity of joint enterprises of the community of the nursing program. She also only meets with colleagues once in the semester. The program coordinator was her contact whenever she needed anything. In Community B, professors were assigned to the same courses according to semester. There were also teacher forums according to the courses, program and in the department: *I may not even have a course to teach. In 19 years, it will be the first year I won't have a course to teach in the nursing program because my course will no longer be provided in the next semester* (Private Case, Interview 5, 70:71).

Nonetheless, the communities did not make an effort, beyond the meetings, to develop learning so that learning during times of reflection and new comprehension was encouraged by the cases in isolation, a result of their experience over the years or the exchange relationships established with other members in their communities. Little was attributed to the community of practice in institutional terms: *I had this dimension of nursing projection, of the importance of putting nursing in a scenario larger than here, beyond individual things; it was not me; it was not the person, you know? It was the group* (Public Case, Interview 1, 3:144).

Discussion

Communities A and B have the same joint enterprise: train nurses, as well as, given the law regulating nursing programs, the same shared repertoire, which refers to the programs' projects. How the repertoires are structured, however, differs due to the way the pedagogical practice is organized

in each community. Even though the programs' projects follow the same legal framework, namely, the Law of Guidelines and Bases of National Education and the national curricular guidelines for undergraduate programs, the way the curriculum was operationalized differed, suggesting that the negotiation of meaning does not occur only at an individual level during practice, but also occurs prior to that at the community level, among its members. That is, there is a "double layer" of negotiation of meaning in the community. Negotiation of the community with the external environment, which generates different shared repertoires in each community, and between the members and the community, which generates distinct practices among members.[6]

The negotiation of meaning itself expands the community's negotiation of meaning, expressing different forms of practice. Not only do communities have differences, but also their members have differences, as we observed in the cases under study. These differences sometimes seem to be more related to differences in the teaching careers rather than related to the influence of the practice established in the community. We did not observe, from the objective and shared repertoires, any determinism of practice oriented by the community based on the program's project. On the contrary, pedagogical reasoning and action reveals an individualized, personalized practice[6] in which the cases developed their own ways to establish compromise and contribute to the attainment of the community's joint enterprise. Part of this fact may be explained by the degrees held by the cases, one with a Master's degree and the other with PhD, as well as the different career paths. The cases had distinct educational and professional trajectories, which at least in theory, differ in terms of access to sources, knowledge bases, and consequently, expression of MPRA in teaching practice.[13]

We cannot, however, affirm that the community of practice did not influence the cases' practice. Influence occurs by other means. We have to consider the characteristics of the teaching practice developed by the cases in their communities in the relationship between the cases and their communities and the potential influence of practice based on MPRA, because these characteristics influence the negotiation of meaning and pedagogical reasoning and action. According to Wenger,[6] participation and reification in the negotiation of meaning are processes that feed each other and coexist within practice. Thus, it is through participation in a set of activities that the professor learns how to teach in that community and constructs his/her *comprehension.*[4] In community A, private case had her workload and courses established every semester according to the enrollment of students. She worked alone and her choice was whether she would teach the course available in a given semester or not. In community B, public case had fixed courses to teach and full-time dedication. There were various professors assigned to the same course and a division of tasks was established among them; they made formal collective agreements and even informal ones. There was apparently a more solid mutual engagement among the members of Community B, who even had more collective opportunities to negotiate.

It is possible to state that the way each of the cases participated in the community was dictated by their university's profile, which in turn signals a teaching profile. The professors of public universities, most working in a regime of full-time dedication, are required to integrate teaching, research and extension, because there is an understanding that quality resides in this integration of activities.[14] In this context, the professor needs to develop teaching activities, research and extension activities, something that can be observed in the public case and her multiple responsibilities in community B. Most professors in this community not only train nurses, but also focus on graduate and extension activities.[15] These activities are not demanded from professors working in private universities, the focus of which is on teaching.[14] Most have a Master's degree and work per hour and have a second job, as shown by private case. She often was not sure whether she would teach the following semester. Continuities and discontinuities in practice are

present in communities represented by frequent changes that imply stability and instability,[6] which can lead to new comprehension and changes in mutual engagement, objective and repertoire, making them more volatile and fragile.

This can be beneficial to some extent and encourage the professor to grow, as it was possibly beneficial to the pedagogical reasoning and act that the private case worked as a nurse, because it expanded her (re)sources. Nonetheless, if discontinuity and instability predominates due to uncertainty, it may lead the member of the community to have a peripheral or even passive participation because communities work when their members see the value of their participation,[16] otherwise, learning in the practice, harming the community and the professor's pedagogical reasoning and action. Such differences in the characteristics of teaching practice between cases given a distinct dynamic in the division of work may be related to the understanding of cases regarding their courses, because as much as the programs' projects show a path, this path was effectively negotiated by the participation of cases in the community and not by the document. The breadth of the negotiation of meaning displayed in the comprehension, transformation and teaching processes is related to the professors' participation in the community. The more opportunities there are to participate, the broader is the negotiation of meaning and the greater the learning within the community.[17] The location or magnitude of participation, as well different ways to participate in communities, caused the cases to see nursing teaching differently and, in the transformation process, they also had a different view of what would be the best resources to teach in their courses. The reification[6] of their participation was seen in the discourse and the teaching plans of the courses they ministered. Lesser or excessive socialization among peers regarding decision-making can influence[18] the professor's comprehension, transformation and teaching processes.[4] It also affects the establishment of dimensions that characterize a community of practice, because pedagogical reasoning and action is developed in solitude. In general, professors work and make pedagogical decisions by themselves.[19] The creation of perennial learning mechanisms is important for community cohesion, otherwise the program's project may become a mere formality. This does not mean it is an easy task. There are challenges inherent to the attempt to keep and promote heterogeneous groups such as communities of teaching practice.[20]

Conclusions. The influence of the practice into the communities on pedagogical reasoning and action is based on the program's project, shared repertoire but negotiation of meaning and learning, are based on the characteristics of practice developed during the participation of cases in their communities, mainly expressing the comprehension phase. The way the community organizes itself to establish commitments, objectives and shared repertoire may not only enhance the chances of achieving them but also expand or limit understanding of professors about their roles, of what it means to teach, learn and the ways of doing it, observed through MPRA. It is important to note that the educational context does not always favor or enable learning opportunities for professors such that they are led to reflect on and transform their practices.

Considering the hybrid nature of Brazilian higher education institutions, which are mainly composed of private institutions with faculty members working per hour, and the potential influence of communities on the breadth of pedagogical reasoning and action, we need to recognize this influence and assume that reflection and learning abilities are not only linked to the professors' higher or lower academic degrees. By recognizing this fact, we will be able to intervene in the characteristics of work, establishing communities in nursing schools that enhance learning among its professors through collective spaces and a collaborative relationship among faculty members. Teaching is a solitary act in which knowledge is shared but there is little mutual learning. Changes in the way work is organized can influence the traditional solitude of the teaching practice, forcing professors to negotiate their understanding and learning.

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The lived experience of undergraduate student parents: roles compatibility challenge

Original article

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Conflicts of interest: None.

Funding: Research Direction of the School of Nursing at the Pontificia Universidad Católica de Chile (DIEE). Nº DIEE201204.

Received: February 21st, 2018.

Accepted: May 31st, 2018.

How to cite this article: Lucchini-Raies C, Márquez-Doren F, Herrera-López LM, Valdés C, Rodríguez N. The lived experience of undergraduate student parents: roles compatibility challenge. Invest. Educ. Enferm. 2018; 36(2):e03.

DOI: 10.17533/udea.iee.v36n2a03

The lived experience of undergraduate student parents: roles compatibility challenge

Objective. To reveal the meanings attributed by university students to their experience of becoming a mother/father during their studies. **Methods.** A phenomenological study was conducted with students at a private Chilean University. Sixteen students from different undergraduate careers (eight women and eight men) participated in in-depth interviews, which were recorded. A phenomenological analysis of the data that followed the Streubert method was carried out, ensuring rigor by the criteria established by Guba and Lincoln during the research process. The ethical aspects were addressed through the process of informed consent, confidentiality and methodological rigor. **Results.** The phenomenon of becoming a mother/father during the university studies was revealed through four central themes: Emotions in conflict; Internal mobilization to address the situation; Position oneself in a new role; and Need for support. The central contribution of the study is the revelation of the transformation process towards the

integrated role of father/mother-student. **Conclusion.** This study provides qualitative evidence that contributes to a comprehensive understanding of the experience of becoming a mother/father during the university studies; concluding that this life experience is presented as a process of role compatibility, which is necessary to support. For this, it is necessary to make visible the role of parents/students in university policies, with the aim of providing concrete support during this process of parallel transition in the lives of young people.

Descriptors: qualitative research; students; parents; life change events.

La experiencia de estudiantes universitarios que son madres/padres: desafíos en la compatibilidad de roles

Objetivo. Develar los significados atribuidos por estudiantes universitarios a su experiencia de convertirse en madre/padre durante sus estudios. **Métodos.** Se realizó un estudio fenomenológico en una universidad privada chilena. Dieciséis estudiantes de diferentes carreras de pregrado (ocho mujeres y ocho hombres) participaron en entrevistas en profundidad las cuales se grabaron. Se realizó un análisis fenomenológico de los datos que siguió el método de Streubert, cuidando el rigor de la investigación mediante el cumplimiento de los criterios establecidos por Guba y Lincoln durante el proceso de investigación. **Resultados.** El fenómeno de convertirse en madre/padre durante la etapa universitaria se develó a través de cuatro temas centrales: Emociones en conflicto; Movilización interna para abordar la situación; Posicionarse en un nuevo rol; y Necesidad de apoyo. La contribución central del estudio es la revelación del proceso de transformación hacia el rol integrado de padre/madre-alumno. **Conclusión.** Este estudio proporciona evidencia cualitativa que contribuye a una comprensión integral de la experiencia de convertirse en madre/padre durante la etapa universitaria. Como conclusión, esta experiencia de vida se presenta como un proceso de compatibilidad de roles, que es necesario apoyar. Para ello se requiere visibilizar el papel de los padres/madres estudiantes en

las políticas universitarias con el objetivo de proporcionar un apoyo concreto durante este proceso de transición paralelo en la vida de los jóvenes.

Descriptores: investigación cualitativa; estudiantes; padres; acontecimientos que cambian la vida.

A experiência vivida por estudantes universitários que são mães/pais: desafios na compatibilidade dos papéis

Objetivo. Revelar os significados atribuídos por estudantes universitários à sua experiência de tornar-se em mãe/pai durante seus estudos. **Métodos.** Se realizou um estudo fenomenológico com estudantes numa Universidade particular chilena. Dezesseis estudantes de diferentes cursos de graduação (oito mulheres e oito homens) participaram em entrevistas em profundidade as quais foram gravadas. Se realizou uma análise fenomenológico dos dados que seguiu o método de Streubert, cautelando o rigor da investigação por meio do cumprimento dos critérios estabelecidos por Guba e Lincoln durante o processo de investigação. **Resultados.** O fenômeno de tornar-se em mãe/pai durante a etapa universitária se revelou através de quatro assuntos centrais: Emoções em conflito; Mobilização interna para abordar a situação; Posicionar-se num novo papel; e Necessidade de apoio. A contribuição central do estudo é a revelação do processo de transformação para o papel integrado de pai/mãe-aluno. **Conclusão.** Este estudo proporciona evidência qualitativa que contribui a uma compreensão integral da experiência de tornar-se em mãe/pai durante a etapa universitária; concluindo que esta experiência de vida se apresenta como um processo de compatibilidade de papéis, que é necessário apoiar. Para isto se requere visibilizar o papel dos pais/mães alunos nas políticas universitárias, com o objetivo de proporcionar um apoio concreto durante este processo de transição paralelo na vida dos jovens.

Descritores: pesquisa qualitativa; estudantes; país; acontecimentos que mudam a vida.

Introduction

A family is a human group integrated by various members and a social system where most human process occurs. The family environment has the capacity to provide the necessary physical, emotional, spiritual, and economic conditions for each member to reach their potential. The birth of a child in the early phase of family constitution is a very important period in the life of a couple as it signifies the incorporation of a new member to the family, who requires a large amounts of attention and care from their parents. This implies that both members of the couple must develop the roles of mother or father, respectively.[1] Traditional family structures, for example parents and child/children living at the same home, are still the conventional type of family in Chile.[2,3] However, there are several different types of family that must be considered, for example a mother or father living alone with their child/children, parents that do not live together, and grandparents raising their grandchildren.[2,3] The process of becoming a mother or father is an experience marked by large internal demands, as well as external demands from the environment. Being a parent signifies adopting a new role and facing the challenge of successfully fulfilling this role.[4]

Higher education and university life demands considerable time and energy from the student, both from an academic and an emotional point of view. Students face a new world in which they must develop social abilities necessary to navigate this new environment, as well as develop and put into practice their intellectual abilities.[5] When becoming a parent occurs at the same time as studying an undergraduate degree, students may experience a crisis that has the potential for a positive outcome if they face the challenge as an opportunity to grow and develop. In order to achieve a successful resolution of this crisis, students require additional support from their families, as well as from the higher education institution where they are studying. Institutional support is essential for the positive development of both the parental and student roles.[6]

Nurses and faculty members are called to share their knowledge and experience with undergraduate students in the process of becoming parents, and in this way support and guide them in the acquisition of their new parental role. The purpose of this support is to promote wellbeing and healthy development of the student and their family as they reconcile both roles of student and parent.[4] Limited literature has been published exploring the phenomenon of the twin role of university student and parent in Chile,[7] nevertheless, some international research on undergraduate/graduate parenthood analyses the way in which both roles are developed. These studies have shown that when there is lack of support, for example from family and/or from the higher education institution, student-parents perceive themselves as both poor students and poor parents.[5,8]

Given the lack of published research in this field, the aim of this current study was to explore the meaning students attributed to their experience of becoming a mother/father during their university life and its impact in family development.

Methods

Phenomenological Approach. Since this study intends to explore the lived experience of becoming a mother/father whilst studying an undergraduate degree, a phenomenological design was chosen. As faculty we are interested in comprehending students lived experience with regards to their lives, health, growth and development processes.[9] Phenomenology as a research method is a rigorous, critical and systematic way to approach unknown phenomena. Its purpose is to comprehend the lived experience of certain phenomena, searching for meaning units of it. As part of the phenomenological research process the precise way in which the researchers interprets the meaning of the phenomenon under study is by immersing them self in the data and remaining open to the meaning the participants attribute to the phenomenon. The only way to really perceive the other's world is to remain as free as possible of preconceived ideas. After identifying the researchers' preconceived notions, they should be removed from consciousness. This is a process that requires the researchers to hold a neutral position with regards to their own beliefs and values in relation to the phenomenon.[9]

Participants and Ethical Considerations. The participants' inclusion criteria for this study were to be an undergraduate student attending a private Catholic university in Santiago, Chile that had experienced the transition to motherhood/fatherhood during their university studies. Twenty-eight undergraduate students were invited to participate in the study (12 women and 16 men) and 16 consented to participate (eight women and eight men). The selection of the participants was made through purposive sample in most cases, and the "snow ball" sampling method was used for the male participants. The nurse coordinator of the Healthy Campus Program at the University made initial contact with the students. The nurse called each potential participant and explained the aims, structure and ethical considerations of the study. If the student agreed to participate, she/he signed an informed consent form and was contacted by one of the three researchers that conducted the interviews. By a phone call or an e-mail, the researcher reiterated the aim of the study and scheduled the interview. Professors of the School of Nursing, with qualitative research experience, a campus nurse and an undergraduate nursing student, integrated the research team; the three female professors, all of them with master degree, conducted the interviews. The criteria used to determine the number of participants was the saturation of the data. The initial point of saturation was reached by to the sixth interview with female participants and the sixth interview with male participants, however, the interview process continued until saturation of the data was ensured. Ethical approval for the study was obtained through the Ethics Committee of the School of Nursing at Pontificia Universidad Católica de Chile. The average age of the participants was 25 years and all had become a parent during their undergraduate studies. The average age of their children was 3 years (range 6 months to 14 years). All but two of the participants lived in the capital city, Santiago, whilst the remaining two students came from other regions of the country. Regarding their academic situation, half of the participants had a curricular delay related with the maternity/paternity process. Nine of the participants lived with their parents, three with their partner, one with both parents and partner, two with their siblings, and one alone. Ten of the participants were studying and working at the same time, as a way of increasing their income to meet the needs of their child, and 14 received economic support from others (parents or their partner) to supplement their income.

Data Collection. The first three authors collected data through in-depth interviews from April to December 2013. During this process, the

researchers recorded of their own feelings and emotions about the phenomenon under study through a process of journaling. The purpose of journaling was to separate the experiences described by the students from their own experiences. In-depth interviews were conducted in order to comprehend the individual experiences from the student's perspective and in this way, the researchers sought to understand these experiences through the spoken narration of the participants. In order to describe sociocultural characteristics of the sample, prior to interviewing participants completed a form denominated "Questionnaire for students" in order to gather demographic, academic, familial and socioeconomic information. One in-depth interview was conducted with each participant, with an open guiding question: Which has been your experience of becoming a mother/father during your undergraduate studies? Subsequent open questions were made to encourage further depth in the narrative when if necessary. The interviews were conducted by the professors and with the exclusive presence of the participants, in the faculty's offices. Interviews were audio taped and transcribed verbatim. The interviews lasted an average of 40 minutes. The audio recordings and transcriptions of the interviews were stored securely in a locked place and after the analysis process were deleted.

Data Analysis. Data was analyzed through a content analysis process, without using any software.[9] The analysis of the first interview allowed for the identification of preliminary units of meanings. Thereafter, the rest of the interviews were analyzed until saturation of the data was achieved. The first analytical phase was completed as a group by the three researchers who conducted the interviews. During this phase, an initial analysis of the first three interviews was performed, the first units of meaning were extracted, and an analysis matrix was constructed. For the following interviews, each researcher performed an initial analysis separately, and in a second phase the three researchers conducted a joint analysis to identify clusters of meanings and central themes, using the phenomenological analytical process described by Streubert and Rinaldi.[9] To confirm the results of the analysis, the structure of the phenomenon was sent back to three participants that validated these results.

Results

Four central themes of the phenomena of being a mother/father during undergraduate studies appeared: Conflicting emotions; Internal mobilization to address the situation; Positioning oneself in a new role; and Need for support. Each theme consisted of domains and subdomains. The experience of males and females was presented through the same four central themes, however, in some domains gender differences were found. A description of each theme is presented. The quotations that represent the experience of the participants were translated from Spanish into English:

Conflicting emotions. Students demonstrated that in a first stage of the process, they transited through a conflict of emotions, which involved assuming the new condition of father/mother at the same time as they continued being students. This caused an initial shock in their close environments: family and university: *For me it was very difficult to accept my pregnancy, I had depression because I didn't accepted my son until I had him in my arms..., I regretted all the time, there were months during my pregnancy that I was in bed all the day, I did not want to do anything...* (I14). Some participants described how their new status as a future mother/father triggered demonstrations of support, however in other cases, participants experienced discrimination by the university environment, especially in the case of females. This generated feelings of guilt because the students required support from others: *There are people that include you in group work and there are people who say 'I hate to work with this girl who has a baby'. However, the truth is that it did not affect so much that my classmates said that. Really what affected me were the opinions of the teachers* (I8); *I explained to them [teachers] that I had some trouble with my son and some*

of them told me well, nobody force you to have a baby… so then the perception of being a mother changes… and to be a college student and mom at the same time is seen as something terrible, like morally bad (I14).

Internal mobilization to address the situation. Once students had accepted their new life situation, they passed through a process of decision-making where they began to rethink the future. They needed to redirect their lives, which implied a change in priorities, and often, sacrificing activities that formed part of their daily lives. Male participants seemed to experience more intensely the loss of certain university activities and often described this process. Thus, both mothers and fathers described going through a process, not without obstacles and barriers, which allowed them to discover a new motivation to continue their studies. In this process, students were able to identify critical moments in the development of the dual role of student-parent: *When my son was born I realized that maybe I could not continue with my studies… that I needed to look for other alternatives that allow me a work for a more stable future… and that was the way I found my vocation to become a teacher and I finished studying pedagogy* (I6); *I always said that for being a mother and student you need a lot of strength and power because… you know… I have all the problems that the others students have… but sometimes I have my head elsewhere because, for example, my son is sick…* (I6).

Positioning oneself in a new role. Once the child had born a change in the hierarchy of roles occurred, and the role of mother/father became the most important. Thus, participants were faced with the task of redistributing their priorities, trying to reconcile their maternal/paternal activities with their student activities. This involved making changes to their life project, with their son/daughter becoming the main motivation to move forward. While it is true that both mother and father go through a process of acquisition of maternal/paternal role, the female students seemed to perceive this change more acutely, since their biological condition forced them to miss their university activities during delivery and the immediate postpartum period: *First of all, it is a responsibility because I am no longer in charge of myself, another person depends on me. It has been complicated to organize my time… There is no time left to be distracted… yes, and that was the complicated thing, that's why I suspended the first semester* (I9).

Need for support. Students reported that during this process they required constant and strong external support, identifying their families and the university environment as fundamental pillars of support. Those who received the required support indicated that a major aspect that had helped them to reconcile both roles was having support from home and from their teachers and peers at the university: *Our parents were a pillar of support because they helped us take care of our daughter when we could not; they supported us financially while we were studying at the university. So they were an important support, without them we would have had to work and study and it would have been very difficult* (I10). However, some participants indicated that they felt invisible to the authorities and lamented the lack of institutional policies that considered the condition of being a father/mother and student, which could be translated into concrete, practical support. In addition, students proposed some practical institutional support measures that would help students to assume the responsibilities of being a father/mother and student: *The first support necessary is that the university recognizes the condition of being both father and student, which in itself is more difficult because of the multiple responsibilities…* (I9). In this way, the phenomenon is experienced as a process of simultaneous transition between the adoption of the maternal/paternal role and becoming a professional with a university degree. This process contains moments of high emotionality when students face the conflicting responsibilities of university and home life, and terminates with the adoption of a new integrated student-parent role. Coping with this new life situation requires internal mobilization of one's own resources and strong external support of the environment. This support becomes a fundamental pillar that

facilitates or hinders the incorporation of this new role in their daily lives.

Discussion

The transformative process of becoming a mother requires an important mobilization of resources in the psychological, social and physical spheres. During this stage, females go through a period of enhanced vulnerability and face great challenges as they transit into motherhood. The process of becoming a mother has been described in four stages: (a) commitment, bonding and preparation for the arrival of the child during pregnancy; (b) getting to know the child and formation of attachment, learning to take care of the child and physical recovery during the first weeks postpartum; (c) moving towards a new normalcy during first four months postpartum; and (d) attainment of a maternal identity at around four months postpartum. These stages overlap each other and are affected by maternal, child, family and environmental variables, which in turn influence the duration of each stage.[4] In the case of males, the process of becoming a father also provokes various emotions and signifies a radical change in their lives. During this process they are exposed to new situations and learn new skills in response to the challenges imposed by their new role as a father, and as they transition into fatherhood, they consolidate this new role.[10–15]

The transformative process of becoming a mother or father may differ in the case of individuals whom experience this transformation during their university studies, since a significant proportion of these individuals are still in the final stages of adolescence.[7,16,17] Pregnancy during adolescence generates new emotions, new actions as well as imbalances for individuals who are still experiencing the vulnerabilities inherent to this developmental stage.[16]These young people experience two significant transitions simultaneously: one towards adulthood and another towards parenthood, therefore, they face a combined stress related to raising their child and achieving independence as an adult. Consequently, young parents generally have fewer resources to facilitate their process of transition to parenthood.[7,17]

When the process of becoming a mother or father coincides with an individual's university studies, additional difficulties may present themselves in relation to the physical and emotional exhaustion of assuming these responsibilities, considering that the requirements each role, student and parent, may enter into conflict. This generates a dilemma for the individual as they may feel incapable of fulfilling either their parental or student role, or even worse, feel incompetent in both roles.[8,16,18]

In accordance with results from this current study, previous studies have shown that the process of becoming a student-parent is characterized by the presence of contradictory emotions, the need to both mobilize internal resources to face the situation and to identify oneself in the new role.[7,8,16,19,20]

A fundamental aspect of this process, highlighted by the participants of this study, is the perceived support of family and the university institution. In particular, family is regarded as the central pillar of support for the individual assuming their new role of student-parent, since family members frequently provide emotional and financial support, and may also care for the child when the student is unable to do so due to the demands of their university studies.[18,20–22]

Concerning institutional support, participants in this current study described a diversity of experiences, some students perceived that university supported them, others shared negative experiences, and whilst others described feeling that, their situation was made invisible in the university setting. This final point is consistent with previous studies that describe a self-imposed invisibility by mothering students adapting to institutional policies and norms that do not take into consideration the possibility that students may be fulfilling their maternal role during this stage of life.[20,23] The lack of institutional consideration for parenting students may generate difficulties on one hand, in relation to the student's

ability to fulfil their maternal/paternal role, in the construction of the previously mentioned self-concept as a parent, and even influencing the parent-child attachment style; and on the other hand, in their self-perception as a student, which influences their academic performance.[8,20,24]

When university policies recognize the unique situation of students being parents and grant them the necessary support to fulfil their dual role, the university environment has the potential to become a setting for enriching experiences that not only promote the integral development of the student, but also positively influence the development of their child and their new family[20] and contribute to a more inclusive university environment.[8,23] Various university institutions have developed specific policies designed to protect and support mothering students, however fewer initiatives exist taking into account that needs of fathering students.[5,25–27]

The phenomenon of becoming a mother or father during the university years was multidimensional in nature, and revealed through four central themes. These themes take into account the emotional process in which various, positive and negative feelings, come into conflict, as the individual faces the challenges of university studies and parenthood. In order to fulfil the responsibilities of both roles, the student needs to mobilize different resources, a process that leads to a transformation towards a new integrated role of parent-student. In order for this transformation to be a process rich in positive experiences, the student-parent requires diverse sources of support, in particular the support of family and friends, in addition to support provided by the university institution. In search of a comprehensive understanding of the phenomenon under study, the central contribution of the study is the revelation of the lived experience of student-parents, in particular their process of transformation towards the integrated role of father/mother-student.

All faculty members should be aware of students that are facing their motherhood/fatherhood, specially nursing faculty who has the responsibility to provide a nourish environment for the student and the child, in terms of promoting a healthy life, for parents and children

Finally, there is a need to make the role of student-parent visible in university policies, with the objective of providing concrete support during this unparalleled process of transition in the life of the young person. Several recommendations for providing concrete support include flexible study timetables, implementation of policies that promote breastfeeding within the institution, provision of childcare options whilst parents are in classes, and ensuring academic mentors are aware of the unique situation of these students.

In regards to the limitations of this study, the results of this research reflect the reality of student parents in only one university. Furthermore, this research considers only the perspective of the student parents, not those of teachers and university authorities. Further research to address these limitations is recommended.

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Knowledge: disease process in patients undergoing hemodialysis

Original article

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Knowledge: disease process in patients undergoing hemodialysis

Objective. To identify the relationship between socioeconomic variables and nursing outcome indicators *Knowledge: disease process.* **Methods.** This is a cross-sectional study involving 51 patients undergoing hemodialysis at a public nephrology hospital in a city in northeastern Brazil. A questionnaire covering sociodemographic information and the 15 nursing outcome indicators *Knowledge: disease process.* **Results.** A statistically significant but weak correlation was found between age and the indicators Specific process of the disease (r=-0.28), Cause and contributing factors (r=-0.36), Signs and symptoms of the disease (r=0.30), Signs and symptoms of complications of the disease (r=-0.37), Precautions to prevent complications of the disease (r=-0.35); number of years of schooling and the indicators Specific process of the disease (r=0.29), Cause and contributing factors (r=0.28), and Signs and symptoms of the disease (r=0.34). There were significant and moderate correlations of age with the indicator Psychosocial effect of the disease in the individual (r=-0.41),

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Conflicts of interest: None.

Received: September 19th, 2017.

Acepted: May 31st, 2018.

How to cite this article: Ferreira JKA, Pessoa NRC, Pôrto NP, Santos LNM, Lira ALBC, Frazão CMFQ. Knowledge: disease process in patients undergoing hemodialysis. Invest. Educ. Enferm. 2018; 36(2):e04.

DOI: 10.17533/udea.iee.v36n2e04

in the family (r=-0.44) and benefits of disease control (r=-0.48). Sex was related only to the indicator Specific process of the disease (p=0.03). **Conclusion.** There was no relationship between some indicators of the outcome *Knowledge: disease process* with the sociodemographic variables in patients undergoing hemodialysis, a fact that underscores the importance of implementing nursing interventions that take into account the particularities of the individuals.

Descriptors: renal insufficiency, chronic; renal dialysis; nursing process; knowledge; health education; standardized nursing terminology.

Conocimiento: proceso de la enfermedad en pacientes sometidos a hemodiálises

Objetivo. Identificar la relación de las variables socioeconómicas con los indicadores del resultado de enfermería *Conocimiento: proceso de la enfermedad.* **Métodos.** Estudio de corte transversal en el que participaron 51 pacientes sometidos a hemodiálisis en un hospital público de referencia en nefrología en una ciudad del nordeste de Brasil. Se utilizó un formulario que contenía preguntas sobre información sociodemográfica y de los 15 indicadores del resultado de enfermería de *Conocimiento: proceso de la enfermedad.* **Resultados.** Se encontró correlación significativa pero baja entre la edad y los indicadores de proceso específico de la enfermedad (r=-0.28), causa y factores colaboradores (r=-0.36), señales y síntomas de la enfermedad (r=-0.30), signos y síntomas de complicaciones de la enfermedad (r=-0.37), precauciones para prevenir complicaciones de la enfermedad (r=-0.35); años de estudio y los indicadores proceso específico de la enfermedad (r=0.29), causa y factores colaboradores (r=0.28), y señales y síntomas de la enfermedad (r=0.34). Se observaron correlaciones significativas y moderadas de la variable edad con el indicador efecto psicosocial de la enfermedad sobre el individuo (r=-0.41), con la enfermedad en la familia (r=-0.44) y con los beneficios del control de la enfermedad (r=-0.48). El sexo solamente se relacionó con el indicador de proceso específico de la enfermedad (p=0.03). **Conclusión.** Hay relación entre algunos indicadores del resultado *Conocimiento: proceso de la enfermedad* con las variables sociodemográficas en los pacientes sometidos a hemodiálisis, hecho que

resalta la importancia de la implementación de intervenciones de enfermería que tengan en cuenta las particularidades del individuo.

Descriptores: insuficiencia renal crónica; diálisis renal; proceso de enfermería; conocimiento; educación en salud; terminología normalizada de enfermería.

Conhecimento: processo da doença em pacientes submetidos à hemodiálise

Objetivo. Identificar a relação das variáveis socioeconômicas com os indicadores do resultado de enfermagem *Conhecimento: processo da doença.* **Métodos.** Estudo transversal em que participaram 51 pacientes em hemodiálise de um hospital público de referência em nefrologia em uma cidade no nordeste do Brasil. Foi utilizado um formulário contendo perguntas sobre informações sócio-demográficas e sobre os 15 indicadores do resultado de enfermagem *Conhecimento: processo da doença.* **Resultados.** Foi encontrada uma correlação significativa, mas baixa, entre a idade e os indicadores de processo específico da doença (r=-0.28), causa e os fatores colaboradores (r=-0.36), sinais e sintomas da doença (r=-0.30), sinais e os sintomas de complicações da doença (r=-0.37), precauções para prevenir complicações da doença (r=-0.35); anos de estudo e os indicadores processo específico da doença (r=0.29), causa e fatores colaboradores (r=0.28), e sinais e sintomas da doença (r=0.34). Houve correlações significativas e moderadas da idade com o indicador efeito psicossocial da doença no indivíduo (r=-0.41), da doença na família (r=-0.44) e os benefícios do controle da doença (r=-0.48). O sexo foi relacionado apenas com o indicador processo específico da doença (p=0.03). Conclusão. Há relação entre alguns indicadores do resultado *Conhecimento: processo de doença* com as variáveis sócio-demográficas em pacientes submetidos à hemodiálise, fato que ressalta a importância da implementação de intervenções de enfermagem que levem em consideração as particularidades do indivíduo.

Descritores: Insuficiência Renal Crônica; Diálise Renal; Processo de Enfermagem; Conhecimento; Educação em saúde, terminologia padronizada em enfermagem.

Introduction

The process of aging of the population favors the manifestation of chronic diseases, which may be associated to the gradual decrease of regulatory functions of the organism and cause a greater vulnerability to certain pathological factors.[1] Among chronic diseases, chronic kidney disease (CKD) stands out as a pathology with high morbidity and mortality and progressive incidence in Brazil and worldwide.[2] It is defined by the presence of a renal parenchymal lesion associated or not with reduced Glomerular Filtration Rate (GFR) for at least three consecutive months or, still, by the presence of GFR of less than 60 mL/minute/1.73 m^2 for 3 months or more.[3] Due to the progressive nature of the disease, CKD has been seen as a public health problem. In 2016, the Brazilian Society of Nephrology estimated that approximately 113 thousand patients were undergoing some kind of therapy for the control of CKD in Brazil, corresponding to an increase of 6.3% over the number of patients treated in the year 2011.[4]

The therapeutic modality chosen depends on the stage of the disease. Thus, CKD patients may receive conservative treatment with drug and dietary therapeutic measures, or renal replacement therapy (RRT), which is necessary when the disease progresses. The types of RRT currently available are: dialysis, represented by hemodialysis and peritoneal dialysis, and renal transplantation.[5] Among renal replacement therapies, hemodialysis is the most commonly used by CKD patients. This modality requires adaptations in the patient's life due to the restrictions imposed by the treatment, with a direct impact on quality of life.[6] These adaptations include, for example, the time reserved for treatment sessions and medical consultations. Physical, social, emotional and psychological changes are also caused by the pathology, which may have an impact leading to isolation and lack of energy to deal with daily assignments.[1]

In order to assist in the care of these patients, the Nursing Process must be deliberately and systematically implemented. To do so, five interrelated, interdependent and recurrent steps must be covered: Assessment, Diagnosis, Planning, Implementation and Evaluation.[7] The *Nursing Outcomes Classification* (NOC) includes outcomes and indicators to be identified and evaluated during the planning of the nursing process. The use of this classification represents a device for the clinical practice of nursing. Among the nursing outcomes listed in the NOC, in the case of CKD patients, it is important to evaluate the "1803 - Knowledge: disease process, defined as the extent of understanding transmitted about the specific process of a disease and the prevention of its complications".[8] Thus, it is considered essential to know the public of renal patients undergoing hemodialysis and their specificities in order to establish possible associations with the nursing outcome to be studied and contribute to a more effective planning of the guidelines provided. Therefore, the present article aims to verify the relationship between sociodemographic data and the nursing outcome *Knowledge: disease process* in patients undergoing hemodialysis.

Methods

This is a cross-sectional descriptive study with a quantitative nature developed in a hemodialysis unit of a public hospital, reference in nephrology, in the State of Pernambuco/Brazil between August and December 2016. The study population consisted of 74 patients, who represented the total number of individuals undergoing hemodialysis in the unit. For selection of the sample, eligibility criteria applied. The inclusion criteria were: to be older than 18 years and to present a medical diagnosis of CKD. Exclusion criteria were: to present difficulty in verbal communication or disorientation as to time, space or psychic state, and have the medical diagnosis of Acute Renal Failure. Thus, 23 patients did not participate in the study because of the presence of some exclusion criteria and/or because they did not meet the inclusion criteria. This left a sample of 51 patients. Data collection occurred by means of an interview with the patients during hemodialysis sessions and after reading and signing the Informed Consent Term. A form was used in the interview and was applied by two resident nurses of nephrology and two nursing undergraduate students from the Federal University of Pernambuco, who had been previously trained. The form used was composed of two parts: 1) questions on sociodemographic and clinical data, and 2) questions related to the indicators of the result of the NOC 1803 - Knowledge: disease process.

The demographic data collected in this study were: age (in years), sex (female or male), marital status (with or without companion), origin (metropolitan region of Recife, coutryside of the state of Pernambuco, or others), a practitioner of a religion (yes or no), years of schooling, family income (number of minimum wages; one minimum wage = R$ 880, which was equal to $ 3520 in 2016), occupation (unemployed, retired/receiving benefit, or others). As to clinical data, the time of diagnosis of CKD (in months), time undergoing hemodialysis (in months) and the dialysis site (Arteriovenous Fistula-AVF, Double Lumen Catheter - DLC/Triple Lumen Catheter - TLC, Permcath and Prosthesis). The indicators used from the result of the NOC 1803 - Knowledge: disease process for specification of CKD were 15, namely: Specific process of the disease; Cause and contributing factors; Risk factors; Effects of the disease; Signs and symptoms of the disease; Usual course of the disease process; Strategies to minimize the progression of the disease; Potential complications of the disease; Signs and symptoms of complications of the disease; Precautions to prevent complications of the disease; Psychosocial effect of the disease on the individual; Psychosocial effect of the disease in the family; Benefits of disease control; Available support groups; and Respectable sources of specific information on the disease. [9]

The grades used for the indicators presented the following classification: 1 = no knowledge; 2 = limited knowledge; 3 = moderate knowledge; 4 = substantial knowledge; and, 5 = broad knowledge. It noteworthy that, in order to elucidate the indicators and grades, operational definitions were identified from research carried out through a narrative review of the literature in textbooks and databases. Thus, grades were defined according to the number of correct responses indicated by the patient, except for the indicators Available support groups, Respectable sources of specific information on the disease, and Usual course of the disease process. In these indicators, there were four options of answers, and the absence of response or the choice of each of them by the patient related to a degree of knowledge. The results from the survey were entered into the *Statistical Package for the Social Sciences* (SPSS) version 20.0 to create a database. This enabled the analysis of these data with the development of descriptive statistics by means of absolute frequency, percentage, mean, median, standard deviation and percentiles of each variable. The Kolmogorov-Smirnov test was performed to evaluate the distribution of quantitative data as to normality. The Spearman correlation test, Mann-Whitney and Kruskal-Wallis test were used to verify the associations between variables. As for the classification of the strength of the correlation between the variables tested

through the Spearman coefficient, the values adopted were: 0.00-0.19 (absent or very weak), 0.20-0.39 (weak), 0.40-0.59 (moderate), 0.60-0.79 (strong), and 0.80-1.00 (very strong).[10] For the statistical significance of the cited tests, a level of 0.05 was adopted. The study was only initiated after approval by the Research Ethics Committee of the Federal University of Pernambuco (Opinion nº 1.451.524 and CAAE 53172216.9.0000.5208), respecting all the precepts of Resolution nº 466/2012 of the National Health Council of the Ministry of Health, which rules research involving human beings.

Results

In this study, the mean age of CKD patients was 50.1±15.2 years (minimum = 20, maximum = 89), 62.7% were male (62.7%), from the Metropolitan Region of Recife (100%), 70.6% lived with a partner, had 9±3.3 years of schooling, and family income of 1.7±1.1 minimum wages. Regarding religious belief, 84.3% practiced some religion. As for occupation, 60.8% were Retired/Receiving benefited (60.8%), 9.8% were unemployed and 29.4% had other non-listed occupation. About the clinical variables, the time of diagnosis of CKD was 31.1±16.5 months and the time undergoing the treatment was 29.5±5.8 months. The prevalent dialysis site was AVF (88.2%), followed by Permcath (long term) and arteriovenous prosthesis, with 5.9% each. Regarding the indicators of the nursing outcome of the *NOC 1803 - Knowledge: disease process*, they are described in detail in table 1. It was observed that in none of the outcome indicators did the participants have knowledge classified as substantial or broad and that the category "no knowledge " prevailed in 8 out of the 15 indicators (in two, there was 100%: Support groups available and Respectable sources of specific information on the disease).

Table 1. Characterization of CKD patients undergoing hemodialysis in terms of knowledge about outcome indicators NOC 1803 - Knowledge: disease process. Recife - PE, 2016

Indicators	No Knowledge		Limited Knowledge		Moderate Knowledge	
	n	%	*n*	%	*n*	%
Specific process of the disease	11	21.6	31	60.8	9	17.6
Cause and contributing factors	2	3.9	44	86.3	5	9.8
Risk factors	9	17.6	39	76.5	3	5.9
Effects of the disease	12	23.5	36	70.6	3	5.9
Signs and symptoms of the disease	0	0	47	92.2	4	7.8
Usual course of the disease process	46	90.2	5	9.8	0	0
Strategies to minimize the progression of the disease	8	15.7	43	84.3	0	0
Potential complications of the disease	8	15.7	43	84.3	0	0
Signs and symptoms of complications of the disease	30	58.8	18	35.3	3	5.9
Precautions to prevent complications of the disease	30	58.8	21	41.2	0	0
Psychosocial effect of the disease on the individual	28	54.9	23	45.1	0	0
Psychosocial effect of the disease in the family	32	62.7	19	37.3	0	0
Benefits of disease control	36	70.6	15	29.4	0	0
Available support groups	51	100.0	0	0	0	0
Respectable sources of specific information about the disease	51	100.0	0	0	0	0

Regarding the association between sociodemographic data and indicators of the outcome of the NOC Knowledge: disease process, a statistically significant but weak correlation was found between the following data: age versus the indicators Specific process of the disease (r_s=-0.282, p=0.045), Cause and contributing factors (r_s=-0.356, p=0.010), Signs and symptoms of the disease (p=0.032; r_s=-0.300), Signs and symptoms of complications of the disease (r_s=-0.370, p=0.007), Precautions to prevent complications of the disease (r_s=-0.352, p = 0.011); number of years of schooling and the indicators Specific process of the disease (r_s=0.286, p=0.042), Cause and contributing factors (r_s=0.287, p=0.041), and Signs and symptoms of the disease (r_s=0.342, p=0.014). A statistically significant correlation of moderate intensity was identified between the data: age and the Psychosocial effect of the disease on the individual (r_s= -0.411, p=0.003), the Psychosocial effect of the disease in the family (r_s=-0.436, p=0.001) and Benefits of disease control ($p<0.001$; r_s=-0.489). And through the Mann-Whitney U test, it was observed an association between the sex variable and the indicator Specific process of the disease (p=0.029). No statistically significant associations were observed between any clinical variable and indicators of the outcome NOC Knowledge: disease process among the analyzed patients.

Discussion

The discussion was based on the data to which significant statistical association was found. The sample was found to be predominantly adult, male and with complete primary education. These variables (age, sex and schooling) had a statistically significant association with eight of the indicators on the knowledge about chronic kidney disease. Age presented a statistical association with the indicators Specific process of the disease, referring to the definition of CKD, and Causes and contributing factors, referring to the main causes that lead to CKD. This was also pointed out in a survey conducted in an outpatient clinic of Nephrology in Goiás, in which CKD patients showed ignorance about important information concerning the disease, such as its incurable character, which was the case of 20% of the sample, and the main causes of kidney disease.[11] Similarly, another study pointed to a low rate of CKD patients who identified diabetes and hypertension as possible causes of renal impairment.[12]

Age was also significantly related with the indicator Signs and symptoms of the disease, referring to the possible signs and symptoms of CKD. A survey that surveyed the knowledge of self-management among CKD patients showed a significant deficit in the recognition of the symptoms of the disease in advanced stages and revealed ignorance about the asymptomatic form of the pathology. This fact can lead to detrimental outcomes, as a long-term search for health care.[13] Likewise, statistical significance was observed between age and the indicators Signs and symptoms of complications of the disease, and Precautions to prevent complications of the disease, referring to signs and symptoms of complications and ways to prevent complications, respectively. A study carried out in a clinic for chronic kidney patients aimed to determine the knowledge perceived by patients in dialysis therapy and revealed that patients younger than 50 years presented better scores in relation to knowledge about kidney disease.[14] Another study also pointed out that older patients were little aware of CKD.[15]

This reinforces the importance of knowledge about signs and symptoms of complications of CKD and about the precautions to prevent them. Research indicated that the most prevalent self-reported complications in elderly CKD patients were hypertension (77.1%), cramps (57.1%), anemia (54.3%), weight loss (54.3%) and pain (51.4%), and these were correlated with the frailty scores presented.[16] The variable age presented, still, moderate correlation with the Psychosocial effect of the disease on the individual and Psychosocial effect of the disease in the family. Regarding this effect in renal patients, it was found that older individuals require more help and support than the younger ones.[17] It is known that social

support is indispensable in the management of kidney disease and should be directed to both patients and caregivers. Despite this, low mean scores were identified of these types of support among caregivers compared to those reached by the patients.[18] Such facts reinforce the importance of interventions for educational, social and psychological support in order to promote the capacity to deal with the adversities generated by the disease.

In this study, age also showed correlation with the indicator Benefits of the control of CKD. A survey of individuals undergoing hemodialysis in a renal replacement therapy unit in São Paulo reported statistically significant correlations between self-care capability and quality of life of CKD patients.[19] Quality of life, in this case, can be considered a benefit of self-care actions that help in the control of kidney disease. Another study that analyzed the factors related to self-care of CKD patients showed a positive correlation between age and self-care. Similarly, a positive correlation between self-care and knowledge of the patient was identified.[20] Thus, when kidney patients have accurate information about self-care, this can influence them to develop such care. As to the variable sex, there was no statistically significant correlation with the indicator specific processof the disease. Contrary to the results of this study, a survey of patients in outpatient clinics of Jordan found no statistically significant results when comparing the level of knowledge between men and women. However, there was significance when the gender was associated with attitudes and practices towards prevention and early detection of chronic kidney disease.[21] In turn, the variable schooling had a weak correlation with the indicators Specific process of the disease, Cause and contributing factors, and Signs and symptoms of the disease. A study that evaluated the influence of educational training on health evidenced that the level of schooling was associated with learning and led to differences in health outcomes among CKD patients.[22] On the indicator Signs and symptoms of chronic kidney disease, a study reinforced its correlation with the variable schooling. It was observed that subjects with incomplete elementary education presented a 4.7-fold higher risk of loss than respondents with more education in relation to the domain "signs and symptoms" of the scale used to measure quality of life in the study.[23]

In view of the findings presented, it is recognized that knowledge about CKD can be an important factor in the search for better adherence and coping with the pathology by the patient. Educational interventions addressing general questions about the disease and ways to deal with the changes can be implemented to improve the outcomes among kidney patients. However, it is important to remember the various stages and representations of disease, which require different knowledge and coping strategies.[12] Finally, no relationship between the clinical data and the nursing outcome indicators *NOC 1803 - Knowledge: disease process* was observed. It was also recognized the need for developing nursing interventions in the field of health education, highlighting the involvement of patients and their families in the learning process with a focus on approaching the knowledge of the disease, particularly directed to the profile of the individuals.

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Rapid response team: what factors interfere with its performance?

Original article

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Rapid response team: what factors interfere with your performance?

Objective. Describe the knowledge in the literature related to factors that influence the performance of response teams. **Methods.** Integrative review of the literature of articles published in Portuguese, English or Spanish between 2006 and 2016. The descriptors *hospital rapid response equipment, cardiac arrest and hospital mortality* were used for the search in the PubMed/ Medline, Lilacs - Bireme and CINAHL bibliographic databases. **Results.** 19 studies were included for the analysis. The results were categorized in: sociocultural barriers and institutional policies, late activation of the rapid response team, composition and/or strengthening of the team's capacity, and use of facilitating tools. The sociocultural barriers found were: the presence of interprofessional hierarchies and beliefs, the limitations of institutional policies were related to the lack of training and human resources deficit. Late activations increased mortality, duration of hospitalization, and admission

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Conflicts of interest: None.

Received: November 8th, 2017.

Accepted: Mayo 31st, 2018.

How to cite this article: Moreira AAS, Ramos RO, Ligório ABS, Junqueira KD, Corrêa KS. Rapid response team: what factors interfere with its performance? Invest. Educ. Enferm. 2018; 36(2):e05.

DOI: 10.17533/udea.iee.v36n2e05

to the intensive care unit. The teams composed of intensive care professionals showed a reduction in mortality and in the occurrence of cardiac arrest. The use of new tools did not promote changes in the response of the team. **Conclusion.** The factors found in this review influence the performance of the rapid response team. The foregoing should be taken into account to improve the survival of patients who require this type of care.

Descriptors: hospital rapid response team; heart arrest; hospital mortality; critical care.

Equipo de respuesta rápida: ¿qué factores interfieren con su desempeño?

Objetivo. Describir el conocimiento en la literatura relacionado con factores que influyen en el desempeño de equipos de respuesta. **Métodos.** Revisión integradora de la literatura de artículos publicados en portugués, inglés o español entre 2006 a 2016. Se emplearon los descriptores *hospital equipo de respuesta rápida, paro cardíaco y mortalidad hospitalaria* para la búsqueda en las bases bibliográficas PubMed/Medline, Lilacs – Bireme y CINAHL. **Resultados.** Se incluyeron para el análisis 19 estudios. Los resultados se categorizaron en: barreras socioculturales y políticas institucionales; activación tardía del equipo de respuesta rápida; composición y/o fortalecimiento de la capacidad del equipo; y uso de herramientas facilitadoras. Las barreras socioculturales encontradas fueron: presencia de creencias y jerarquías interprofesionales. Las limitaciones de las políticas institucionales se relacionaron con la falta de capacitación y déficit de recurso humano. Las activaciones tardías aumentaron la mortalidad, la duración de la hospitalización y el ingreso del paciente a la unidad de cuidados intensivos. Los equipos compuestos por profesionales de cuidados intensivos mostraron una reducción en la mortalidad y en la ocurrencia de paro cardíaco. El uso de nuevas herramientas no promovió cambios en la respuesta del equipo. **Conclusión.** Los factores encontrados en esta revisión influyen en el desempeño del equipo de

respuesta rápida. Lo anterior debe tenerse en cuenta para mejorar la supervivencia de los pacientes que requieren este tipo de atención.

Descriptores: equipo hospitalario de respuesta rápida; paro cardíaco; mortalidad hospitalaria; cuidados críticos.

Equipe de resposta rápida: quais fatores interferem no seu desempenho?

Objetivo. Descrever o conhecimento da literatura a respeito dos fatores que influenciam o desempenho das equipes de resposta. **Métodos.** Revisão integrativa da literatura de artigos publicados em português, inglês ou espanhol entre 2006 e 2016. Foram usados os descritores equipe de respostas rápidas de hospitais, parada cardíaca e mortalidade hospitalar para pesquisar nas bases de dados bibliográficas PubMed/Medline, Lilacs – Bireme e CINAHL. **Resultados.** Foram incluídos 19 estudos para a análise. Os resultados foram categorizados em: barreiras socioculturais e políticas institucionais; ativação tardia da equipe de resposta rápida; composição e/ou fortalecimento da capacidade da equipe; e uso de ferramentas facilitadoras. As barreiras socioculturais encontradas foram: presença de hierarquias e crenças interprofissionais. As limitações das políticas institucionais se relacionaram à falta de capacitação e déficit de recursos humanos. As ativações tardias aumentaram a mortalidade, a duração da hospitalização e internação em unidade de terapia intensiva. As equipes compostas por profissionais de terapia intensiva mostraram redução na mortalidade e na ocorrência de parada cardiorrespiratória. O uso de novas ferramentas não promoveu mudanças na resposta da equipe. **Conclusão.** Os fatores encontrados nesta revisão influenciam no desempenho da equipe de resposta rápida. Isso deve ser levado em conta para melhorar a sobrevida dos pacientes que necessitam desse tipo de cuidado.

Descritores: equipe de respostas rápidas de hospitais; parada cardíaca; mortalidade hospitalar; cuidados críticos.

Introduction

Rapid response teams (RRTs) first appeared in Australia in the early 1990s. They aim to bring knowledge and skills for the critical care of patients with signs of physiological deterioration, at sites outside the intensive care unit (ICU), in a timely manner to avoid adverse events.[1] The RRTs are systems composed primarily of two components. The first is called afferent team, which is next to the patient providing the normal care and with the appearance of signs of deterioration is to trigger a call to the efferent team, respecting assessment criteria. The efferent team responds to the call and conducts rapid and necessary measures to avoid worsening and death.[2] With the creation of the teams, several studies were carried out that evaluated their efficiency in hospitals. A significant reduction was observed as to the number of cardiorespiratory arrests (CRAs) and mortality of patients who showed signs of clinical deterioration.[3] However, other studies have not shown effectiveness of RRTs concerning the same parameters.[4] In order to clarify these differences, a recent meta-analysis[5] was conducted that evaluated 29 studies and concluded that the presence of RRTs reduces rates for hospital mortality and CRAs. However, it was suggested that there are factors that can interfere with the quality of the outcomes and that should be better elucidated. Therefore, this study aims to review the literature to determine the main factors that can interfere with the performance of RRTs.

Methods

This is a literature review of scientific articles (clinical trials, observational studies, and qualitative studies) published from January 1, 2006 to July 25, 2016, in Portuguese, English, and Spanish. The databases researched were PubMed/Medline, Lilacs – Bireme e CINAHL. The keywords used in the search were "hospital rapid response team," "cardiac arrest," and "hospital mortality" and their respective terms in Portuguese and Spanish. The search strategies used were the following associations of keywords: "hospital rapid response team" AND "cardiac arrest"; "hospital rapid response team" AND "hospital mortality"; and "hospital rapid response team" AND "cardiac arrest" AND "hospital mortality." We included studies that described or evaluated one or more factors that could interfere with the performance of RRTS, both those with quantitative and qualitative characteristics. There was no restriction as to the studies' countries of origin; however, we included only the complete articles published in Spanish, English, or Portuguese. We excluded the literature reviews and editorials because it did not present intervention methods.

Four phases for the selection of studies were previously defined. The first phase was the exclusion on articles that were repeated in the databases; in the second phase we excluded studies that did not address the proposed

topic in their titles; in the third stage we excluded studies that – after reading of the abstracts – were found to not address the research topic; and, finally, in the fourth stage – after complete reading of the articles – we excluded those that did not address the research question. In the first and second stages the exclusion of the studies was done by a principal evaluator; in the other stages, two reviewers carried out the reading and agreed to include only articles that answered the research question. At the end of the steps the selected studies were analyzed and classified according to the study objective and interference factor tested using the comparison method. From the classification it was possible to categorize the studies that tested the same interference factor.

Results

We selected 19 studies to compose the integrative review, as described in Figure 1. After analysis and classification, the studies were organized into categories according to the assessed interference factor. As follows: sociocultural barriers and institutional policies, delayed RRT activations, composition and/or capacity building of teams, use of enabling tools for RRTs.

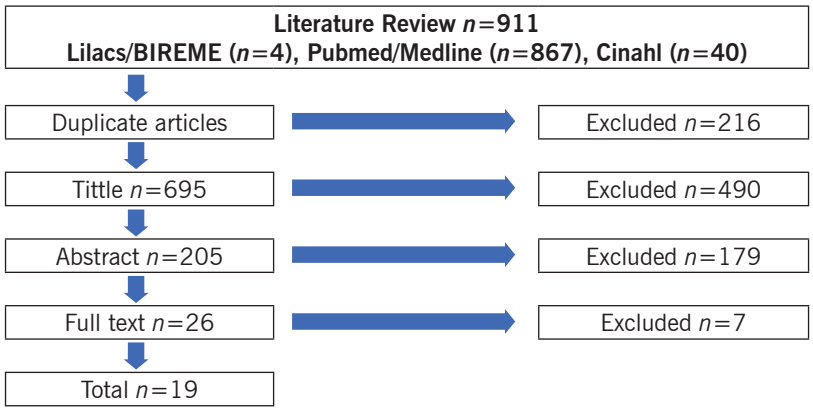

Figure 1. Article selection flowchart

Sociocultural barriers and institutional policies. Two qualitative studies investigated what factors influenced the performance of RRTs. The results of these studies, as described in Table 1, pointed as limiting aspects: the sociocultural barriers such as interprofessional hierarchy and beliefs. Firstly, due to believing that the afferent team needs to provide justifications when activating the efferent team. Secondly, due to believing that the specialized afferent team should be sufficient to resolve adverse events. Other factors were the lack of training of professionals and lack of human resources to meet the demands of patients, as well as limitations in protocols and institutional policies.[6,7]

Delayed RRT activation. In Table 2, the articles showed that delayed RRT activations are associated with increased hospital mortality rates, length of hospital stay, number of CRAs, and higher risk of admission to ICU.[8–11] For patients admitted to ICU there is also increased mechanical ventilation time, length of hospital stay, and death.[9] There was no reduction of delayed activation even with monitoring of patients.[12] The causes for delayed activation were described as the presence of unnecessary information reported during the activation, hesitant speeches, and difficulty in locating the emergency event.[8]

Table 1. Sociocultural barriers and institutional policies

Authors / Year / Country / Journal	Objectives	Type of study	Results
Braaten JS / 2015 / United States.[6]	Describe the factors that interfere with the behavior of nurses when activating the RRT.	Qualitative study	The interference factors were the lack of training, lack of human resources, limitations in institutional policies and protocols, need to justify RRT* activation, social acceptance of activations for patients with lower severity, and professional competence.
Shearer B, Marshall S, Buist MD. 2012. United Kingdom. BMJ Quality & Safety.[7]	Explore the causes of the failures for activation of the RRT.	Observational study	4.04% of the patients met the criteria for RRT activation in the 24-hour period before the index event; however, the RRT was not activated in 10 (1.75%) of these patients. There were 31 activations considered missed. When the RRT activation was delayed, it was identified the need to wait for further investigation, treatment, and reviews by the treatment and ICU teams. When the RRT had not been activated, the most common answers were that there had been no need for RRT activation and that the team assembled had the necessary expertise.

Composition and/or capacity building of teams. We selected 8 studies (Table 3) that showed that RRTs led by intensivist professionals or professionals with experience in critical care can reduce hospital mortality and the number of CRAs, unplanned ICU admissions, and decrease disease severity scores.[13–17] The teams were mostly composed of doctors, nurses, and physical therapists with experience and/or specialization in critical care.[13–20] Some studies included a pharmacist, laboratory technicians, radiology technicians, and administrators and clinical secretaries.[13,16–18,20] It was shown that the presence of a resident doctor in the team represented no difference when compared with the responsible intensivist.[16] Capacity building and maturation of the teams can improve the outcomes, reducing mortality and unplanned ICU admissions as well as enabling shorter activation time for efferent teams.[18–21]

Use of enabling tools for RRT. Four studies evaluated some enabling tools for the success of RRTs, as shown in Table 4. These tools were described as early warning systems, new activation criteria, two-level response systems (early and late), and case handoff tools. Early warning systems functioned as a digital program that through electronic medical records could detect changes in the patient's vital signs in real-time and thus promote earlier detection.[22] New activation criteria corresponded to instruments to observe the patients' vital signs with definition of new criteria for activation of the RRT and that were completed by the afferent team.[23] The two-level response system consisted in coordinating the response, in the first instance the patient was provided care when there were minor changes in vital signs by the afferent team (early) and if the patient remained with worsening of clinical condition there was activation of the second level of response executed by the efferent team (late).[23,24] The case handoff tool evaluated was the SBAR (situation-background-assessment-recommendation), which aims to enhance communication among nurses and optimize response time for critical patients.[25] The use of all tools did not show a significant reduction in patient mortality.[22–25] However, there was an increase in the number of team activations when using new activation criteria, two-level response system, and case handoff tool[23–25] and a decrease in length of hospital stay when using an early warning system.[22]

Table 2. Delayed RTT activation

Authors / Year / Country / Journal	Objectives	Type study	Results
Barwise A, Thongprayoon C, Jensen J, *et al.* 2016. United States. Critical Care Medicine.[9]	Determine if delayed RRT activations contribute to mortality and morbidity of patients that are provided care.	Observational retrospective cohort study.	57% of the patients had delayed RRT activation. In the delay group, hospital mortality, mortality after 30 days, and hospital stay were significantly higher than in the no delay group. In patients with delay transferred to ICU, use of mechanical ventilation, use of vasopressor, mortality in the ICU after 30 days, and ICU stay were higher.
Chen J, Bellomo R, Flauboris A, *et al.* 2015. Australia. Critical Care Medicine.[10]	Test if delay greater than 15 minutes in RRT calls may be associated with increased mortality.	Observational study that used data from a randomized clinical trial.	The risk of death in patients with delayed calls was significantly higher than in those with no delay both for hospitals with RRT and for control hospitals. There was significant decrease of delayed calls in groups with RRT than in control hospitals, and patients with delayed calls had higher risk of admission to ICU.
Chen J, Bellomo R, Flauboris A, *et al.* 2009. Australia. Critical Care Medicine.[11]	Examine the relation between early emergency calls and the incidence of serious adverse events.	Observational retrospective study that used data from a randomized clinical trial (MERIT study).	There was no significant relation between the presence of RRT and the increase in the proportion of early calls; however, in hospitals with RRT there was significant decrease in total deaths. The increase in the number of early calls significantly decreased the number of unexpected CRAs and deaths.
Akhtar N, Field RA, Greenwood L, *et al.* 2011. United Kingdom. BMJ Quality & Safety.[8]	Determine the quality and accuracy of diagnosis in emergency calls in an adult clinical hospital.	Prospective observational study.	The average duration of calls for CRA and medical emergency was 15 and 20 seconds respectively. The specificity and sensitivity of calls for CRA was 62% and 91% respectively. Specificity was higher in calls with greater duration. Survival rates were higher in shorter calls. The qualities of the delayed calls were grouped into 5 themes: unnecessary information, incorrect terminology, hesitant speech, difficulty in locating the event, and uncertainty of the nature of the emergency.
Tirkkonen J, Yla-Mattila, Olkkola KT, *et al.* 2013. Finland. Resuscitation.[12]	Study the factors related with delayed RRT activation and the increase in hospital mortality.	Prospective observational study.	The action of the RRT was more evident in monitored patients (41% of the calls). Verification of vital signs preceded the RRT call by about 6 hours, compared with the beds without monitoring. The reasons for RRT activation were CRA (76%) and altered vital signs (26%). The failure of the afferent team presents as a risk factor for hospital mortality.

Table 3. Composition and/or training of teams

Authors / Year / Country	Objectives	Type of study	Results
Al-Qahtani S. *et al.* / 2013 / Saudi Arabia.[13]	Examine the impact of implementing an intensivist-led RRT on CRAs and mortality.	Observational study	After the implementation of the RRT, there was a decrease in transferences to the ICU, in CRAs outside the ICU, in mortality in the recovery room, in the occurrence of CRAs in the ICU, in total hospital mortality, and in APACHE II scores.
Dacey MJ. *et al.* / 2007 / Iceland.[14]	Determine the effect of a RRT conducted by medical assistants on the rate of CRAs, unplanned admissions to the ICU, and hospital mortality.	Prospective study controlled with trial before and after implementation of the RRT.	After implementation of the RRT, there was significant decrease in the number of CRAs, mortality, and unexpected admissions in the ICU. However, there was no significant decrease in the length of ICU stay. Over time there was also significant decrease in the number of CRAs, mortality, and admission in the ICU. The satisfaction of nurses in the care of the RRT was reported in 98% of the cases as extremely satisfied.
Sebat F. *et al.* / 2010 / United States.[18]	Determine whether a training program for RRT professionals can improve the response in patients in shock.	Prospective observational study.	After deployment of the RRT with the training, there was significant increase in the number of patients identified as with shock and significant decrease in time to treatment and hospital mortality. The length of ICU stay had no significant reduction and hospital stay increased after deployment.
Jung B. et al. / 2016 / France.[15]	Evaluate the effect of the implementation of the RRT led by an intensivist on mortality in hospitalized patients.	Retrospective observational study.	After the RRT period there was significant reduction in rates of unexpected death and total hospital deaths. This reduction was not observed in the three hospitals without the RRT. CRA rates were reduced, but not significantly.
Davis DP. *et al.* / 2015 / United States.[19]	Explore the effectiveness of a new RRT to decrease intrahospital CRA, the need of ICU, and hospital mortality.	Longitudinal experimental study.	The incidence of CRA outside the ICUs decreased, while in the ICUs it remained unchanged. There was significant reduction of hospital mortality (2.12% to 1.74% $p<0.0001$).
Morris DS. et al. / 2012 / United States.[16]	Evaluate the differences between the RRT led by a resident physician or intensivist physician.	Observational retrospective study.	Of the events 38% were for the intensivist physician-led RRT and 62% for the resident physician-led RRT. There was no considerable difference for CRAs, transfers to ICU, and hospital mortality between the RRTs evaluated. However, there was higher incidence of invasive procedures in the RRT led by medical residents.

Table 3. Composition and/or training of teams. (Cont.)

Authors / Year / Country	Objectives	Type of study	Results
Calzavacca P. *et al.*/ 2010 / Australia.[20]	Evaluate the impact of a more experienced RRT on the delay in activation of the calls, the characteristics of patients, and their results.	Observational longitudinal study.	Lower RRT activation time was observed in the current group compared with the deployment group ($p<0.001$). Unplanned ICU admissions were also reduced from 31.3% to 17.3% in the current group, and hospital mortality was also reduced.
Hatlem T et al. / 2011 / United States.[17]	Analyze results of a RRT program composed of a critical care nurse and the use of a patient classification systems (All Patient Refined Diagnostic Related Groups - APR DRG).	Observational retrospective study.	Unplanned transfers to ICU after a RRT call decreased by 35.9%. The volume of patients in ICU between ROM groups 3 and 4 (more severe) increased by 12.5%, while in ROM groups 1 and 2 a corresponding decrease was observed. Moreover, the total number of days in the ICU increased. As for mortality, the HSMR decreased by 31.2%, while the overall mortality remained relatively stable, decreasing from 2.27% to 2.21%.

RRT: Rapid response team; CRA: Cardiorespiratory arrest; ICU: Intensive care unit; APR DRG: All Patient Refined Diagnostic Related Groups; ROM: Risk of mortality; HSMR: Hospital-Standardized Mortality Ratio.

Discussion

This study through a broad literature review provided the determination of four main factors that interfere with the performance of RRTs. Categorization of these factors can enable access by professionals to this information and improve their understanding of it, consequently, contributing to institutional planning in health. With the growing demand for quality care in critical patients[2] it is necessary to understand the causes of failures in the provision of care of these RRTs, enable better planning of actions to correct and remodel systems and thus provide better safety to the patient. Health safety policies require scientific foundations that ensure health care with minimal adverse events as possible, which makes it essential to know elements that lead to inefficiency of these assistance systems.

Sociocultural barriers were underlined as elements that interfere with the quality of the care provided by RRTs and derive from the creation of a nightmarish institutional culture among the professionals, particularly concerning the activation for efferent teams of the RRT. The need to justify the activation, as observed in this study, come from the establishment of a criticism culture in which early activations are deemed "unnecessary".[26] In this context, the professionals' lack of training can generate fear in activations, as they feel embarrassed to show little knowledge of the critical situation and consider themselves unable to handoff the case of the patient to efferent teams.[27] Institutional culture, therefore, can adversely influence professionals towards not executing activations in the correct time and consequently causing delays and worse outcomes.[27] This finding was also observed in the study of Tirkkonen *et al.* 2013, in which even with the identification

Table 4. Use of enabling tools for RRTs

Authors / Year / Country / Journal	Objectives	Type of study	Results
O´Connel A. *et al.* / 2016 / Australia.[23]	Examine the impact of a response chart and a change in call criteria on RRT calls, CRAs, unplanned admissions to the ICU, and hospital mortality.	Observational longitudinal study	After the introduction of the tool (response chart) and changes in call criteria, there was a significant increase in the number of calls. Hospital mortality and number of CRAs had no significant reduction. The number of ICU admissions increased significantly, but remained constant over time.
Bertaut Y, et al. / 2007 / United States.[25]	Evaluate the results of implementing a RRT that uses a nurse-to-nurse consult approach (SBAR).	Experimental study.	One year after implementation of the RRT mortality decreased from 2.35% to 2.13% and the number of calls increased. The nurses' assessment in relation to RRT was predominantly positive, indicating a good job.
Kollef MH, *et al.* / 2014 /. United States.[22]	Determine if real-time alerts improve patient care.	Randomized controlled trial.	Transfers to ICU (17.8% vs. 18.2%) and hospital mortality (7.3% vs. 7.7%) were similar for the intervention and control groups. The number of patients who required transfer to support houses or to long-term hospitals was similar in patients in the intervention and control groups (26.9% vs. 26.3%). The length of hospital stay (8,469,5 days vs. 9,4611,1 days) was statistically lower for the intervention group.
Kansal A, Havill K. / 2012 / Australia.[24]	Determine the impact on RRT calls and patient outcomes after implementation of a RRT with two levels of response with observation charts and new calling criteria.	Retrospective observational study.	There was a nonsignificant decrease of 20% in unexpected deaths and a decrease of 26% in CRAs. There were no significant differences in the severity scores of the admission and subsequent outcomes in the ICU and in the hospital for these patients. There was an increase of 50% in the number of rapid response calls after the introduction of a rapid response system in two levels of response and new observation charts and calling criteria.

RRT: Rapid response team; CRA: Cardiorespiratory arrest; ICU: Intensive Care Unit; SBAR: situation-background-assessment-recommendation.

of signs of clinical deterioration in the patient by monitoring, RRT activations remained late.

Institutional policies intended for professional valorization and training can reduce these barriers as they build a new culture, in which professionals can activate calls without being criticized and focus only on patient safety.[26] The presence of interprofessional hierarchy can also interfere negatively. Other studies that have also observed delays in the activation of RRTs identified as one of the causes the hierarchical model in which the nurse of the sector where the patient is must first contact the local doctor before activating the RRT. Training the members of the multidisciplinary team in order to develop their professional autonomy in the workplace can assist in interprofessional relationship and avoid these limitations and impositions from a profession on the other.[28]

Delays, on the other hand, can be caused by the afferent teams' failure to recognize the signs of early

clinical deterioration in patients. These attitudes occur both due to the professionals' lack of adherence to the protocols and criteria for activation of calls and to the lack of human resources to meet the patients' demand.[26] The proportion of human resources in relation to the number of patients is a factor that is still questioned, and there are studies that relate the increase in the proportion of nurses with the reduction in mortality of patients; however, there are still limitations to demonstrate that the increase in the number of nurses can become a patient safety strategy.[29] Regarding the professionals' lack of adherence to protocols, it was observed that better knowledge and familiarity with the instruments of criteria to evaluate the signs can increase adherence to activation of the teams, avoiding delays.[30]

The team's composition may vary for each hospital, and most have a doctor leading the team. The need for the doctor in the RRT as a factor that can interfere with its efficiency is still controversial. Although most hospitals use the doctor as head of their teams, a meta-analysis did not show that the presence of the doctor is associated with better outcomes.[5] What has been observed is that when the professionals have experience and/or specialization in intensive care, the teams can achieve better outcomes.[31] In order to improve the RRT responses, tools and instruments have been devised that help professionals in the detection of signs of clinical deterioration, as well as in the team activation process and patient case handoffs.

Contrarily to what was found in this review, in some institutions the use of evaluation instruments led to lower rates of mortality and CRA events.[32] It is probably explained by the presence of programs of continuing education and training to employ the tools appropriately, which shows that, as much as the tools are useful to improve response, without the proper training for their use they may not bring clear benefits.[32]

This review presents limitations: firstly, due to the fact that instruments have not been used to assess the methodological quality of the studies identified; secondly, due to the existence of few controlled and randomized clinical trials that addressed the research question. However, this study was conducted based on a wide search in the literature in the world's main databases and managed to summarize the main aspects that can influence the performance of RRTs. Thus, it can guide health professionals and health managers to identify the flaws in their institutions in order to promote corrections and better results. Individuals who need critical care will be safer and with better chances of survival.

Conclusion. RRTs may have flaws due to the presence of sociocultural barriers, delayed efferent team activations, lack of experience, and lack of training. These factors may interfere with the increased occurrence of CRAs, ICU admissions, length of hospital stay, and hospital mortality.

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Sexuality and HIV prevention: consensus and dissent of Catholic youths

Original article

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Sexuality and HIV prevention: consensus and dissent of Catholic youths

Objective. To analyze the consensus and dissent of Catholics youths about HIV/AIDS prevention from their representations about sexuality. **Methods.** This is a quantitative and qualitative research based on the Theory of Social Representations carried out with 84 Catholics youths who answered online to the Free Word Association Test on Facebook and three questions about the influence of Catholic doctrine on the free exercise of sexuality and the adoption of practice safe sex. The techniques of Factorial Analysis of Correspondence and Semantic Content were used. **Results.** On sexuality, only the young women with access to higher education represented the term as a free practice that should not lead to guilt. There was a consensus on chastity, virginity, and sex within marriage as effective means of HIV prevention. It is also representational consensus of the young people that sexual practice is pleasurable, however, condemned by the church, and that AIDS is a preventable disease. Social

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Research linked to the article: Social representations on the exercise of sexuality and HIV/AIDS prevention in young Catholic(s) girls.

Funding: Capes/CNPq – Master's Degree Scholarship.

Conflicts of interest: None.

Received: May 9th, 2017.

Accepted: May 31st, 2018.

How to cite this article: . Couto PLS, Paiva MS, Oliveira JF, Gomes AMT, Teixeira MA, Sorte ETB. Sexuality and HIV prevention: consensus and dissent of Catholic youths. Invest. Educ. Enferm. 2018; 36(2):e06.

DOI: 10.17533/udea.iee.v36n2e06

representations have revealed dissent between men and women, while they consider that the exercise of sexuality should be restricted to marriage, they advocate sexual freedom. As for AIDS, they represent that the syndrome stems from prejudice, and they consider that vulnerability favors contagion. **Conclusion.** In the consensuses among the young people studied, there are sexist prejudices and stereotypes that influence HIV/AIDS prevention actions. Therefore, health professionals, especially those of Nursing should propose actions aimed at this age group in educational activities about the adoption of preventive practices on safe sex, always considering the social representations around the subject.

Desciptors: young adult; religion and sex; sexuality; sexual behavior; consensus; dissent and disputes; acquired immunodeficiency; síndrome; social media.

Sexualidad y prevención del VIH: consenso y disenso de jóvenes católicos

Objetivo. Analizar los consensos y desacuerdos entre los jóvenes católicos sobre la prevención del VIH/SIDA a partir de sus representaciones sobre la sexualidad. **Métodos.** Investigación cuanti-cualitativa basada en la Teoría de las Representaciones Sociales. 84 jóvenes católicos respondieron on-line en Facebook un cuestionario de Asociación Libre de Palabras y tres preguntas sobre la influencia de la doctrina católica en el libre ejercicio de la sexualidad y en la adopción de prácticas sexuales seguras. Se utilizaron las técnicas de Análisis Factorial de Correspondencias y de contenido semántico. **Resultados.** Sobre la sexualidad, solamente los jóvenes con acceso a la educación superior, representaron el término como una práctica libre que no debe causar culpabilidad. Hubo consenso en cuanto a la castidad, la virginidad y el sexo dentro del matrimonio como medios eficaces para la prevención del VIH. También fueron consensos representacionales entre los jóvenes que la práctica sexual es placentera, sin embargo es condenada por la Iglesia, además, que el SIDA es una enfermedad que puede prevenirse. Las representaciones sociales revelaron disensos entre hombres y mujeres puesto que mientras que ellos consideraban que el ejercicio de la sexualidad debe ser restringido al matrimonio, ellas defendieron la libertad sexual. En cuanto al SIDA, ellos estiman que el síndrome deriva del prejuicio y ellas consideran que la vulnerabilidad favorece el contagio. **Conclusión.** En los consensos entre los jóvenes participantes del estudio hay preconceptos y estereotipos sexistas que influyen en las acciones de prevención del VIH/SIDA. Por tanto, los profesionales de la salud, en

especial los de Enfermería, deben proponer que en las actividades educativas sobre la adopción de prácticas preventivas sobre sexo seguro que se realizan en este grupo etário se tengan en cuenta las representaciones sociales sobre el tema.

Descriptores: adulto joven; religión y sexo; sexualidad; conducta sexual; consenso; disentimientos y disputas; síndrome de inmunodeficiencia adquirida; medios de comunicación sociales; mídias sociais.

Sexualidade e prevenção ao HIV: consensos e dissensos de jovens católicos

Objetivo. Analisar consensos e dissensos de jovens católicos/as sobre a prevenção ao HIV/aids a partir de suas representações sobre a sexualidade. **Métodos.** Pesquisa quanti-qualitativa, fundamentada na Teoria das Representações Sociais, realizada com 84 jovens católicos, que responderam on-line no Facebook ao Teste de Associação Livre de Palavras e três questão acerca da influência da doutrina católica no livre exercício da sexualidade e na adoção de prática sexuais seguras. Foram utilizadas as técnicas de Análise Fatorial de Correspondência e de Conteúdo Semântica. **Resultados.** Sobre a sexualidade, apenas as jovens com acesso ao ensino superior representaram o termo como uma prática livre que não deve acarretar culpa. Houve consenso quanto a castidade, a virgindade e o sexo dentro do matrimônio como meios eficazes de prevenção ao HIV. Também são consensos representacionais entre os jovens que a prática sexual é prazerosa, entretanto condenada pela igreja e que a AIDS é uma doença que pode ser prevenida As representações sociais revelaram dissensos entre homens e mulheres, enquanto eles consideram que o exercício da sexualidade deve ser restrito ao casamento, elas defendem a liberdade sexual, quanto a AIDS eles representam que a síndrome decorre do preconceito, elas consideram que a vulnerabilidade favorece o contágio. **Conclusão.** Nos consensos entre os jovens estudados, há preconceitos e estereótipos sexistas que influenciam as ações de prevenção do HIV/Aids. Portanto, os profissionais de saúde, sobretudo os de Enfermagem, devem propor que, nas atividades educativas sobre a adoção de práticas preventivas sobre sexo seguro, ações voltadas para essa faixa etária, considerando sempre as representações sociais em torno ao assunto.

Descritores: adultos jóvenes; religião e sexo; sexualidade; comportamento sexual; consenso; dissidências e disputas; síndrome de imunodeficiência adquirida.

Introduction

Throughout history, religious practices and their entire mystical, symbolic and magical dimension have become inherent to the human being by fomenting the formation of social representations. As various aspects of life are guided by religion, which influences both the origin of new ideas and categories of thought and reaffirms existing values, these same aspects tend to stimulate the development of religious practices in a circle of constant self-empowerment.[1]

In this sense, the Catholic Church has been a former of representations and meanings regarding everyday affairs, always with the intention of influencing the thoughts and ideas of social groups and individuals to preserve their practices and their characteristic values. Faced with the many facets that HIV prevention has in the discourses and practices that permeate the sexuality and daily life of society, there are several young people inserted and linked in the Christian Catholic religion, found in an ethical and bombarded crossroads by meanings disseminated by various spheres of society about what is right or wrong about the exercise of sexuality or sexual practice.[2] Therefore, this study becomes relevant for the understanding of how young Catholics live sexuality and what preventive behaviors for HIV prevention are adopted. Therefore, it can contribute to educational actions developed by health professionals, especially by nurses, in constructing a care system that guides discussions about sexual health care. Also, this work has its relevance because there are few studies conducted on Facebook aimed at the sexual health of religious youths.

The Theory of Social Representations was the theoretical support adopted, since it allowed the understanding of social and mental constructions, as well as of the socio-cognitively constructed meanings, making it adequate for this study. The network of meanings, which is shared between individuals, brings them closer to forming the membership groups.[3] In this aspect, this article discusses the contents that emerge from the cognitive field that originate the social representations of Catholic youths belonging to the Renewal The Catholic Charismatic Church, which maintains discourses consistent with Roman Catholic precepts, renewing the practice of rites and the mystique of the church.[4] From this, to analyze the consensus and dissent of young Catholics about HIV/AIDS prevention from their representations about sexuality was the goal set for the development of this study.

Methods

It is a quantitative-qualitative research, so it is a study with mixed methods and techniques, which uses the strengths of qualitative and quantitative research, helping to break with the positivist and interpretative paradigms, based on the Theory of Social Representations. Data were produced between

February and March 2015 on the Internet, with 84 young Catholics aged between 18 and 24, of both genders, who participated in World Youth Day, members of the group in the social network called Facebook, which was constituted as a research scenario. In the selection of the participants, information was also considered to regularly attend a parish and to join one of the groups linked to the Catholic Charismatic Renewal. There was no need to apply exclusion criteria.

For the production of the data, three techniques were used, appropriate to the research based on the Theory of Social Representations, applied at different moments. The characterization questionnaire and the Free Word Association technique were answered by 84 participants, who agreed to contribute to the survey after being invited from a collective invitation to the youth who were members of the World Youth Day page on Facebook and had participated in the event in 2013. The participant identification/characterization questionnaire was composed of the following variables: gender, age, city/state, education level, self-reported color, how often they went to church, participation in Catholic youth groups, sexual orientation, beginning of sexual intercourse, number of partners, condoms use during sexual activity. The stimuli used for the free association of words were: Exercise of sexuality; Exercise of sexuality and Catholic religion; AIDS; AIDS and Catholic religion. Finally, the questions used in the interviews and the sub-questions that made up the developments were: 1- From your experience and the exchange of information and knowledge within the Catholic group of which they belong, tell me about how it is seen and discussed the exercise of sexuality between you and how feel on this issue. 1.1- Still in relation to your experience in your group of belonging, tell me how you feel on the various sexual practices. 2- The Catholic Church advocates sexual abstinence before marriage as a way to avoid unwanted pregnancy and infection by sexually transmitted diseases or HIV. Tell me how you feel in relation to sexual abstinence. 2.1. Comment your opinion on a young man who professes the Catholic faith, having multiple partners - regardless of sexual orientation - as a free form of the exercise of sexuality 3. Still based on the Catholic Church's speeches and what is discussed in your group, tell me about your vision of safe sex. 3.1- Discuss your opinion about condoms and AIDS and how this topic is discussed in your group. 3.2- Tell us a little about your position on the Catholic Church's internal policy regarding sexuality and AIDS prevention.

After the invitation, the 84 young people who agreed to participate in the production of information, responded online and instantly to an in-depth interview script in the social network's tool available for dialogue and exchange of information between people, known as "inbox" or simply "chat boxes", which contained the three guiding questions (apart from the questionings that unfolded during the interview) about the influence of Catholic doctrine on the free exercise of sexuality and the adoption of safe sexual practice. It is reiterated that the interview was developed online and individually, since the questionings were made one after the other, after each answer given by the participant, until the interviewer was satisfied with the information provided. This technique had the participation of 19 Internet users. The data obtained through the Theory of Social Representations were coded and organized in the Factorial Map of Correspondence originated by software Tri-Deux Mots version 2.2 and analyzed according to Factorial Matching Analysis. In turn, the verbalizations emanating from the in-depth interviews were copied from the "chat boxes" in full and then organized and analyzed according to the semantic similarity of the content of the speeches with the evocations, when it was possible to cross the answers with consequent identification of consensus and dissent.

In the factorial analysis of correspondence, variations of words were visualized in relation to the spatial organization of the evocations (opinion variables) for the inductors described above. The analysis showed approximations and distances of the fixed variables (gender, race, origin and education level) and the opinion variables in the two factors that conformed the factorial map.

The research complied with all the steps recommended in Resolution 466/2012 of the National Health Council, approved by the Ethics and Research Committee of the Federal University of Bahia, protocol number 878.042/2014. The TCLE was sent online through the tools provided by the social network, and after reading, the participants confirmed their participation with the digital signature.

Results

The general characteristics of the 84 participants can be appreciated in Table 1. They were 51.2% man. About the age group, there was a certain balance between the number of participants, from 18 to 21 years old was 46.4% and from 22 to 24 years old was 53.6%. Most of them came from the state of Bahia (42.8%) followed by Minas (14.3%). Regarding their education level, the upper level prevailed (38.1%), with courses completed. Approximately half of the participants declared themselves as white (48.8%) and the other half black/brown (51.2%). Most reported being single (72.6%). As for sexual orientation, 21.4% of the young people declare themselves as homosexual and 9.5% as bisexual. Regarding the practice of safe sex with a condom, 38 (45.2%) did not use it (of them, 21 declare themselves virgins and 17 had unprotected sex). Of the total number of participants, 73.8% reported attending the church 2-3 times per week and 26.2% between 4 and 5 times.

Table 1. General characteristics of the 84 study participants

Characteristic	Frequency	%
Gender		
Male	43	51.2
Female	41	48.8
Age group (years old)		
18-21	39	46.4
22-24	45	53.6
Origin (States of the Federation of Brazil)		
Bahia	36	42.8
Minas Gerais	12	14.3
Rio de Janeiro	7	8.3
São Paulo	7	8.3
Ceará	4	4.8
Pernambuco	4	4.8
Rio Grande do Norte	3	3.6
Goiás	3	3.6
Paraíba	2	2.4
Paraná	2	2.4
Sergipe	1	1.2
Mato Grosso	1	1.2
Distrito Federal	1	1.2
Pará	1	1.2

Table 1. General characteristics of the 84 study participants. (Cont.)

Characteristic	Frequency	%
Education		
Complete Higher Education	32	38.1
Incomplete higher education	30	35.7
Complete high school	22	26.2
Self-declared color		
Black/brown	43	51.20
White	41	48.8
Marital status		
Singles	61	72.6
Married	23	28.4
Sexual orientation		
Heterosexuals	58	69.1
Homosexuals	18	21.4
Bisexuals	8	9.5
Safe Sex Practice with a condom		
They used	46	54.8
They do not used	38	45.2
Virgins	21	55.2
Active sex life	17	44.8
Frequency with which they went to church		
2-3 times per week	62	73.8
4-5 times per week	22	26.2

In the factorial analysis of correspondence, the total variance of the evocations was explained by the sum of the percentage values of the correlations emerged with the processing of the data by the software Tri-Deux Mots (Figure 1), a total of 63.5%, which demonstrates reliability of the statistical parameters (considering the qui^2 analysis possible by the factorial analysis of correspondence), consistency of the answers, enabling a significant analysis. For this study, the minimum frequency of 8 words was considered due to the plurality of the semantic field elaborated by the participants; 1 637 words were evoked for 4 stimuli, 313 of which were different.

The stimulus that offered the greatest contribution of words to the game of oppositions was stimulus 3 (AIDS), possibly due to its greater diffusion, propagation, and propaganda, in the media and social environments. Gender, age, and race were the fixed variables with the highest contribution. When correlating the variable gender with the variables of opinion, there was dissent in the formation of the representations. Thus, the opposition of men and women of black race in the age group of 22 to 24 years old, and of young white men from 18 to 21 years old was noticed.

It was also evidenced that the men in the formation of the representations did not express statistically significant evocations for the stimulus1 (e1) exercise of sexuality, possibly demonstrating the traumatic character of the stimulus for these youths. However, as they were stimulated by the increased expression of the Catholic religion, stimulus2 (e2), they verbalized the words repression, sin, respect,

and doctrine, revealing the psychological defense of the sexual control exercised by the church.

The talk of the participants ratifies these objections: (...) *I think and understand the purpose of the church and I think it is a conscious attitude, it only wants to protect the young, teaching that premarital sex can generate bad consequences such as unwanted pregnancy, diseases* [E.3; male]. The stimulus Aids (e3) was objectified in the words irresponsibility and prejudice, in turn, when stimulated by Catholic religion and AIDS (e4) they mentioned doctrine. They presented consensuses in the representations for these stimuli. The following statements relate to the elaborate evocations: *I agree with the Catholic Church, because it gives indications consistent with the Bible, and it is the truth. We must believe in it, for the things and illnesses that take place in the world are due to people who do not follow what the mother church teaches* [E.10; male]. *Safe sex for us is within marriage. In marriage, there is security. But if one partner has STDs they will have to use a condom because it is only allowed for couples, where one partner has contracted AIDS or other STDs* [E.18; male].

In dissonance of the men, the women evoked for the (e1) the exercise of the sexuality the words orientation and practices (sexual). For the stimulus 2, Catholic religion and exercise sexuality issued bias. Excerpts from the interviews of some participants reinforce these representations: *We talk about sexuality, but it is not profound, everything very superficial... and what we have to do is resist, I have been struggling to resist all this, sometimes I can (...) but like all sin, I try to resist even though it is difficult* [E.4; women]. *I have another view... since the church forbids certain positions on diversity in sexual practice... the Catholic did not adapt to the modern world where sex has become commonplace* [E.17; women].

When asked about the stimulus3 (e3) AIDS, they represented the terms vulnerability, fear, and prevention. When stimulated by the expression catholic religion and AIDS (e4) they once again referred to the prevention, this time, associating the Catholic principles (chastity, marriage) in the prevention of HIV infection. The contents obtained in the participants' answers complement the words objectified: *(...) The condom is an ally in the prevention of diseases and AIDS mainly because it is a serious disease (...) but for the sex after the marriage is not required. I prefer fidelity* [E.1; women].

Young people between 18 and 21, who declared to be black, objectified pleasure, freedom, love for the stimulation of sexuality; and the word forbidden to (e2), catholic religion and exercise of sexuality. *My position on sexuality is of total respect. People should choose their sexual practice (...) I understand the exercise of sexuality as freedom of choice to practice and with whom to practice* [E.14; young black woman; 22 years]. *Our dogmas teach us to live sex with the beloved (...) The church teaches to live chastity. Chastity is to live with the loved one, the church teaches it ... Chastity is you living the relationship with only the person you truly love* [E.19; young black woman; 24 years].

When stimulated by the word AIDS (e3) they verbalized disease, irresponsibility, homosexuality, prostitution, treatment, and sadness. However, they did not emit any evocation for the expression catholic religion and AIDS (e4), possibly because they blocked the association between the terms of their networks of cognition. The following statements reinforce the representations also expressed in the evocations: *AIDS is a very sad disease and causes a lot of suffering (...) the condom has a problem, that despite the many campaigns in favor of its use, the young people with whom I relationship outside and inside the church do not use it... there is the forgetfulness of talking about responsibilities, the person is responsible for acquiring a disease* [E.8; young black; 23 years]. On the other hand, white young people aged between 22 and 24 represented the expression sexuality (e1) as the word sex. When stimulus was added from the expression catholic religion (e2) virginity and family were evoked. Thus, the content of the interviews reinforces the heteronormative and Catholic discourse of sex for procreative purposes: *(...) the church directs that the person marry and then have sex, we were*

created under this interpretation. The woman who was not a virgin should be stoned because she was taxed as a sinner [E. 13; young white; 19 years old]. *There is a blockage, we are called to live chastity and we leave sexuality for after marriage* [E.18; young white woman; 21 years].

The (e3), Aids, was associated with the words Africa, promiscuity, condom. When they were induced with (e4), catholic religion and AIDS, they issued words with religious connotation: guilt, faith, and empathy. The following speeches reinforce these evocations: *I feel that the church has difficulty speaking clearly about these matters, even though it defends its values. I think people should protect and protect each other, in any way* [E.9; young white woman; 18 years old].

Discussion

The Correspondence Factor Analysis highlighted the significant oppositions for the fixed variables sex, age group, and race/color. As for the origin of the participants (capital/metropolitan or interior), there was no significant opposition between the social representations of young people, which reinforces the notion that the internet, especially social networks, when used, the formation of membership groups, promote a "cybernetic culture" and, consequently, acculturate the groups.[5,6] In these networked relationships, there is the formation of belonging groups that share ideas, beliefs, and religions, similar aspects of lives, favoring the production of social representations. In opposition to men, women include in their network of critical meanings as to how the Catholic Church treats sexuality, for it considers that free sexual practice is sinful, whose speeches are damning against those who exercise it. This reveals a consensus among them since most of them were inserted in higher education, having contact with the scientific knowledge, while their representations show dissent towards the men, who, for the most part, presented lower educational level than the women.

These new representations about sexuality, revealed by women differ from what is disseminated by the Catholic Church to those who practice it, and exposes a (re) thinking about sexuality that provides pleasure, does not cause guilt, at the same time, make them deviate from chastity, highlighting dissent in the representations of the group studied. Control exercised over bodies, called biopower, aims to repress sexuality through reified discourses permeated by prohibitions, denials, and social interventions, especially female sexuality. Biopower is adopted by moral norms of the Catholic religion, whose dogmas are strengthened in the name of God in order to make sex a consequence-laden sin.[2,7]

The ideas opposed here to Catholic doctrines gain strength when it is proposed that young people can be good Catholics, but disagree with the hierarchical and imposing position of the Church. Even if they have the need and the desire to follow the norms of the church, all feel that freedom is necessary to distinguish what is essential to their faith.[2] Both chastity and virginity, as well as practiced sex only matrimonially, constitute consensuses in the representational content, mainly in the social representations apprehended with Catholic men of the study group, since they think they are the most effective means to prevent HIV, even if there is the availability of the condom. Also, they associated the conduct of each individual as the main cause of HIV infection, reinforcing the hegemonic representations about the forms of prevention and the cause for contamination with the virus (risk behaviors).

A study carried out with adolescents on the conceptions of homosexuality in their social context, they presented representations that are in line with those apprehended in the group of young Catholics, since the male homosexual practices are represented as a practice discriminated by the society, often associated with HIV infection.[8] This representational content about AIDS, expressed by both young Catholics and adolescents in the study cited has elements that subsidize the process of stigmatization of people who experience sexual and individual freedom, as a reflection of a macho, patriarchal society, embodied by a state that should be secular.[9]

The representation of fear may be associated with the idea of rejection, especially in social environments, the probability of suffering insults and discriminatory attitudes. In some studies the representation of fear was associated with misconceptions derived from the unconscious about AIDS, based on sexuality and death[10] or by the impotence of many women in having difficulties negotiating with their partners to use condoms, hindering to protect against HIV infection.[10,11] The representation of AIDS as a syndrome that is amenable to treatment is another consensus in the young Catholics of this study and has already been highlighted in other studies with several investigated groups such as adolescents, women, and people in the process of aging.[11,12] Treatment is important for longevity with quality of life.

The words homosexuality and prostitution were high frequencies, revealing themselves in consensuses in the representational content of this study. This is corroborated in another study that analyzed the structuring elements of social representations about AIDS when the terms homosexuals and prostitutes had a discriminatory connotation to groups considered to be at risk.[13] These representations that remain in the imaginary refer to this consensus on a stigma diffused and naturalized with the history of the beginning of the epidemic, which continues to permeate among young Catholics, possibly by traditional Catholic doctrine in the country. Another hegemonic representation of AIDS present with statistical significance in the words evoked by the young participants of this study was the association with Africa, possibly due to the relation to a knowledge spread in the 80's, still early in the epidemic, when it was propagated that the virus that caused AIDS was derived from the monkey and it was transmitted by the sexual practice of the human being with these primates in the African continent.

The idea that AIDS originated in Africa reveals the idea that this STI is "a disease of the other", which comes from poverty, i.e. only vulnerable and/or sexually free people are the most likely to be infected. This idea refers to the fact that AIDS is associated with sexual behaviors considered as deviant, such as bestiality, by groups from the poorest continent of the world, where social inequalities are more pronounced.[14] This notion is part of the prejudice of Western society to society who considers her uncivilized for adopting unusual sexual practices, which is seen as deviant by the Catholic Church. This finding demonstrates another disagreement, since only part of the group associated HIV/AIDS as an infection related to socially marginalized people. In other words, everything that is in the logic of social and religious normality is considered abnormal, which reveals the social stigma about people who make up the population groups of sexual minorities.[15]

Therefore, it is not possible to understand social representations about sexuality and HIV/AIDS prevention in isolation, because it demands an understanding of how mental processes are socially constructed, in this sense, about social behaviors, such as sexual practices and roles played by men and women in society.[16] It is thought that the consensus and dissent present in the representations of the young Catholics leads to the perception that there is as much influence of the Catholic religion as of the scientific knowledge about the representations of the faithful about sexuality, when some presented concepts of guilt and sin at times that did not follow the doctrines for sexual practices. However, others especially those who have access to higher education (mostly women) did not reveal guilt in their practices, even pointing to condoms as an important means of safe sex.

The conclusion of this study is that the representational consensus among young people is that sexual practice is pleasurable, yet it is condemned by the Catholic Church. As for AIDS, it is a consensus in their social representation that it is a preventable disease. In turn, dissent is evidenced when men represented the sexual practice outside what is proposed by the doctrine of the church as sinful (in this case outside marriage), showing respect for religion and women represented prejudice, while the church and members of it stigmatize those who choose freedom in the exercise of sexuality. As far as Aids is concerned, the dissent was perceptible when they objected to prejudice and irresponsibility,

anchoring these representations in the stigma and social prejudice that many people have built about the disease; women, in turn, aimed at prevention and vulnerability, demonstrating in the social representation they have about AIDS a progressive vision in line with current scientific knowledge.

Also, in the consensus among men, there are sexist prejudices and stereotypes defended by Christian churches, such as Catholic, revealing influences on HIV prevention actions. Gender inequalities have been reinforced, with the propagation and reassertion of social constructions of sexuality and HIV among young people. Therefore, the contribution of this study lies in the fact that health professionals such as Nursing can propose educational activities on safe sex, based on social representations, which makes this study relevant, since knowledge of sexual rights is fundamental for the adoption of preventive practices. The study has its limitation in the low adherence of young people to data collection since the universe of social networks has numerous possibilities for recruiting participants.

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Digital Photography: a Tool for Nursing on the Assessment of Pressure Lesions

Original article

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Digital Photography: a Tool for Nursing on the Assessment of Pressure Lesions

Objective. This work sought to assess the inter-observer agreement among expert nurses by using digital photographs and between these experts and the nursing registries in the electronic clinical record in the identification and degree of PL. **Methods.** This was an observational study, including 225 photographic records (184 patients, 97 with pressure lesion and 128 registries without lesion) randomly selected from the total of photographs registered in the PENFUP clinical trial (without lesion). Three expert evaluators assessed said photographs in masked manner. The notes from nursing of patients included related with the description of PL were evaluated. The Kappa index was calculated along with the composite agreement ratio for each evaluation. **Results.** Good agreement was observed among expert evaluators of photographic records on the presence of PL and between good-moderate for the degree of PL (I-II). Likewise, upon evaluating the agreement between the nursing registries of PL and the photographic assessment

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Conflicts of interest: None.

Funding: Administrative Department on Science, Technology and Innovation - COLCIENCIAS (Grant no. 277865740699 of 2014).

Received: October 11th 2017.

Approved: May 31st 2018.

How to cite this article: Cortés OL, Alvarado PA, Rojas YA, Salazar LD, Acuña X. Digital Photography: a Tool for Nursing on the Assessment of Pressure Lesions. Invest. Educ. Enferm. 2018; 36(2):e07.

DOI: 10.17533/udea.iee.v36n2e07

of the three expert evaluators of the same areas, good agreement was observed to determine the presence of PL and moderate agreement for the degrees of PL. **Conclusion.** Photographic records are a tool that permits recognizing the types of wounds, as well as the visualization of the different layers of skin injured. The study highlights the importance of assessment and validation by experts, given that it permits identifying existing problems that can lead to the underestimation or overestimation of PL when conducted by a single caregiver.

Descriptors: pressure ulcer; nursing assessment; reproducibility of results; nursing records; observer variation; electronic health records; photography.

Fotografía digital: Una herramienta para Enfermería en la evaluación de las Lesiones Por Presión (LPP)

Objetivo. Evaluar la concordancia interobservador en la identificación y grado de las Lesiones Por Presión –LPP- entre: i) enfermeros expertos utilizando fotografías digitales y, ii) entre estos expertos y los registros de enfermería en la historia clínica electrónica. **Métodos.** Estudio observacional, que incluyó 225 registros fotográficos (184 pacientes, 97 con lesión por presión y 128 registros sin lesión) seleccionados al azar del total de fotografías registradas en el ensayo clínico PENFUP. Tres evaluadores expertos valoraron las mismas fotografías de forma encubierta. Se evaluaron las notas de enfermería de los pacientes incluidos relacionadas con la descripción de LPP. Se calculó el índice Kappa y la proporción de acuerdo con el compuesto para cada evaluación. **Resultados.** Se observó una concordancia buena entre los evaluadores expertos de registros fotográficos sobre la presencia de LPP y entre buena y moderada para el grado de LPP (I-II). Así mismo, al evaluar la concordancia entre los registros de enfermería de LPP y la valoración fotográfica de los tres evaluadores expertos de las mismas áreas, se observó una concordancia buena para determinar la presencia de LPP moderada para la concordancia de los grados de LPP. **Conclusión.** Los registros fotográficos son una herramienta que permite el reconocimiento de los tipos de heridas al igual que la visualización de las diferentes capas de piel lesionadas. Se resalta la importancia de la evaluación y validación por expertos ya que nos permite identificar problemas existentes que

pueden llevar a la subvaloración o sobrevaloración de las LPP cuando los realiza un solo cuidador.

Descriptores: úlcera por presión; evaluación en enfermería; reproducibilidad de los resultados; registros de enfermería; variaciones dependientes del observador; registros electrónicos de salud; fotografía.

Fotografia digital: Uma ferramenta para Enfermagem na avaliação das lesões por pressão

Objetivo. Avaliar a concordância inter-observador na identificação e grau das Lesões Por Pressão –LPP- entre: i) enfermeiros especialistas utilizando fotografias digitais e, ii) entre estes especialistas e os registros de enfermagem na história clínica eletrônica. **Métodos.** Estudo observacional, que incluiu 225 registros fotográficos (184 pacientes, 97 com lesão por pressão e 128 registros sem lesão) selecionados por azar do total de fotografias registradas no ensaio clínico PENFUP. Três avaliadores especialistas avaliaram as mesmas fotografias de forma encoberta. Se avaliaram as notas de enfermagem dos pacientes incluídos relacionadas com a descrição da LPP. Se calculou o índice Kappa e a proporção de acordo composto para cada avaliação. **Resultados.** Se observou uma boa concordância entre os avaliadores especialistas de registros fotográficos sobre a presença de LPP e entre boa e moderada para o grau de LPP (I-II). Assim mesmo, ao avaliar a concordância entre os registros de enfermagem de LPP e a valorização fotográfica dos três avaliadores especialistas das mesmas áreas, se observou uma boa concordância para determinar a presença de LPP e moderada para a concordância dos graus de LPP. **Conclusão.** Os registros fotográficos são uma ferramenta que permite o reconhecimento dos tipos de feridas ao igual que a visualização das diferentes capas de pele lesionadas. Se recalca a importância da avaliação e validação por especialistas já que nos permite identificar problemas existentes que podem levar à subvalorização ou sobrevalorização das LPP quando os realiza um único cuidador.

Descritores: lesão por pressão; avaliação em enfermagem; reprodutibilidade dos testes; registros de enfermagem; variações dependentes do observador; registros eletrônicos de saúde; fotografia.

Introduction

Pressure lesions (PL) are adverse events that emerge as consequence of a condition or chronic or acute state of health and can be related with the daily care of patients at risk.[1] The definition of PL has been standardized by the National Pressure Ulcer Advisory Panel (NPUAP) and the National Group for the Study and Advisory on Pressure Ulcers and Chronic Wounds (GNEAUPP, for the term in Spanish)[2] as a "localized damage on the skin and/or underlying soft tissue generally over an osseous prominence or related with a medical device or another, which can be painful", bearing in mind the factors associated to the appearance of PL.[2] These predisposing factors include age,[3] nutritional status, urinary or fecal incontinence, alteration in tissue perfusion (*e.g.*, in patients with cardiovascular problems, or hemodynamic alteration)[4] and certain comorbidities (*e.g.*, anemia, immobility due to neurological alteration).[4] Additionally, increased pressure, friction and shearing, especially on osseous prominences, are determinants of the appearance of lesions.[5,6]

The incidence and prevalence rates of PL in patients hospitalized and which have been described in the literature have broad ranges of variation.[6-8] An example of this are the data reported from a survey applied to hospitals to explore the incidence and prevalence rate of PL in the United States in 2006 - 2007. The results showed 4.5% incidence (n=2313/51842), and 16.7% prevalence (n=502/2999) during the hospital stay.[6] Similarly, a wide range of variation exists between the data of incidence and prevalence among themselves. For example, the literature has reported variable rates of incidence of 7%[7] and 71%;[8] and, likewise, prevalence rates described varying between 8.8%[9] and 53.2%.[10] In Colombia, prevalence was evidenced at 2.21%, obtained from a national survey of hospitals in Bogotá, Yopal, and Valledupar conducted in 2013,[11] reported by caregivers in the hospitals, without evaluating the validity of the information. Although the incidence and prevalence rates may vary depending on several factors, among these the hospital, care practices, and the health condition, thus, the existence of an adequate evaluation of the events and an adequate process of their validation is also important.

One of the factors that can explain the variation in the report of events (incidence and prevalence) in research studies may be due to the limitations in the blind validation of the lesions and of their degree of complexity.[12] Given that reporting these lesions is a quality indicator in health services throughout the world, the assessment of PL must follow a methodology that certifies their presence or absence (given that they may be one or another type of lesion) and defines the degree of complexity of the lesion.[13] The identification of the incidence rate and prevalence of PL permits establishing the level of risk in each hospital, while promoting the development of improvement plans in hospitals requiring them. These improvement plans include developing preventive care programs, which can lead to the reduction of the events and of the complications associated with the appearance of PL.[14]

Some clinical practice guides and global consensus of skincare have established a system to assess and qualify PL, but deficiencies have not been overcome in the knowledge about the appropriate methods to validate said events.[14,15] Although the practice of assessing PL is carried out by the nurses who provide direct care, the validation of the existence of the ulcer (confirmation of the lesion) and validation of the classification of its degree must be conducted by a quality team.[14] Precision on the definition of a PL is a component of optimal nursing care. It is possible that some lesions are classified erroneously as PL, producing an overestimation of the incidence; or on the contrary that they are not recognized as such, reducing artificially the incidence, losing the opportunity of healing according to a plan of adequate care.[14] Limitations in care and in research related with the appearance of PL are related with the lack of a process that validates the events (PL yes; PL No) and the degree of the lesion, bearing in mind the existence of a guide that defines the degrees of the lesions.[14]

Using the photographic record to evaluate the evidence of events in health has been used in identifying PL,[12,16] but its implementation and standardized use accompanied by a methodological plan to validate the reproducibility of the events has presented methodological limitations.[12,16] The aim of this study was to evaluate inter-observer agreement among experts in identifying PL and the degree of lesions in adult patients hospitalized with risk of PL, using photographic records. Likewise, agreement was assessed between expert evaluators and the record and degree of PL described in the nursing registry in the electronic clinical record.

Methods

Study design. An observational study of agreement was conducted on a sample of photographic records of patients included in the study "Prevention in Nursing of Pressure Ulcers" (PENFUP, for the term in Spanish) (clinicaltrials.gov/ NCT02565745).

Study population. The study universe comprised 6474 photographic records of 600 patients included in the PENFUP project between October 2016 and June 2017. "Prevention in Nursing of Pressure Ulcers" is a randomized, controlled, blind, simple clinical trial on patients ≥18 years, with high or very high risk according to the BRADEN scale, whose objective was to evaluate the impact of applying skin protectors (Intervention) compared with the application of moisturizing cream (Control) upon the appearance of pressure ulcers in patients hospitalized due to medical/surgical reasons with healthy skin. Evaluation of the events of the PENFUP study was carried out through photographic records on admission (healthy areas of risk) and upon discharge from the study (with or without lesion). The patients were included according to the anatomic position at which they had more exposure during hospitalization (SIMS, PRONE, SUPINE). The photographs were taken of the areas at risk according to each position (SIMS 6 areas, PRONE 10 areas, SUPINE 11 areas).

Sample. The sample was made up of 225 photographic records, corresponding to 184 patients from the PENFUP study, selected through a simple random sampling. Pressure lesions were identified in 97 photographic records and in the 128 remaining there were no findings.

Procedure

Position and areas at risk. All the patients in PENFUP study, independent of the group to which they were assigned (Intervention/Control), had photographs taken of the zones of higher risk of lesion according to the position and the side in which the patient would spend the greatest time during hospitalization. In patients in supine position, photographs were taken of 11 areas (scapulae, elbows, sacrum, malleolus, heels, trochanters); in patients assigned to prone position, photographs were taken of 10 areas (forehead, chin, cheekbones, ribcages, iliac crests, knees), and in patients assigned to Sims position (left lateral or right lateral), photographs were taken of 6 areas (Pinna, ribcage, trochanter, elbow, knee, and malleolus). The photographic records to be evaluated by the adjudicators of events (two

evaluators who were experts on management and treatment of PL and the most expert taken as a "gold standard") were sent in packages of 50 equal pairs of photographic records to each evaluator separately. These evaluators were blind to the patient's intervention (Hydrocolloid dressings/Moisturizing cream) and the evaluators did not know each other. To give their verdict, they were sent the photograph from the start of the study (healthy skin) and the photograph to be evaluated (state of the skin on discharge from the study).

Taking of photographs. Training was offered on the specialized technique of photographs to the staff of professional nurses in charge of taking the photographic records. Special care was taken to cover the genitalia, breasts, areas with tattoos, and faces of the participants, according to that agreed in the informed consent, as well as institutional logos, and the procedures were standardized through the elaboration of a manual on taking of photographs to reduce the variability and bias in each image registered. The same photographic camera model was used in both centers, NIKON COOLPIX L330 with 20.2 megapixels with means of storage and SD, SDHC or SDXC memory card. The distance to take the photograph could not be greater than 45 cm, and perpendicular to the area of interest to register, according to the positioning of the patients. If it was decubitus, the patient was rotated to the left or right turning the back to the camera to take the record. If the patient was to spend most of the time possible in prone position, the patient was left in decubitus supine position to take the photographic records of the zones of interest. The lighting depended on each service; in patients hospitalized in ICU, each unit had LED lighting and no flash or any other type of light was used when taking the photograph. To adapt the lighting of patients hospitalized in ward, the curtains were drawn to avoid day light and bright lights to avoid altering the brightness or contrast of the image, preferably using light tone background (sheets from the ICU and the hospitalization wards), grays or blacks and using the camera in automatic or manual setting and without effects. The moment of taking the photographic record was done after the patient's bath with the skin clean and dry, and several shots were taken to select the image with the best quality, corresponding to each body site.

All the photographs were stored in a common file of the PENFUP study through DROPBOX™ with a blind code. Additionally, the images were included in a registry reading base to then be attached to an evaluation format that was sent (via Gmail or in USB memory) to the evaluators with the photographs before the intervention and the photographs to be evaluated after removing the intervention (upon discharge from the study). The evaluation format only had the information from the blind code. Lastly, from the PENFUP study, broadened information was obtained of each patient related with the general variables, bearing in mind demographic aspects, health antecedents, admission diagnosis, and in-hospital care and complications.

Selection of the expert evaluators. Three evaluators were selected to classify the photographs. Two of them through an initial adjudication assessment using historical photographic records of PL and a third evaluator was included through merit and expertise to improve the quality of the evaluation and solve disagreements. For the initial standardization of two evaluators, 50 pairs of photos were selected (50 healthy and 50 with pressure ulcer) by an expert and 50 photographs were randomly distributed (with and without PL) to each of the evaluators on two moments to revise them in masked manner. The Kappa index of inter-observer reproducibility between the two evaluators was 0.82 (EE 0.07, $CI_{95\%}$: 0.70 - 0.96) for the first pair of 50 photos and 0.76 (EE 0.07, $CI_{95\%}$: 0.62 - 0.89) for the second pair of 50 photos. With these results (good and very good Kappa) these two evaluators were accepted. The three evaluators did not know each other, and conducted the evaluation independently.

Follow up of patients and identification of lesion. During the development of the PENFUP study, follow up was conducted of all the patients after

the initial session of photographs, directly on the seventh day and then every day during their hospital stay through the clinical record. Once a registry of a lesion appeared, verbally or in the clinical record, a photograph was taken of the zona of lesion. The clinical records were revised by a nurse in each investigation center. The REHCE revised on the presence and degree of PL, the date of detection of the event, area, and degree of the lesion.

Criteria to evaluate the photographs. The evaluators knew the categories for the classification of the ulcers according to the EPUAP and NPUAP[1] to standardize the evaluation of the PL. The totality of the photographs (with and without PL) was sent to each evaluator in blind manner in a different sequence, in groups of 50 and only a package of 25 at the end, for their reading. Each evaluator had two weeks to conduct the reading and had to fill out a format for each photographic record in which the evaluator defined the presence of PL (Yes, No); and classified the degree of the lesion according to the depth of the lesion in category (I: presence of erythema that does not pale on intact skin, this lesion indicates that a patient is at risk; II: partial loss of the skin that affects the epidermis, dermis or both; it was classified as a superficial ulcer with an aspect of abrasion, blister, or superficial crater; III: there is total or complete loss of the skin thickness that implies lesion or necrosis of the subcutaneous tissue, which can extend down but not through the underlying fascia; IV: total loss of thickness of the subcutaneous tissue with extensive destruction, necrosis of the tissue, or lesion in muscle, bone, or support structure). We included a zero (0) category to denominate the absence of PL.[1]

Study variables. i) Result variables. Proportion and degree of Kappa agreement among the three evaluators on the presence and category of the PL. The proportion and degree of Kappa agreement was also evaluated between the REHCE and the presence or absence of PL and category assigned according to the evaluators, and ***ii) Descriptive variables of the patients.*** Demographic variables were included (age, gender, schooling, occupation), health antecedents (comorbidities), and variables relating the diagnosis on admission. Additionally, complications and days of hospital stay were included.

Data analysis. The characteristics of the population included upon hospital discharge, including demographic variables and comorbidities. Qualitative variables were analyzed in proportions and quantitative variables were analyzed in summary measures, like the arithmetic mean, according to its nature and level of measurement. The qualitative agreement of the presence of PL (dichotomous variable) was evaluated in the photographs analyzed by using the Kappa index, through the fit of the random effect in the proportion of the agreement observed and interpreted, thus: poor or weak ≤0.40, moderate: 0.41-0.60, good: 0.61-0.80, and very good: 0.81-1.[17] The inter-evaluator agreement was compared with the expert evaluator (E3 denominated gold standard) to conform the composite agreement for each of the evaluations.[18]

Ethical considerations. This study was approved by the institutional ethics committee in the centers of the PENFUP study based on resolution 8430 of 1993 by the Ministry of Health. All the participants or their relatives accepted the taking of photographs of the zones at risk on admission and discharge from the study, with prior signed informed consent.

Results

This study included 184 patients, mostly men with a mean age of 61±18.2 years (minimum age = 20 and maximum age = 92); 46.7% of the patients included worked independently and 72.8% with some level of basic schooling. Among the comorbidities observed, those with the highest frequency were neurological and endocrine. The most frequent cause of admission to the hospital center was neurological alteration (14.7%) and the most common hospital collection service was that of medical hospitalization (77.2%). The individuals had on average 2.3 medical devices, like nasal cannula, vesical catheter, nasogastric

catheter, mechanical ventilation, indicating a critical state of health that required support of vital functions. The median of days of hospitalization was 13.5 days (Q1=7, Q3=25, minimum=2 and maximum=154), and 52.2% had very high risk, according to the BRADEN scale. Complications during hospitalization in highest proportion were sepsis (42.9%), bleeding (23.9%) pneumonia (21.7%) and death (14.7%). Of the 97 PL included in the study, the experts identified 32 in the sacrum, 16 in scapulae, 15 in heels, 14 in trochanters, and 20 in other places (Table 1).

Table 1. General characteristics of 184 patients with high or very high risk of developing PL

Variables	*n* (%)
Sociodemographic variables	
Age group	
20-44	36 (19.6)
45-68	75 (40.8)
69-92	73 (39.7)
Gender	
Masculine	103 (56.0)
Feminine	81 (44.0)
Schooling	
Basic	134 (72.8)
Technological	21 (11.4)
Professional	29 (15.8)
Occupation	
Independent	86 (46.7)
Employed	51 (27.7)
Other	47 (25.6)
Clinical variables	
Comorbidities*	
Cardiorespiratory	62 (33.7)
Neurological	52 (28.3)
Endocrine	52 (28.3)
Renal	32 (17.4)
Gastrointestinal	19 (10.3)
Anterior pressure ulcer	9 (4.9)
Type of diagnosis	
Neurological	27 (14.7)
Cardiovascular	25 (13.6)
Endocrine	23 (12.5)
Respiratory	22 (12.0)
Infectious	20 (10.9)
Cancer	19 (10.3)
Musculoskeletal	5 (2.7)
Other	43 (23.4)

Table 1. General characteristics of 184 patients with high or veryhigh risk of developing PL. (Cont.)

Variables	*n* (%)
Clinical variables	
Collection service	
Medical	142 (77.2)
Surgical	42 (28.8)
Braden Score	
Very high risk: <9	96 (52.2)
High risk: 10-12	88 (47.8)
Medication consumption	
Relaxants	76 (41.3)
Hypnotic	62 (33.7)
Vasopressors	60 (32.6)
Presence of Devices	
Vesical	140 (76.1)
Nasal	131 (71.2)
Mechanical ventilation	88 (47.8)
Nasogastric	79 (42.9)
Hospitalization in ICU†	81 (44.0)
Complications	
Infectious	
Sepsis	79 (42.9)
Pneumonia	40 (21.7)
Cardiovascular	
Cardiogenic shock	17 (9.2)
Cerebrovascular accident	16 (8.7)
Acute myocardial infarction	16 (8.7)
Deep venous thrombosis	18 (9.8)
Heart failure	22 (12.0)
Bleeding	44 (23.9)
Cardiogenic shock	17 (9.2)
Other	
Delirium	26 (14.1)
Death	27 (14.7)
Anatomic position of the patient	
Supine	174 (94.6)
Prone	8 (4.3)
Sims	2 (1.1)

(*) A patient may have more than one comorbidity; (†) Intensive Care Unit

No PL degree III or degree IV were identified in the assessment by the experts, or in the registries of the clinical records. Table 2 displays that the evaluation of the agreement of the presence or not of PL was statistically significant in the photographic records among the three evaluators, presenting "good"

agreement between evaluators 1 and 2, between evaluators 2 and 3 and moderate agreement between evaluators 1 and 3. Assessment of the agreement among the three evaluators for the degrees of PL include three categories (without PL 0, PL degree I, PL degree II). Good agreement was observed between evaluators 1 and 2 and moderate agreement between evaluators 1 and 3 and between evaluators 2 and 3.

Table 2 details the evaluation of agreement of the presence or not of PL among that observed among the three evaluators of photographic records and the REHCE by nursing presented the following findings, all significant: good agreement between REHCE and evaluator 1 and good agreement between REHCE and evaluator 3; and moderate agreement between REHCE and evaluator 2. Assessment of the agreement of the degree of PL between REHCE and the evaluators identified good agreement between REHCE and evaluator 1, moderate between REHCE and evaluator 2 and between REHCE and evaluator 3.

Table 2. Agreement among experts and between nursing notes and expertson the presence and degree of PL

Comparison	Kappa index			Composite agreement ratio		*p*
	k	Standard Error	$CI_{95\%}$ Inf-Sup	%	$CI_{95\%}$ Inf-Sup	
Among evaluators						
Presence of PL						
E1 vs. E2	0.74	0.065	0.65-0.83	0.86	0.81-0.90	<0.001
E1 vs. E3	0.46	0.066	0.34-0.58	0.83	0.77-0.88	<0.001
E2 vs. E3	0.64	0.064	0.54-0.74	0.76	0.70-0.82	<0.001
Degree of PL (I vs II)						
E1 vs. E2	0.68	0.044	0.59-0.77	0.81	0.75-0.86	<0.001
E1 vs. E3	0.41	0.057	0.29-0.52	0.71	0.64-0.76	<0.001
E2 vs. E3	0.52	0.047	0.42-0.61	0.74	0.67-0.79	<0.001
Between nursing notes and evaluators						
Presence of PL						
Notes vs. E1	0.73	0.048	0.65-0.81	0.88	0.83-0.92	<0.001
Notes vs. E2	0.70	0.048	0.60-0.80	0.79	0.73-0.84	<0.001
Notes vs. E3	0.50	0.064	0.37-0.62	0.86	0.80-0.90	<0.001
Degree of PL (I vs II)						
Notes vs. E1	0.62	0.042	0.53-0.70	0.77	0.71-0.82	<0.001
Notes vs. E2	0.57	0.043	0.49-0.66	0.74	0.68-0.82	<0.001
Notes vs. E3	0.47	0.059	0.35-0.58	0.75	0.69-0.80	<0.001

This study showed moderate agreement between evaluators E1 and E3 and good agreement among the expert evaluators of photographic records for the existence of a PL and moderate agreement for E1 and E2 versus the expert, while the agreement among those not so expert (E1 and E2) is good in the degree of the lesion. Similarly, good agreement was observed to determine the presence of lesion and moderate for its degrees among the nursing registries and the three expert evaluators (Table 3).

Table 3. Level of agreement among evaluators on the presence of PL and degree

Among evaluators	Level of Agreement
Presence of PL	
E1 vs. E2	Good
E1 vs. E3	Moderate
E2 vs. E3	Good
Degree of PL (I vs II)	
E1 vs. E2	Good
E1 vs. E3	Moderate
E2 vs. E3	Moderate
Entre nursing notes and evaluators	
Presence of PL	
Notes vs. E1	Good
Notes vs. E2	Good
Notes vs. E3	Moderate
Degree of PL (I vs II)	
Notes vs. E1	Good
Notes vs. E2	Moderate
Notes vs. E3	Moderate

Discussion

This study recalls the importance of using photographic records of the skin in patients admitted to hospitalization services with healthy skin but with high risk for developing PL, as key element in the validation of the lesions.[12] This type of evaluation through photographic records permits blind adjudication of events, quite important in investigation. These photographic records can be used by institutional quality groups and provide greater precision to the adjudication of the events of obligatory report to the Ministry of Health and Social Protection, like the case of pressure lesions. Photographic records, when evaluated by several experts, can reduce variation in the definition of PL, as well as their degree[17,18] and permit the comparison and adjudication of final events, especially in research projects. The existence of an adequate and permanent training plan of the professional direct caregivers, as conducted in these centers that participated in the PENFUP study, shows minor variation among the registries by the nursing staff and the external evaluators.

Given that greater difference exists in the agreement on the types of PL, more emphasis should be made on training in identification or discrimination of the degree of PL in care groups.[20] The precise definition of the degree of the ulcers is directly related with the type of treatment required to prevent progress of the lesion (degree I) or its healing. A periodic evaluation by experts using photographic records could improve quality of care and the precise use of resources in hospitals or outpatient care groups. This type of record can be used for remote expert assessment; this becomes a resource to help caregivers in remote regions of the country with greater needs in the orientation of caring for PL.[19,20]

In conclusion, identification, definition, and classification of PL is a task that is still not performed systematically in our hospitals and we still

have much to learn. Certainty in the definition of whether a skin lesion is a PL or not, and what is the degree of complexity are the base to enhance preventive care plans and structure adequate treatment for each type of lesion. Adequate classification of lesions in each hospital permits valid reporting to quality regulation entities from the Ministry of Health and Social Protection and, thus, better assessment of the quality of health care in our hospitals.

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Factors Contributing to Active Aging in Older Adults, from the Framework of Roy's Adaptation Model

Original article

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Factors Contributing to Active Aging in Older Adults, from the Framework of Roy's Adaptation Model

Objective. To determine the variables contributing to the explanation of active aging according to Roy's adaptation model. **Methods.** Descriptive correlational study, with convenience and snowball sampling. Two hundred older adults with chronic disease, were included. The instruments used were: a) Yesavage's Geriatric depression scale, b) Pheiffer's mental state questionnaire, c) basic activities of daily living, d) instrumental activities of daily living, e) Hope scale, f) coping mechanism items from the Successful Aging Inventory (coping with aging), g) hours of volunteer work, and h) The Duke-UNC Functional Social Support Questionnaire. Coping with aging was composed of independence in basic and instrumental activities of daily living, free from symptoms of depression, good mental state, and perception of health as good. Data were analyzed by using descriptive and inferential statistics, and simple and multiple linear regression models. **Results.** Fifty one percent of the participants showed active aging (42%

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Conflicts of interest: None.

Received: December 11th, 2017.

Accepted: May 31st, 2018.

How to cite this article: Salazar-Barajas ME, Lillo CM, Hernandez CPL, Villarreal RMA,Gallegos CE, Gómez MM, Salazar – Gonzalez BC. Factors Contributing to Active Aging in Older Adults, from the Framework of Roy's Adaptation Model. Invest. Educ. Enferm. 2018; 36(2):e08.

DOI: 10.17533/udea.iee.v36n2e08

men, and 56% women). Of the proposed variables, the variables showing effect on the variables of active aging, in the generalized linear model, were years of suffering the disease (Λ=0.922; p=0.008), coping with aging (Λ=0.582; p=0.001), and perceived social support (Λ=0.885; p=0.001). These three variables explained 5% of basic activities of daily living, 41% of the instrumental activities, 12.5% of health perception, 26% of mental state, and 21% of depression. Hope, and volunteer work were not significant. When the variables of active aging were dichotomized, age showed negative effect on global active aging and coping with aging positive effect. **Conclusion.** Although, proposed variables explained individually active aging, only coping with aging explained global active aging.

Descriptors: healthy aging; psychologic adaptation; depression; activities of daily living; social support; chronic disease; nursing theory.

Factores que contribuyen al Envejecimiento Activo en los adultos mayores, desde el marco del Modelo de Adaptación de Roy

Objetivo. Determinar las variables que contribuyen a la explicación del envejecimiento activo de acuerdo con el modelo de adaptacion de Roy. **Métodos.** Estudio descriptivo correlacional; se hizo muestreo por conveniencia y bola de nieve. Se incluyeron 200 adultos mayores. Se utilizaron los instrumentos: a) escala geriátrica de depresión de Yesavage, b) cuestionario de estado mental de Pfeiffer, c) Actividades básicas de la vida diaria, d) Actividades instrumentales de la vida diaria, e) escala de esperanza, f) reactivos de mecanismos de afrontamiento del inventario de Envejecimiento exitoso (afrontamiento al envejecimiento), y g) el cuestionario de apoyo social Duke-UNC-11. El envejecimiento activo se conformó por independencia en las actividades básicas e instrumentales de la vida diaria, libre de síntomas de depresión, buen estado mental y percepción de salud buena. Los datos se analizaron a partir de estadística descriptiva e inferencial, y modelos de regresión lineal y múltiple. **Resultados.** El 51% de los participantes mostró envejecimiento activo (42% en hombres y 56% en mujeres). De las variables propuestas, el modelo lineal generalizado mostró que los años de padecer la enfermedad, (Λ=0.922; p=0.008), el afrontamiento al envejecimiento (Λ=0.582; p=0.001), y el apoyo social percibido (Λ=0.885; p=0.001), presentaron efecto sobre las variables que conformaron el envejecimiento activo. Estas tres variables explicaron el 5% de las actividades de la vida diaria, 41% de las instrumentales, 12.5% de la percepción de salud, 26% del estado mental y el 21% de la depresión. La esperanza y trabajo voluntario no fueron significativas. Al dicotomizar las variables del envejecimiento activo se encontraron efectos negativos de la edad y positivos del afrontamiento al envejecimiento. **Conclusión.** Aunque en

este estudio se encontró que las variables propuestas explican en forma individual las variables del envejecimiento activo, solamente el afrontamiento al envejecimiento explicó la varianza del envejecimiento activo en forma global.

Descriptores: envejecimiento saludable; adaptación psicológica; depresión; actividades cotidianas; apoyo social; enfermedad crónica; teoría de enfermería.

Fatores que contribuem ao Envelhecimento Ativo nos adultos maiores, desde o marco do Modelo de Adaptação de Roy

Objetivo. Determinar as variáveis que contribuem à explicação do envelhecimento ativo de acordo ao modelo de adaptação de Roy. **Métodos.** Estudo descritivo de correlação, se fez amostragem por conveniência e bola de neve. Se incluíram 200 adultos maiores. Se utilizaram os instrumentos: a) escala geriátrica de depressão de Yesavage, b) questionário de estado mental de Pfeiffer, c) Atividades básicas da vida diária, d) Atividades instrumentais da vida diária, e) escala de esperança, f) reativos de mecanismos de afrontamento do inventário de Envelhecimento de sucesso (afrontamento ao envelhecimento), e g) o questionário de apoio social Duke-UNC-11. O envelhecimento ativo se conformou por independência nas atividades básicas e instrumentais da vida diária, livre de sintomas de depressão, bom estado mental e percepção de boa saúde. Os dados se analisaram através de estatística descritiva e inferencial, e modelos de regressão lineal e múltipla. **Resultados.** 51% dos participantes mostrou envelhecimento ativo (42% em homens e 56% em mulheres). Das variáveis propostas o modelo lineal generalizado mostrou que os anos de padecer a doença, (Λ=0.922; p=0.008), o afrontamento ao envelhecimento (Λ=0.582; p=0.001), e o apoio social percebido (Λ=0.885; p=0.001), apresentaram efeito sobre as variáveis que conformaram o envelhecimento ativo. Estas três variáveis explicaram 5% das atividades da vida diária, 41% dos instrumentais, 12.5% da percepção de saúde, 26% do estado mental e 21% da depressão. A esperança, e trabalho voluntário não foram significativas. Ao classificar as variáveis do envelhecimento ativo se encontrou efeito negativo da idade e positivo do afrontamento ao envelhecimento sobre o envelhecimento ativo global. **Conclusão.** Embora neste estudo se encontrou que as variáveis propostas explicam em forma individual as variáveis do envelhecimento ativo, somente o afrontamento ao envelhecimento explicou a variável do envelhecimento ativo em forma global.

Descritores: envelhecimento saudável; adaptação psicológica; depressão; actividades cotidianas; apoio social; doença crônica; teoria de enfermagem.

Introduction

Aging of the population is among the phenomena of greatest impact globally during the 21st century. The increase of people 60 years old and older is partly due to birth control and increased life expectancy at birth. Projections indicate that by 2050, one in every five inhabitants in the planet will be an older adult, with the rate in Latin America being one in every four.[1] In Mexico, according to the National Institute on Statistics and Geography, in 2014,[2] this age group was 9.3% of the total population with a tendency to increase the proportion, as in the rest of the world. It is known that aging is associated to social, economic, and – especially – health difficulties, which affect older adults, and those around them, including society and its governments.

Consequently, one of the biggest challenges for countries is to achieve better results in the older population, and to live in the best possible manner, independently, the longest time possible even in the presence of chronic diseases. In that sense, the World Health Organization (WHO)[3] promotes active aging to optimize health opportunities, participation, and security to improve quality of life as people age. Active aging implies continuous participation of the older adults in social, economic, cultural, spiritual, and civic matters, and not only the capacity to be physically active or participating in the workforce. Hence, active aging involves adaptation as challenges are faced. The WHO adds that people suffering from any disability or disease are not exempt from continuing to participate actively with their families.[3] In Mexico, the chronic diseases with the highest prevalence are arterial hypertension, diabetes mellitus type 2, and heart disease. In the state of Tamaulipas (Mexico), the first place is taken by diabetes, followed by ischemic heart disease, arterial hypertension, and cancer.[4]

Accepting the changes that emerge during aging implies a series of adaptations by the older adult, such as modifications of health behaviors and, at the same time staying socially connected.[5] Nursing can help older adults to face aging well, particularly those enduring chronic diseases. In countries like Mexico, active aging constitutes a need to preserve independence and delay disabilities in older adults , including those with chronic diseases.[5] According to Roy, the objective of nursing is to promote adaptation around a state of well-being in human beings. Thus the, Roy's Adaptation Model (RAM) was considered adequate to guide this study regarding factors that favor active aging, considered as adaptation.[6]

Roy[6] describes the person or human system as a holistic being with interdependent parts that function as a unit with a given objective. As a system, it responds to internal and external stimuli processed through coping subsystems called regulator and cognator. The ability to respond positively to environmental changes, as in this case due to aging, is a function of the level

of adaptation of the human system influenced by the demands of the situation, and the person's internal resources.

The internal and external stimuli called focal, contextual, and residual stimuli activate coping processes, regulator and cognator which in turn, produce responses in the physiological, self-concept, role function, and interdependent modes. When these responses are adaptive, they promote the person's integrity (adaptation of active aging); on the contrary, ineffective responses do not contribute to the person's integrity. Focal stimuli refer to those stimuli demanding attention and energy from the person at a given moment. In this study, chronic disease represented the focal stimulus by considering that disease imposes care derived from the treatment, that demands the attention from the patient. Contextual stimuli are those that although present in a given situation, do not demand energy and immediate attention from the individual, but do contribute to the effect of the focal stimulus and influence upon the situation.[6] This study proposed hope and sociodemographic variables as contextual stimuli; given that the literature indicates that hope is a precursor of effective coping and decision making,[7] as in this case in treating the disease and of active aging.

For chronic diseases, like diabetes mellitus type 2 and arterial hypertension, a balanced and healthy diet, and engaging in physical activity or exercise are recommended as part of their treatment, thus they were considered as contextual stimuli. At the same time, age, schooling, and gender can influence upon the decisions made by the older adult with chronic disease, so they were also contextual stimuli.

Residual stimuli are those stimuli whose effects in a given situation are not clear to the person; an example is fear. Roy indicates that when the stimulus becomes clear to the individual, it is no longer residual. Hence, this concept was not studied. The regulator and cognator are the subsystems capable of modifying the levels of adaptation. Roy[6] defines coping processes as innate or acquired ways of responding to the changing environment, that is, to stimuli. In that sense, Roy states that stimuli from the internal and external environment act as inputs to the human system to produce a response. The cognator subsystem responds through four cognitive-emotional channels: perception and processing of information, learning, judgment, and emotion.

Troutman *et al.*[8] formulated a theory on successful aging based on Roy's coping processes and subsequently developed and tested the successful aging inventory. In her theory the effective use of coping mechanisms permit the person to age successfully. Based on these statements, two of Troutman's coping mechanisms were renamed as coping to aging. Responses to stimuli and processed by the regulator and cognator subsystems are manifested in four modes: physiological, self-concept, role function, and interdependence. The physiological mode refers to the manifestations of the cells, tissues, organs, and systems of the human body, according to five basic needs and four physiological processes. This concept was not used in this study. The self-concept is defined as the beliefs and feeling one holds about oneself at a given moment and it is formed through one's perceptions and that of others, on the physical and personal self. This concept was also not used.

The response of the role function mode refers to the series of expectations on how a person performs while occupying a given position. Roy[6] describes the primary, secondary, and tertiary roles. The primary role refers to what a person expects to accomplish. The secondary role refers to the achievement of expectations according to a given stage of development and includes the primary role; the theorist describes it as the series of tasks to perform as spouse, father, mother, teacher, among others. The tertiary role is freely chosen by the person and is generally temporary, such is the case of volunteer work. Social participation is a determining factor of active and healthy aging. A form of involvement or social participation is to voluntarily undertake actions in favor of others. The literature documents that offering one's time to serving others provides satisfaction to those who serve; whether by carrying out household chores,

running errands, caring, or sharing knowledge, that is, volunteer work.[9] This type of work has also been linked to the wellbeing and quality of life in older adults.[10] This activity implies staying physically and cognitively active; working for others increases self-esteem and security in oneself, and favors social relationships,[10] which is why volunteer work represented Roy's tertiary role.

The aging process, treatment and care of chronic disease are best endured when the older adult receives support from his or her family and friends. [11] The interdependence mode refers to the interactions related to giving and receiving love, respect, and worth. The social support perceived by the older adult regarding aid, love, and respect from their family and friends represented the interdependence mode. Finally, the general adaptation defined as "the process and result through which people with the capacity to think and feel opt consciously to become integrated with their environment",[6] was represented by active aging. Active aging comprised physical independence, interaction with their environment, cognitively alert, free of symptoms of depression, and good or excellent health perception in spite of suffering from chronic disease. Which is why, based on the literature review and the guide of Roy's Adaptation Model, we sought to study if chronic disease as focal stimulus, hope and sociodemographic variables as contextual stimuli, coping with aging as cognator, and adaptive responses represented by volunteer work, and perceived social support explain active aging (cognition, independence, free from symptoms of depression, and good health perception) in a sample of older adults in Matamoros, Tamaulipas (Mexico).

Methods

This was a cross-sectional, descriptive and correlational study conducted in the city of Matamoros, Tamaulipas (Mexico), with non-probabilistic convenience and snowball sampling. The participants were recruited through co-worker reference at Universidad Autónoma in Tamaulipas.

The sample size was estimated through the nQuery Advisor package version 4, for a multiple linear regression model with eight variables and the following criteria: 0.05 significance level, effect size between medium and large of 0.12, and 90% power, resulting in 200 participants.

Participants were included as older adults who were 60 years of age and over, had a chronic disease diagnosed more than one year before, were oriented in place, time, and space, and who were capable of hearing the interviewer's voice. The study exclude older adults with visible difficulty in walking.

A list was drawn of the possible participants suggested by the university coworkers of the first author; thereafter, they were invited to participate through a telephone call during which they were explained the aim of the study; inclusion and exclusion criteria were corroborated through simple questions, like: what is your name, what day is today, where are we, and do you suffer from any disease. Data was gathered from August to November 2016 in the homes of the participants, who signed an informed consent. At completion of the instruments, they were thanked for their participation and were asked if they knew of someone or a relative who could also participate.

For data collection, a sociodemographic data sheet was used and several instruments. According to Roy's model, the adaptation was represented by active aging, a term that refers to older adults who fend for themselves, without symptoms of depression, cognitively alert, and who perceive their health as good or excellent for which the following scales were used: Katz's index of basic daily living activities,[12] Lawton's index of instrumental daily living activities,[13] geriatric depression scale (GDS-5 short version),[14] Pfeiffer's mental state short questionnaire,[15] and a question on the perception of their health with four response options: excellent, good, regular, and poor from 1 to 4 points.[16]

The index of basic activities of daily living (ADL) evaluates people's degree of independence/dependence in six basic functions: bathing,

dressing, using the toilet, mobility, continence, and feeding. If independent, 1 point is assigned in each item; if help is needed, 0.5 point is assigned; and if dependent, 0 point is assigned. The total score can range from 0 to 6 points, higher scores meant greater independence. For active aging, participants who obtained 6 points were considered independent.

The index of instrumental activities of daily living (IADL) evaluates physical autonomy, it contains eight items (capacity to use the telephone, go shopping, food preparation, house chores, laundry, use transportation vehicles, responsibility with respect to medication, and administration of their economy). Each item was assigned a value of 1 = independent, 0 = dependent. The final score ranges from 0 to 8 points, higher scores mean greater independence. For male participants, the study excluded questions related with food preparation, house chores, and doing laundry; the score for men ranged from 0 to 5 points, and for women from 0 to 8 points, dependent and independent, respectively. For purposes of active aging, 8 points were considered for women and 5 points for men.

The geriatric depression scale, GDS-5 short version, quantifies symptoms of depression in older adults, centered on cognitive behavioral aspects. The response pattern is dichotomous 0 and 1, if the response suggests a depression episode it is scored with 0, on the contrary it is assigned 1 point. The score ranges from 0 to 5 points, higher scores mean less symptoms of depression. This study considered as free from depression a score equal to or higher than 4 points.

Pfeiffer's mental state short questionnaire assesses cognitive impairment through 11 items. It is evaluated in terms of errors: 0-2 errors, the score ranges from 11 to 9 points and is considered normal; 3-4 errors, the score is 8 to 7 points and it is equivalent to slight cognitive impairment; 5-7 errors is equal to 6 to 4 points, meaning moderate cognitive impairment; and 8-10 errors corresponds to 3 to 1 points, which indicates severe cognitive impairment. Active aging was considered when a score from 9 to 11 points was obtained.

In summary, active aging was considered with the following cut-off points: ADL = 6 points, IADL = men (5) and women (8), free from symptoms of depression = 4-5 points, good mental state = 9-11 points, and health perception = 3-4 points.

Hope refers to positive feelings and beliefs with respect to their future and it was measured with the Herth Hope Index, composed of 12 items, with a Likert-type response format from 1 to 4 points, varying from "totally disagree" = 1, to "totally agree" = 4. Values of reactions 3 and 6 are negative assertions, which are transformed to preserve the positive sense. The total score varies from 12 to 48, a higher score denotes a higher level of hope.[17]

Coping with aging was defined as the capacity of the older adult of accepting and dealing with physical changes, life events, carrying out activities, and able to perform house chores. It was measured using the coping mechanisms items of the successful aging inventory.[8] The SAI was developed for people 65 years of age and over, with eight items of which only five those related to coping were used; general reliability with Cronbach's alpha reported was 0.86.[18] The SAI was translated into Spanish and a Cronbach's alpha of 0.85 was obtained for these five questions: 1) I have been able to face the changes occurring in my body as I have aged; 2) I feel capable of facing my own aging; 3) I feel capable of facing life's events; 4) I can solve problems; and 5) I am good at finding new ways of solving problems. The answers used a Likert-type format ranging from 1 = almost never to 5 = almost always. The scores range between 5 and 25 points, higher scores meant better coping with aging.[19]

Perceived social support assesses perception of the older adult of aid, affect, and trust received from relatives, friends, and neighbors.[20] It was measured through the *Functional Social Support Questionnaire (Duke-UNC-11).* It has 11 questions with a Likert-type format with five response options, ranging from 1 (much less than what I desire/want) to 5 (as much as I desire/

want), estimating that affective social support exists if a minimum of 18 points is obtained and confidence of at least 15 points.[21]

Volunteer work comprised activities and time offered freely by people at the service of others, without economic reward. This was measure through 11 activities taken from the National Survey on the Use of Time,[22] which asked about activities done for others, like sweeping the sidewalk, gardening, driving or waslking children to school, shopping, as well as religious activities, community, educational, and cultural services in institutions, and caring for grandchildren, relatives, and transfers to the doctor's office. The response options went from 0 = never, 1 = once per week, 2 = twice per week, 3 = three or more times, and 4 = every day, related to the frequency of volunteer work, higher scores meant greater volunteer work. The scores ranged from 0 to 44 points, higher scores indicate more time of volunteer work. In each affirmative activity, the participants were asked for the time in minutes per week dedicated to that activity.

The study was approved by the ethics and research committees of the Faculty of Nursing at Universidad Autónoma de Nuevo León (Registry Nº: FAEN-D-912). The ethical considerations of the study included the recommendations by the Regulation of the General Health Legislation on Research, with respect to the dignity and rights of the participants, privacy, and signed consent.

Data was analyzed with the IBM SPSS statistical package version 20.0 for Windows. Descriptive and inferential statistics was used. The internal consistency of the instruments was evaluated through Cronbach's alpha. Frequency distribution of the variables was not normal; it was verified with the Kolmogorov-Smirnov test with Lilliefors significance correction. The Mann-Whitney U test was used to learn the difference of medians for years of study of the participants and variables implied for active aging; besides the variables proposed, simple, multiple, and generalized linear regression models were applied with the backward variable selection method and bootstrap technique with 200 samples and the non-standardized beta is reported. A logistic regression model was also applied to observe the effect of the variables of disease, hope, volunteer work and perceived social support on dichotomized active aging (ADL, IADL, mental state, health perception, and depression). The coefficients signs and confidence intervals of the multiple linear regression model and those of the bootstrap technique are similar, therefore we can assume that non normality of data was not a problem. To explore if coping with aging moderates between the contextual stimulus of hope and the adaptive modes of social support and volunteer work, simple and multiple linear regression models were run, following criteria by Baron and Kenny (1986). The following hypothesis was proposed: active aging is determined by age, chronic disease, hope, coping with aging, social support and hours of volunteer work.

Results

The results correspond to 200 older adults with a mean age of 68.9±7.6 years. Among the principal characteristics of interest, the following prevailed: (64.5%) corresponded to the female gender, one in every three was 70 years old and over, average schooling was 10.2±6.6 years of study, 54.5% lived with their partner, for 29% the favorite hobby was watching television and 34.5% helped in religious services; 98% had chronic noncommunicable disease (with most having arterial hypertension (43.5%) followed by type 2 diabetes and 23% had other diseases, like breast cancer, osteoarthritis, cardiovascular disease, and prostate problems), and 97.5% referred taking medications.

Regarding the median of the instruments, for hope was 87.8±12.1, coping with aging was at 84.0±17.2, perceived social support 73.3±19.8, without symptoms of depression 73.3±19.7, ADL 97.5±7.7, and IADL 92.2±18.9. The median of hours of volunteer work was 3.26± 5.06. Descriptive data are shown in Table 1.

Table 1. Frequency distribution of sociodemographic variables of 200 older adults

Characteristics	Frequency	%
Gender		
Female	129	64.5
Male	71	35.5
Age group		
60-69 years	121	60.5
70-79 years	61	30.5
80 years and over	18	9.0
Years of study		
0 years	14	7.0
1-14	122	61.0
+ 15	64	32.0
Marital status		
With partner	109	54.5
Without partner	91	45.5
Lives		
Alone	31	15.5
1 person	82	41.0
2 people	37	18.5
3 people	24	12.0
4-12 people	26	13.0
Favorite hobby		
Watching TV	58	29.0
Reading	28	14.0
Spending time with children/grandkids	23	11.5
Doing exercise/walking	21	10.5
Listening to music	17	8.5
Gardening/Handicrafts/ Dancing	30	15.0
Going on trips/travelling	8	4.0
Attending church/cooking/lottery	13	6.5
Did not know	2	1.0
Disease reported		
Hypertension	87	43.5
Diabetes	61	30.5
Diabetes/hypertension	25	12.5
Others	23	11.5
None	4	2.0
Volunteer work		
Participating in religious services	69	34.5
Shopping for others	44	22.0

Table 1. Frequency distribution of sociodemographic variables of 200 older adults. (Cont.)

Characteristics	Frequency	%
Volunteer work		
Taking care of grandkids	40	20.0
Sweeping the sidewalk for others	31	15.5
Gardening for others	10	5.0
Does not engage in volunteer work	6	0.3

For this study, the internal consistency using the Cronbach's alpha coefficents were: hope scale 0.85aging inventory 0.84, functional social support 0.88, geriatric depression scale 0.53, and mental state questionnaire 0.78 .

In the ADL, 89% (n=178), and in the IADL, 76.5% (n=153), classified as independent; 81% (n=162) had no symptoms of depression, and 94% (n=188) had good mental state. In relation to the health perception of the older adult, the category of excellent was reported by 21% (n=42), good by 60% (n=120), regular 16.5% (n=33), and poor by 2.5% (n=5).

Table 2 displays that 51% (n=102) of the participants classified for active aging, which was significantly higher in women (42.2%), in the age group from 60-69 years (67.7%) and in those with over 11 years of schooling (63.2%).

Table 2. Proportion of participants with active aging by gender, age group, and schooling

	Frequency	%	Probability value
Gender			
Male (n=71)	30	42.2	0.028
Female (n=129)	72	55.8	
Age group			
60-69 years (n=121)	82	67.7	<0.001
70-79 years (n=61)	15	24.6	
Over 80 years (n=18)	5	27.7	
Schooling			
0 - 11 years (n=94)	35	37.2	<0.001
12-14 years (n=106)	67	63.2	

To test the relations suggested by Roy's Adaptation Model and explain the variables implied in active aging, Figure 1 was drafted.

To verify the Roy's statement that the contextual stimulus contributes to the effect of the focal stimulus, a simple regression analysis was first run where the disease was the independent variable and coping with aging was the dependent variable. The disease showed tendency at 0.10 value [F (8, 191)=1.75, p=0.089] and R^2=0.029. When hope (contextual stimulus) was introduced into the equation, both variables become significant hope [F(1, 190) = 138.36, p <0.001]; disease [F(8, 190)= 2.43, p=0.016] and the explained variance increases to 43.5%. This result confirms that hope, contextual stimulus, modifies the effect of the focal stimulus, disease, on coping to aging.

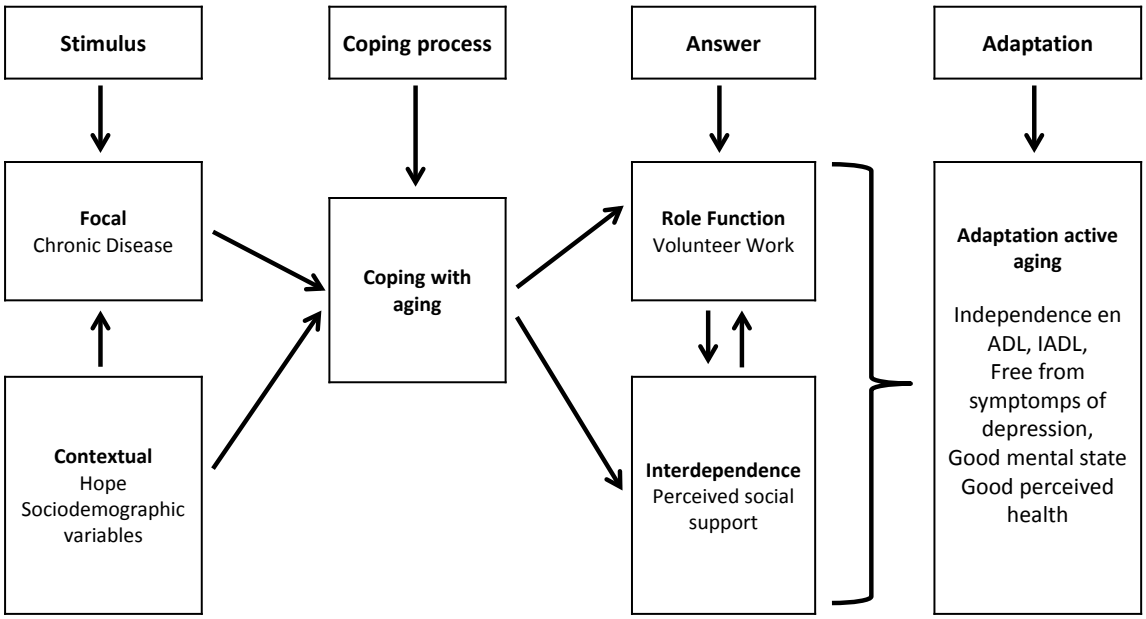

Figure 1. Representation of variables proposed in the model of coping and adaptation to active aging

To learn the effect of all the variables proposed on active aging, we first used the values (transformed to indices) of the variables that conformed active aging (Table 3) and, thereafter, active aging was dichotomized by using the cut-off points from each variable. The first case used a generalized linear model with all the variables implied. Indices of basic activities of daily living, instrumental activities, mental state, depression, and health perception were introduced as dependent variables, and years of enduring the disease, hope, coping with aging, perceived social support, and years of performing volunteer work were introduced as independent variables. The test of multivariate contrasts showed significant effect of of years of enduring the disease, coping with aging, and perceived social support. The three variables explained 5% of activities of daily living, 41% of the instrumental activities, 12.5% of perceived health, 26% of the mental state, and 21% of depression. Years with the disease affect negatively the mental state; more years with the disease meant greater number of errors. Coping with aging showed positive effect on all the variables that conformed active aging, and social support showed positive trend with the instrumental activities of daily living and negative effect on symptoms of depression. Hope and years of performing volunteer work showed no significant effect on the variables of active aging.

In the second case, and to respond to the proposed hypothesis if active aging is determined by age, chronic disease, hope, coping with aging, social support, and hours of volunteer work, eight logistic regression models were run with the backward method. The first model showed significant effect (χ^2=53.98, df 9, R^2=23.7%, p<0.001), age (B=-0.091, p=0.002) and only tendency of coping with aging (B=0.028, p=0.063). The variable with the highest p value was eliminated, which was hope, followed by social support, volunteer work, gender, years with the disease,

and schooling. In the last model (χ^2=42.59, df 2, p<0.001), age (B=-0.097, p=0.001) and coping with aging were significant (B=0.041, p=0.001) with 19.2% of explained variance on active aging. Age shows negative effect and coping with aging a positive effect on active aging. That is, older age indicated less probability of active aging, greater scores on coping with aging meant greater probability of aging actively (Table 4).

Furthermore, the study explored if coping with aging moderates between the contextual stimulus of hope and the adaptive modes of social support and volunteer work. First, hope was introduced as independent variable and coping with aging as dependent variable. The model shows that hope affects coping with aging [F(1,198), 135.16, p<0.001], with an explained variance of 40%, B=0.637. Upon introducing hope and coping with aging as predictive variables and social support as dependent variable, the model continues being significant [F(2,197), 14.67, p<0.001, R^2=12%]; the contribution of hope was B=0.18 and coping with aging was B=0.21. This confirms that hope, as contextual stimulus, affects coping and both (hope and coping) affect the perception of social support or the interdependence mode of Roy's Adaptation Model. Hope in the first step showed no significant effect on hours of volunteer work [F(1,198) = 0.581, p<0.447], which is why this analysis was not continued.

Table 3. Generalized linear model of years with disease, coping with aging, and social support on active aging

Multivariate contrasts	Λ	F	DF	DF error	*p* value
Intercept	0.844	207.71	5	192	<0.001
Years with disease	0.922	3.24	5	192	0.008
Coping with aging	0.582	27.58	5	192	<0.001
Perceived social support	0.885	5.97	5	192	<0.001

Test of inter-subject effects						
Origin	Scale	Sum of type III squares	DF	Mean Square	Frequency	*p* value
Years with the disease	Mental state	10.0	1	10.0	13.7	<0.001
Hope	Health perception	2.4	1	2.4	6.0	0.015
Coping	ADL	529.0	1	529.0	9.3	0.003
	IADL	12364.6	1	12364.6	57.3	<0.001
	Health perception	2.3	1	2.3	5.6	0.018
	Mental state	10.6	1	10.6	14.5	<0.001
	Depression	2878.0	1	2878.0	9.1	0.003
Social support	IADL	616.1	1	616.1	2.8	0.092
	Depression	5482.0	1	5482.0	17.4	<0.001

Note: ADL = basic activities of daily living, IADL = instrumental activities of daily living, DF= degrees of freedom, n=200

Table 4. Logistic regression model of hope, coping with aging, volunteer work, social support, age, gender, years of study, and years with disease on active aging

Variable	*B*	*SE*	Wald	*DF*	*OR*	*p*
Model 1*						
Constant	3.082	2.935	1.10	1	21.8	0.294
Hope	0.012	0.020	0.33	1	1.0	0.562
Coping with aging	0.028	0.15	3.46	1	1.0	0.063
Weekly volunteer work	-0.049	-0.034	2.15	1	0.9	0.142
Perceived social support	0.099	0.009	0.92	1	1.0	0.337
Age	-0.091	0.030	0.93	1	0.9	0.002
Gender	-0.479	0.361	1.76	1	0.6	0.184
Years of study	0.520	0.403	1.66	1	1.6	0.197
Has disease	-1.277	0.777	2.69	1	0.3	0.100
Model 8†						
Constant	3.169	2.226	2.02	1	23.7	0.155
Coping with aging	0.041	0.012	11.33	1	1.0	0.001
Age	-0.097	0.027	13.37	1	0.9	0.001

(*)χ^2=53.98, DF=9, R^2=23.7%, p<0.001; (†)χ^2= 42.59, DF=2, R^2=19.2%, p<0.001

Note: *B*=beta not standardized, *SE*= standard error, *DF*=degrees of freedom, *OR*=odds ratio, *n*=200

Discussion

Over half of participants adults classified in active aging, that is, were independent in ADL and IADL, had good mental state, were free of symptoms of depression, and perceived their health as excellent or good. Active aging represented the general adaptation that in Roy's terms represents the individual's integration and their environment. It means that the older adult with chronic disease fend for themselves for basic activities, like dressing, eating, using the bathroom, among others. With respect to instrumental activities, they can use the telephone, go shopping, and cook food, among others, activities that show that these older adults interact with their environment. Pfeiffer's mental state indicates that they are alert with their environment, for example knowing the day, and place where they are. Being free of depression indicates that the older adults continues encouraged and interested with things and people around him or her, as well as perceiving their health as good or excellent.

More women than men classified in active aging, contrary to that reported by other authors,[23] although measured through physical activity and not through daily living activities. In Mexico, women are responsible for tasks at home even if they have to work and men participate less in daily activities in the home. With respect to basic and instrumental activities activities of daily living, participants are mostly independent although in lower proportion in the instrumental activities, data that confirms results,[24] and similar to the literature, some women present problems of incontinence.[9] Only a fifth part reported symptoms of depression; both men and women in similar proportion, a result that agrees with studies conducted in Latin American older adults.[25]

Less than 10% had slight cognitive impairment, errors occurred mostly in the calculation and orientation of time, a fact that is documented[26]

However, this data must be taken with caution given that the sample was selected intentionally with high educational level and is not representative of the educational levels of Mexican older adults. The perception of good health obtained greater frequency and in higher proportion by women than men and in those with more years of studies, results that reaffirm previous reports.[27] This data is relevant if we consider that most suffered from at least one chronic disease.

The study confirmed Roy's postulate, contextual stimulus in this case hope, contributes to the effect of the focal stimulus in this case disease, on the situation or coping with aging. Hope protects against the stress generated by disease and enables individuals to reassess their situation, seek strategies, and get involved in health behaviors, which contribute to treating the disease and, in turn, contributes in the adaptation.[28]

The results suggests, that hope is a prerequisite for coping[7] and both variables influence upon the perception of social support as interdependence mode. However, the effect of hope and social support on active aging was lost, only coping with aging persists.

It was noted that time with the disease affects negatively the mental state, results that confirm reports by another author.[26] It is known that years of enduring diabetes mellitus impact negatively on cognitive functions, like memory, attention, executive functions, principally due to episodes of hypoglycemia of which this study did not inquire. Seemingly, aging with one or more diseases is to be expected and while such do not affect one's bodies physically or is not serious, these do not affect one's lives. A selection criterion of participants was that they suffered from some chronic disease; it may be necessary to include older adults free from disease. Coping with aging showed positive effect on all the variables that conformed active aging. In this study, coping with aging meant the capacity of the older adult to accept and deal with physical changes and life events. These results support that the cognator concept according to RAM.[6] Coping with aging turned out to be the strongest variable in this study, suggesting that active aging in these participants depends on their own capacity to face changes and challenges presented by aging. In that sense, different authors refer to such as an individual phenomenon and not depending on programs or facilities of the community.[23]

Social support showed a positive trend with the instrumental activities of daily living and negative effect on symptoms of depression. The interdependence mode represented by perceived social support complied with the assumption that behaviors or adaptive responses are a function of the stimuli and the adult's level of adaptation represented by coping processes.[6] Social support implies perceiving demonstrations of aid, affect, and trust by relatives, friends, and neighbors. The negative effect indicates that higher perceived social support yields less symptoms of depression. The importance of perceiving social support by older adults and its beneficial effects in relation to symptoms of depression has been documented by other authors.[20]

The association of perceived social support and coping with aging in this study was noted perhaps due to the possibility of communicating and sharing the problems of aging with the people who live with them and unloading negative emotions; more than 75% of the sample in this study lives with more than one person. Having someone close and living with him or her may help to face aging challenges.[23] Another strategy mentioned in the literature is the self-distraction of adults as positive reinforcement of social support and coping. In this regard, this study also inquired about the favorite hobbies of the older adults, their answers were quite diverse, but it seems that conducting activities different from the daily obligations and cultivating social relations favors coping.[23] With respect to relations guided by Roy's Adaptation Model to explain active aging, it may be said that chronic disease considered focal stimulus showed no effect on coping and the rest of the variables. The diseases reported most often were arterial hypertension and diabetes mellitus type 2; it may be necessary to study older adults with other types of chronic disease to establish their effect on active aging.

Study limitations included non-randomization in selecting the participants, not including objective indicators like glycosylated hemoglobin, foot sensitivity, and blood pressure among other tests. There were practically no participants without chronic disease, which is perhaps why it was not possible to establish differences between those with disease and those without.

This study concludes that hope modifies the effect of the disease on coping with aging. Time with the disease affects negatively the mental state; coping shows positive effect on the variables that conformed active aging, and social support showed positive relation with the instrumental activities of daily living and negative effect on symptoms of depression. Hope and years of performing volunteer work showed no significant effect on the variables of active aging. Coping with aging turned out to be the strongest variable in this study, which suggests that active aging in these participants depends on their own capacity to face changes and challenges presented by aging and disease. More than half of the participants showed active aging in spite of chronic disease. Nursing can promote strategies for older adults to remain active.

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Cooperative Learning and Hand Disinfection in Nursing Students

Original article

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Cooperative Learning and Hand Disinfection in Nursing Students

Objective. The study sought to evaluate the effectiveness of an educational intervention based on cooperative learning on the acquisition of knowledge and skills on hand washing. In addition, the interest and self-perception was studied of the participants on the acquisition of knowledge and skills. **Methods.** This was a pre-post intervention study with 49 students from the second course of the Nursing degree, evaluating: i) *acquisition of knowledge* with an *ad hoc* questionnaire; ii) *skills on hand washing* by conducting the technique with reagent solution and verification with fluorescent lamp; and iii) *interest and self-perception of the importance of acquiring knowledge and skills* with specific questions. **Results.** The mean age was 21.8 years, 83.7% were women, and 32.6% had prior studies related with health. Significant post-intervention improvement was evident in the level of knowledge ($p<0.001$) and skills ($p<0.001$). Interest for the intervention (m=4.1±0.6) and perception on the acquisition of knowledge (m=4.4±0.6) and skills

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Conflicts of interest: None.

Funding: This work was funded by the call for projects on educational innovation 2016/2017 at Universitat Jaume I, within the "Acquisition of skills in clinical practices and simulation" (Code: 3311/16).

Approved by Resolution 01 of December 2016.

Received: December 11th, 2017.

Approved: May 31st, 2018.

How to cite this article: Dembilio-Villar T, González-Chordá VM, Cervera-Gascch A, Mena-Tudela D. Cooperative Learning and Hand Disinfection in Nursing Students. Invest. Educ. Enferm. 2018; 36(2):e09.

DOI: 10.17533/udea.iee.v36n2e09

(m=4.3±0.5) were scored high (scale from 1 to 5). **Conclusion.** The cooperative learning intervention improved knowledge and skills on hand washing in nursing students and awakened their interest.

Descriptors: nursing; education, nursing; students, nursing; hand desinfection; hydroalcoholic solution; learning.

Aprendizaje cooperativo e higiene de manos en estudiantes de enfermería

Objetivo. Evaluar la efectividad de una intervención educativa basada en el aprendizaje cooperativo sobre la adquisición de conocimientos y habilidades en lavado de manos. **Métodos.** Estudio pre-posintervención realizado con la participación de 49 estudiantes de segundo curso de grado en enfermería. Se evaluaron los siguientes aspectos: i) *adquisición de conocimientos* con un cuestionario *ad hoc*, ii) *habilidades en lavado de manos* mediante la realización de la técnica con solución reactiva y verificación con lámpara fluorescente, y iii) *interés y autopercepción de la importancia de adquisición de conocimientos y habilidades* con preguntas específicas. **Resultados.** La edad media fue 21.8 años, 83.7% mujeres y el 32.6% tenía estudios previos relacionados con salud. Hubo una mejoría significativa post-intervención en el nivel de conocimientos ($p<0.001$) y habilidades ($p<0.001$). El interés por la intervención (m=4.1±0.6) y la percepción sobre la adquisición de conocimientos (m=4.4±0.6) y habilidades (m=4.3±0.5) se calificaron como elevados (escala de 1 a 5). **Conclusión.** La intervención de aprendizaje cooperativo mejoró los conocimientos y habilidades sobre lavado de manos en estudiantes de enfermería, además, despertó su interés.

Descriptores: enfermería; educación en enfermería; estudiantes de enfermería; desinfección de las manos; solución hidroalcohólica; aprendizaje.

Aprendizagem cooperativo e higiene de mãos em estudantes de enfermagem

Objetivo. Avaliar a efetividade de uma intervenção educativa baseada na aprendizagem cooperativa sobre a aquisição de conhecimentos e habilidades no lavado de mãos. Ademais, se estudou o interesse e a auto-percepção dos participantes sobre a aquisição de conhecimentos e habilidades neste assunto. **Métodos.** Estudo pré-pós intervenção realizada com a participação de 49 estudantes de segundo curso de grau em enfermagem. Se avaliou: i) *aquisição de conhecimentos* com um questionário *ad hoc*, ii) *habilidades em lavado de mãos* mediante a realização da técnica com solução reativa e verificação com luz fluorescente, y iii) *interesse e auto-percepção da importância de aquisição de conhecimentos e habilidades* com perguntas específicas. **Resultados.** A idade média foi 21.8 anos, 83.7% eram mulheres e 32.6% tinham estudos prévios relacionados com saúde. Houve uma melhoria significativa pós-intervenção no nível de conhecimentos ($p<0.001$) e habilidades ($p<0.001$). O interesse pela intervenção ($m=4.1\pm0.6$) e a percepção sobre a aquisição de conhecimentos ($m=4.4\pm0.6$) e habilidades ($m=4.3\pm0.5$) foram qualificados como elevados (escala de 1 a 5). **Conclusão.** A intervenção de aprendizagem cooperativo melhorou os conhecimentos e habilidades sobre lavado de mãos em estudantes de enfermagem e ademais despertou seu interesse.

Descritores: enfermagem; educação em enfermagem; estudantes de enfermagem; desinfecção das mãos; solução hidroalcoólica; aprendizagem.

Introduction

Infection associated with health care is a substantial problem for patient safety and its prevention is of priority importance. Lack of adequate hand disinfection is the cause of spread of multi-resistant organisms, significantly contributing to infection associated to health care, also being one of the basic methods to reduce the transmission of microorganisms,[1] and is well-accepted due to being a procedure whose technique improves with attendance to continuous formation processes.[2] Furthermore, reduced indices of crossed transmission and infections are lowered with improved practices de hand disinfection.[1]

In spite of the importance of hand washing and the good results of the formation in health professionals, deficit still persists in knowledge and skills related with this procedure in students from health sciences,[3,4] and specifically in nursing.[5-6] In a study,[7] after analyzing the level of knowledge of nursing students on hand washing, it was concluded that it was necessary to improve existing formation programs in hand disinfection to fill voids in knowledge and obtain highly qualified nurses in the future. These results coincide with those from another research,[8] which found that attendance to training and seminars on hand disinfection is one of the predictors of better hand disinfection.

Cooperative learning is a way of working in small groups based on the collective construction of knowledge, where each member of the group is responsible for their learning and that of the group.[9] The internal dynamics that allow cooperative learning to function are based on characteristics that enable professors to structure activities so that students become positively interdependent and individually responsible to perform their part of the work and use social skills appropriately.[9] This method is applicable to a vast variety of subjects, as well as in the specialization in a task. Empirical evidence available on the basis, benefits, and characteristics of cooperative learning is sufficient to encourage its use to improve the knowledge and skills of nursing students on hand washing.[10]

One of the best known and used techniques of cooperative learning is probably the Jigsaw method or Aronson puzzle.[11] This cooperative-learning technique has been used in nursing education to teach research methods[12] or cardiac physiology[13] among other contents, although the literature has not identified studies applying the Aronson puzzle on formation about hand washing in nursing students or other professions in health sciences.

Thus, the principal objective in this study was to determine the efficacy of an educational intervention based on cooperative learning, through the Aronson puzzle technique to acquire knowledge and execute the hand-washing technique in students from the second course of the Nursing degree. Additionally, it was studied if the intervention stirred interest in the participants and their perception on the acquisition of knowledge and skills in hand washing.

Methods

A pre- and post-intervention study was conducted to evaluate the effectiveness of an educational intervention based on cooperative learning, through the Aronson puzzle technique, on the acquisition of knowledge on hand disinfection and the execution of the hand-washing technique with hydroalcoholic solution in students from the second course of the Nursing degree program at the public Universidad Jaume I de Castellón (Spain). The study took place between January and July 2017.

The study included students who accepted to participate and who were registered for the first time in the assignment "Basic nursing care" from the second course of the Nursing degree at Universitat Jaume I, given that it is the assignment that covers the contents related with hand washing (n=49). The educational intervention was based on the Aronson puzzle technique.[11] In this technique, professors divide the subject they wish to teach into unique and essential parts to comprehend the theme, and prepares the material of each of the parts. Students are divided into heterogeneous teams of 5 or 6 members (mother groups), thereafter, each student receives a part of the theme (one piece of a puzzle) and has to join it to the parts held by their classmates to complete the learning (complete the puzzle). For this, students study individually their part, discuss it among their group of experts (members from other groups with the same piece of the puzzle), and return to their mother group to teach the rest.

As result variables, knowledge on hand washing and execution of the hand-washing technique with hydroalcoholic solution were established. In addition, it was studied if the intervention awakened interest by the participants in hand washing and their perception on acquiring knowledge and skills. In the first place, a two-hour theoretical class was given on hand washing. After the class, the students were allowed two days to answer an on-line ad hoc questionnaire on knowledge on hand washing through the assignment's virtual classroom. The questionnaire had five test-type questions, with four response options and only one was true; these were: 1. what is the principal measure to prevent hospital infection? (a. perform correct hand disinfection, b. wear sterile gloves; c. wear lab coat and face mask; d. wear double gloves); 2. In hygienic washing of the hands, it is necessary to: (a. Use antiseptic soap; b. Use a nail brush and dry with sterile towel; c. Follow a given technique using water, soap, and disposable paper towels; d. Use a spatial tap); 3. Is hand disinfection indicated when removing the gloves? (a. only in case of patients with infections; b. No, if they were washed before putting them on; c. Only if the hands have been contaminated with organic fluids; d. Yes, because the flora of the hands increases when remaining too much time wearing gloves); 4. Wearing gloves is indicated to: (a. Reduce the transmission of microorganisms among patients and prevent on-the-job risks for the health personnel; b. Reduce the number of hand washings; c. Transfer patients to other units; d. Avoid contamination of the hands when distributing medication, trays with food, picking up the telephone…). 5. Surgical washing: (a. It is the same as antiseptic hand washing; b. It is done before placing a bladder catheter; c. Can be done with hydroalcoholic solution; d. It is done at the start of the work shift). The questions were selected through consensus of the three professors of the assignment and were based on the theoretical contents taught, taking as reference the recommendations on hand washing by the Center for Disease Control (CDC) in the United States[14] and those by the World Health Organization (WHO).[1] This questionnaire served to measure the level of pre-intervention knowledge. The students were asked prior to the following phase to read at home the clinical practice guide on hand disinfection for health professionals based on these very recommendations.[15]

In the second place, a two-hour practical session was conducted in which student performed hand washing with hydroalcoholic solution that included a stain reactive to ultraviolet light to verify if the technique had been done correctly. The zones with incorrect application of

hydroalcoholic solution that remained exposed under the ultraviolet light were reflected for each student on a template with the back and palm of the left and right hands. This template was used as pre-intervention measurement of the execution of the hand-washing technique. The regions of the hand were grouped for analysis into palm, back, thumb, interdigital, wrist, and fingers,[16] the nail-pulp region was added, as proposed in another study,[17] and it was decided to differentiate the "fingers" region into back fingers and palm fingers, given that in the technique for hand disinfection proposed by the WHO[1] these are two differentiated steps, leaving finally eight regions for each hand. The score received 1 point if the region had been correctly exposed to the hydroalcoholic solution and 0 if the contrary was found, being able to obtain a maximum score of 16 points, 8 for each hand.

Thereafter, in the same session, groups with five students (mother groups) were created and each member of the group was assigned a type of hand washing as parts of the piece of the puzzle (hygienic washing, antiseptic washing with soapy solution, antiseptic washing with hydroalcoholic solution, surgical washing with antiseptic soap, surgical washing with hydroalcoholic solution). During a second time, these were reorganized into groups of experts to exchange knowledge with the rest of the classmates from the other groups who had worked on the same type of hand washing. Once completed, each expert returned to their mother group, where they explained to the rest of the members the corresponding type of hand washing. To end, the groups of experts were again formed, who explained and executed their respective types of hand washing to the rest of the class. The intervention was supervised at all times by the professors in the assignment, clarifying issues whenever necessary.

Lastly, after five days, in the following practical session, each student again performed hand washing with hydroalcoholic solution and the execution was tested with ultraviolet light. The template was used again with the palm and back of each hand to indicate those zones with incorrect application of the hydroalcoholic solution that remained exposed to ultraviolet light, serving as post-intervention mean. After this session, the students had six days to again answer the knowledge questionnaire (post-intervention mean of knowledge). Additionally, the questionnaire included three more questions to know the interest and perception on the acquisition of knowledge and skills by the students which were answered through a 5-point Likert-type scale (1=nothing; 5=maximum). Also, sociodemographic variables were collected (age and gender), along with prior formation in health, and students were asked if they had attended the theoretical class and if they had read the clinical practice guide on hand washing.[15]

A descriptive analysis was performed of the variables according to their nature. The effectiveness of the intervention on the level of knowledge and skills was studied through Student's t test for paired data and with the Mann-Whitney U test and average ranges, obtained by dividing the sum of ranges of each group by the amount of cases in the group, verifying if significant differences existed in the pre- and post-intervention results in function of the sociodemographic variables. The McNemar test was used to if there were differences in the percentage of right answers in each of the questions of the pre- and post-knowledge questionnaires as with the zones marked by the ultraviolet light after performing the technique. Interest and self-perception on the acquisition of knowledge and skills were studied in descriptive manner. The SPSS program version 21 for Windows was used. The level of statistical significance in the hypothesis contrasts was $p<0.05$.

The study was approved as an educational innovation project at Universitat Jaume I (Spain) (code 3311/16). All the participants granted consent and no personal data were used that permitted their identification. A random code was assigned to each student that was only known by them to perform the analysis of paired data. At all times, the study respected the Spanish legislation with regarding the protection of data and the ethical principles of the Helsinki Declaration (beneficence, non-maleficence, autonomy, and justice).

Results

The sample comprised 49 students, 2 subjects were discarded for using the same identification code, 2 for not responding to any of the questionnaires, and 2 for not monitoring the technique, which is why the study had a final sample of 43 subjects. The mean age was 21.8 ± 5.8 years, with a minimum age of 19 years and maximum age of 50 years; 83.7% were women. Among the subjects, 32.6% reported prior studies related with health; 83.7% of the students attended the theoretical class and 88.4% read the guide before attending the laboratory.

The mean score obtained in the questionnaire on pre-intervention knowledge was 3.8±0.7 (95%CI=3.6-4.0) and post-intervention knowledge of 4.6±0.4 (95%CI=4.4-4.9), with significant differences between both moments of the questionnaire's application ($p<0.001$). The mean post-intervention score of the test of knowledge showed no significant differences in function of gender ($p=0.425$), if the students had prior studies related with health ($p=0.786$), if they attended or not the theoretical class ($p=0.425$), or if they read the clinical guide on hand washing ($p=0.172$). Significant differences were also not found in the mean score of the questionnaire on pre-intervention knowledge in function of the same variables ($p>0.05$). Table 1 shows the analysis of the responses from each question of the questionnaire on knowledge before and after the intervention.

The mean pre-intervention score was 8.07±2.3 (95%CI=7.3-8.8) of 16 maximum possible points, while the mean post-intervention score was 13.2±2.1 (95%CI=12.6-13.9), showing significant differences ($p<0.001$). The question, What is surgical washing?, obtained the lowest percentage of right answers during pre-intervention (9.3%), increasing significantly after the intervention (83.7%; $p<0.001$), followed by the question, When hygienic hand washing necessary? (76.7%), which also increased significantly after the intervention (93%; $p=0.016$).

No significant differences were found in function of gender in the score of pre ($p=0.149$) and post-intervention ($p=0.501$) skills; nor in function of attendance or not to the theoretical class (pre-intervention $p=0.44$; post-intervention $p=0.118$), or the reading of the clinical practice guide on hand washing (pre-intervention $p=0.802$; post-intervention $p=0.786$). Subjects with prior studies in health obtained higher scores in pre-intervention skills (average range=28.32) against those without

Table 1. Pre- and post-intervention comparison of the level of knowledgeof 43 students from the second year of Nursing

Question	Pre-intervention *n* (%)		Post-intervention *n* (%)		
	Correct	Incorrect	Correct	Incorrect	*p**
1. Principal measure to prevent hospital infection	42 (97.7)	1 (2.3)	42 (97.7)	1 (2.3)	1
2. When is hygienic hand washing necessary?	33 (76.7)	10 (23.3)	40 (93)	3 (7)	0.016
3. Is hand disinfection indicated when removing gloves?	41 (95.3)	2 (4.7)	39 (90.7)	4 (9.3)	0.625
4. When is it indicated to wear gloves?	43 (100)	0 (0)	43 (100)	0 (0)	-
5. What is surgical washing?	4 (9.3)	39 (90.7)	36 (83.7)	7 (16.3)	<0.001

(*)Hypothesis contrast having performed McNemar test

prior health studies (average range=18.95) (p=0.019), although no significant differences post-intervention were noted for this variable (p=0.58).

A detailed comparison was made per zones of the hand pre- and post-intervention (Table 2). In the right hand, the zones with the worst exposure to the hydroalcoholic solution prior to the intervention were the thumb and wrist, followed by back of the hand and nail-pulp, all with statistically significant post-intervention improvement (p<0.05). In the left hand, the zone with the worst result was the wrist, followed by the thumb, the back of the hand and nail pulp. As with the right hand, all had statistically significant improvement (p<0.05). The thumb continued being the zone with the highest amount of errors in both hands after the intervention.

Table 2. Pre- and post-intervention comparison of the skills of 43 students from the second year of nursing (exposure of the hands under a fluorescent light lamp after hand disinfection with hydroalcoholic solution)

Region	Pre-intervention *n* (%)		Post-intervention *n* (%)		*p**
	Correct	Incorrect	Correct	Incorrect	
Right hand					
Hand palm	36 (83.7)	7(16.3)	42 (97.7)	1 (2.3)	0.031
Back of Hand	15 (34.9)	28 (65.1)	36 (83.7)	7 (16.3)	<0.001
Fingers Palm	43 (100)	0 (0)	41 (95.3)	2 (4.7)	-
Fingers Back	20 (46.5)	23 (53.5)	28 (65.1)	15 (34.9)	0.152
Nail-pulp	15 (34.9)	28 (65.1)	42 (97.7)	1 (2.3)	<0.001
Thumb	6 (14)	37 (86)	25 (58.1)	18 (41.9)	<0.001
Interdigital	32 (74.4)	11 (25.6)	38 (88.4)	5 (11.6)	0.146
Wrist	6 (14)	37 (86)	32 (74.4)	11(25.6)	<0.001
Left hand					
Hand palm	37 (86)	6 (14)	41 (95.3)	2 (4.7)	0.219
Back of Hand	15 (34.9)	28 (65.1)	36 (83.7)	7(16.3)	<0.001
Fingers Palm	42 (97.7)	1 (2.3)	41 (95.3)	2 (4.7)	1
Fingers Back	20 (46.5)	23 (53.5)	27 (62.8)	16 (37.2)	0.210
Nail-pulp	17 (39.5)	26 (60.5)	43 (100)	0 (0)	-
Thumb	8 (18.6)	35 (81.4)	24 (55.8)	19 (44.2)	<0.001
Interdigital	30 (69.8)	13 (30.2)	39 (90.7)	4 (9.3)	0.012
Wrist	5 (11.6)	38 (88.4)	34 (79)	9 (21)	<0.001

(*)Hypothesis contrast having performed McNemar test

Table 3 shows the frequency distribution and percentages of the evaluation of the students, showing high interest for the intervention with a mean score of 4.2±0.6 of a possible 5 points. Additionally, students evaluated that the intervention had increased their knowledge, with a score of 4.4±0.6, and their skills with 4.3±0.5.

Table 3. Perception and evaluation of the students on the methodology used regarding the interest awakened, skills, and knowledge acquired

Categories	Interest		Knowledge		Skills	
	n	%	*n*	%	*n*	%
Sufficient	4	9.3	3	7	2	4.7
Very much	27	62.8	19	44.2	28	65.1
Maximum	12	27.9	21	48.8	13	30.2

Discussion

Hand disinfection is the principal measure to prevent infection associated with health care and reduce antimicrobial resistance.[1] However, it has been noted that the level of knowledge and skills on theme are deficient in students in health sciences[4-5] and specifically with nursing students.[5-6] In this sense, the objective of this study was to evaluate the effectiveness of an educational intervention based on cooperative learning in the acquisition of knowledge and execution of the hand-washing technique in students from the second course of the Nursing degree program. The results obtained indicate that the cooperative learning methodology, based on the Aronson puzzle,[11] improved significantly the level of knowledge and skills of students. Other experiences have demonstrated the efficacy of this technique, like a study[18] which improved significantly the academic results in English classes with respect to the control group. It also turned out to be an effective method[19] to introduce medical students to the long-stay institutional environment.

Regarding knowledge, significant improvement was obtained after the intervention. In this sense, a cross-sectional descriptive study[17] with 398 medical students and 141 nursing students, based on classroom sessions and simulation workshop, concludes that the role of education is fundamental to set the bases of good practices in hand disinfection, in theoretical knowledge and in the development of skills; however, this study did not evaluate improvement at the level of theoretical knowledge. Another study[20] conducted a pre- and post-evaluation of the technique, knowledge and attitudes of the participants toward hand disinfection, in a sample of 40 students from health sciences (medicine, nursing, and physical therapy), the authors evaluated through ad hoc questionnaire the attitudes and knowledge, and through direct observation the performance of the disinfection technique and the quality of the process by using ultraviolet light and reagent solution. They did not use the Jigsaw technique, but – however – did coincide in part with the methodology in our study, given that in their case the laboratory was imparted by students. This study concludes that knowledge, technique, and attitudes improved toward hand washing after the conducting the educational intervention. Our study did not evaluate attitudes and the use of questionnaires ad hoc should be considered a limitation in both cases, in spite of the good results.

To evaluate the skills, one of the hand disinfection techniques was monitored, specifically hand washing with hydroalcoholic solution, through visual evaluation of the hands under ultraviolet light, methodology used in different studies.[16-17,20] With respect to the results by zones of the hand, a study[17] concludes that the zones with the worst application are the thumb and back of the hand. This study does not distinguish the "wrist" region. Another study,[16] which consisted of an evaluation of hand disinfection on a sample of 293 health professionals from different categories and work shifts employing reagent solution under ultraviolet light, the zones with the worst results were the fingers (includes pulp and interdigital space), wrist

and thumb. As a limitation in both studies,[16-17] it must be mentioned that a pre-post intervention comparison was not made, rather, only a post-intervention measurement. In our study, the zones with the worst post-intervention application were the thumb, followed by the back-fingers region, a zone that did not show statistically significant improvement with respect to the pre-intervention measurement. Another study[20] does distinguish between pre-intervention and post-intervention, with the zones with the worst post-intervention exposure being the pulps, which did not have significant differences between round 1 and 2, the backs of the hand and thumbs. A study aimed at nursing and medical students concludes that the back of the hand areas; interdigital spaces; thumb; fingertips, and periungual region had an error rate >50%.[21] It is observed that in the different studies reviewed,[16-17,20] and in the present study, the thumb appears as one of the zonas with worse exposure to the hydroalcoholic solution, both during pre-intervention and post-intervention, which is why special attention should be paid to this anatomical region when imparting formation on hand disinfection.

With respect to the satisfaction obtained, the students were asked on the interest awakened by the educational intervention, the perceived improvement in their knowledge, and the perceived improvement in their skills, satisfactorily responding in each of the items, which is why the methodology used, besides being effective in improving knowledge and skills, was perceived satisfactorily by the students.

Several cooperative learning experiences at the university have assessed students' opinions on the methodology employed, showing majority satisfaction by the students in different careers and cooperative learning techniques. In the study conducted in the pedagogy and social education careers,[22] comparison was made with a control group of the use of cooperative learning, specifically a case study in which a positive evaluation was obtained regarding the methodology, skills acquired, and functioning of the group, by the students. Another case[23] employed cooperative learning in the civil engineering career at Universidad de Salamanca and the students considered adequate the methodology employed to work the skills of the study area and of the profession. The Aronson puzzle technique has also been used in students from the teacher training for childhood education[24] with positive evaluation by the alumnus. The students agreed that the methodology employed surpasses the limitations of group work. The Aronson puzzle was also a methodology well-received by the medical students to be introduced in extended-stay institutions.[19] However, the students reported that they had not learnt more than with other techniques, that it had meant greater workload and more effort, and preferred that it not be used in the following courses.[12]

The results in this study must be considered with caution due to the different limitations it presents. Regarding the use of an *ad hoc* knowledge questionnaire, we propose using a previously validated questionnaire to determine the effectiveness of future educational interventions, as well as the possibility of broadening the sample size, and comparing the methodology employed with a professor-led methodology through a control group. Additionally, it must be kept in mind that the study has only been conducted with nursing students and in a single institution, which hinders generalization of the results. In spite of this, the results are favorable and invite to continue assessing the effectiveness of the intervention to improve learning of future professionals. Moreover, in spite of the significant improvement of skills and knowledge, the second round still detected shortcomings in carrying out the procedure and in the questionnaire of knowledge. It cannot be stated that this methodology is better than other professor-led methodologies, given that no comparison has been made, but it may be stated that the cooperative methodology is a valid methodology that has permitted improving knowledge and skills of students with statistically significant differences, and with their positive perception regarding that learnt and the interest awakened.

In conclusion, according to the results in this study, development of the educational intervention based on cooperative learning, specifically with the Aronson puzzle technique, improved in nursing students the hand disinfection technique and related knowledge, which is why it is recommended to continue applying this methodology to impart knowledge on hand disinfection at Universitat Jaume I, while encouraging future research to solve the limitations posed.

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