

NURSING RESEARCH GROUPS: COMPLEX SYSTEMS FOR THE KNOWLEDGE MANAGEMENT

GRUPOS DE PESQUISA EM ENFERMAGEM: SISTEMAS COMPLEXOS PARA A GESTÃO DO CONHECIMENTO

GRUPOS DE INVESTIGACIÓN EN ENFERMERÍA: SISTEMAS COMPLEJOS PARA LA GESTIÓN DEL CONOCIMIENTO

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ABSTRACT

Objective: to understand the meanings attributed by nursing undergraduate students, care nurses and researchers to the research groups; to discuss the implications of these meanings to the knowledge management in nursing. **Method:** qualitative research based on the Theory of Complexity and Grounded Theory as theoretical and methodological underpinnings, respectively. Research with 25 participants, of which: nursing undergraduate students, care nurses and researchers. The semi-structured interview was used for collecting the data. **Results:** the research revealed that research groups are understood as complex attractors that can reorganize negative situations for connecting research and nursing care and, this way, promote the knowledge management. **Conclusions:** through the integration of the nursing undergraduate students, care nurses and researchers, the dynamic of the research groups can promote a nursing education based on a systemic perspective of the profession, grounded on the needs of updated knowledge and connected to social demands. **Keywords:** Nursing; Science; Knowledge Management; Research Groups.

RESUMO

Objetivos: compreender os significados que estudantes de Enfermagem, enfermeiros assistenciais e pesquisadores atribuem aos grupos de pesquisa; discutir as implicações desses significados para a gestão do conhecimento em Enfermagem. **Métodos:** pesquisa explicativa, de abordagem qualitativa cujo referencial teórico foi a Teoria da Complexidade e o metodológico a Teoria Fundamentada nos Dados. Pesquisa com 25 participantes, dos quais: graduandos em Enfermagem, enfermeiros assistenciais e pesquisadores, vinculados a instituições públicas do estado do Rio de Janeiro. A entrevista semiestruturada foi utilizada como técnica de coleta de dados, realizada no período de outubro de 2014 a agosto de 2015. Os dados foram codificados por análise comparativa, seguindo os preceitos da Teoria Fundamentada nos Dados. **Resultados:** o estudo revelou que os grupos de pesquisa são compreendidos como atratores complexos que podem reordenar situações negativas para conectar pesquisa e assistência de enfermagem e, assim, impulsionar a gestão do conhecimento. **Conclusões:** a partir da integração entre estudantes de Enfermagem, enfermeiros assistenciais e pesquisadores, a dinâmica dos grupos de pesquisa pode favorecer a formação do enfermeiro pautada em uma perspectiva sistêmica da profissão, fundamentada na necessidade de conhecimento atualizado e conectado às demandas sociais. **Palavras-chave:** Enfermagem; Ciência; Gestão do Conhecimento; Grupos de Pesquisa.

RESUMEN

Objetivos: comprender los significados que estudiantes de enfermería, enfermeros asistenciales e investigadores les atribuyen a los grupos de investigación; discutir las implicaciones de dichos significados para la gestión del conocimiento en enfermería. **Métodos:** investigación cualitativa cuyo referente teórico es la Teoría de la Complejidad y el metodológico la Teoría Fundamentada en Datos. Investigación con 25 participantes vinculados a instituciones públicas del estado de Rio de Janeiro, entre ellos estudiantes de grado en enfermería, enfermeros asistenciales e investigadores. La entrevista semiestructurada fue utilizada como técnica de recogida de datos, realizada entre octubre de 2014 y agosto de 2015. Los datos fueron codificados por análisis comparativo, siguiendo las normas de la teoría fundamentada en datos. **Resultados:** el estudio reveló que los grupos de investigación se perciben como atratores complejos capaces de reordenar situaciones negativas para conectar investigación y atención de enfermería y, así, fomentar la gestión del conocimiento. **Conclusiones:** a partir de la integración entre estudiantes de enfermería, enfermeros asistenciales e investigadores, la dinámica de los grupos de investigación puede favorecer la formación del enfermero desde la perspectiva sistémica de la profesión, basada en la necesidad de conocimiento actualizado conectado a las demandas sociales. **Palabras clave:** Enfermería; Ciencia; Gestión del Conocimiento; Grupos de Investigación.

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INTRODUCTION

Promoting science is not limited to the development of scientific research or to the isolated process of incorporating scientific results, but it is limited to the systems of knowledge as a science with conscience, that is, a science connected to the social demands.¹⁻³ From another angle, the mechanisms that destabilize science are multifaceted and can present peculiarities depending on the context in which they occur.²

For Nursing, it is important to consider the strategies that strengthen the connections between research and care.⁴ Therefore, it is desirable that the knowledge management comprises the process of professional formation, of learning through research, from the undergraduate course to the emerging demands of the nurses in health care services for the fields of science, innovation and technology.⁵

In this conjecture, the research groups, when integrating different agents, as undergraduate, postgraduate students, care nurses and researchers, may constitute valuable facilitating contexts and maintenance connections between research and nursing care, thus impelling the scientific knowledge management in this area.⁶⁻⁸ It is important to highlight that the scientific knowledge management comprises all the steps needed for the development of science: the formulation of the object of research to the implementation of scientific results and evaluation of their impact on the society.⁹⁻¹⁰

Thus, the research groups may positively influence the performance of human capital to strengthen of the Nursing science and, consequently, of the knowledge management. For such purpose, the quality of the interaction between the elements constituting these groups, as well as the meanings that each member assigns to the research is a condition to enable the progress of the Nursing science.^{11,12} Therefore, based on the what was mentioned, it is questioned: which meanings do Nursing students, care nurses and researchers attribute to research groups?

Despite this question, it is pertinent to consider the Nursing science from a complex perspective, due to the fact that the knowledge is plural and diverse,² making it important to know the meanings that emerge from the different agents imbricated in the dynamics of the research groups.

From this perspective, the following objectives emerged: to understand the meanings that students of Nursing, care nurses and researchers attribute to research groups; to discuss the implications of these meanings to the knowledge management in nursing.

METHODS

Explanatory study, with a qualitative approach, having as theoretical and methodological references the Theory of

Complexity² and the Grounded Theory, known in Brazil as Teoria Fundamentada nos Dados (TFD).

The Grounded Theory is a method developed from a set of analytical resources that, if systematically conducted, enable to generate an explanatory theoretical matrix of the research phenomenon.

In view of the heterogeneity of the elements constituting the research groups, the participants of this study formed three sample groups, divided into: nurses beside, care nurses, researchers and undergraduate students of Nursing.

The inclusion criteria for the care nurses group were: professional experience time in the current scenario equal or higher than a year; exclusion criteria: nurses taking a *stricto sensu* graduation degree.

The inclusion criteria for the nurses' researchers group were: to have a doctorate degree, to be bounded to a group of research enrolled in the *Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)*, with a research line that is similar to the context of the nurses performance that composed the first sample group. The researchers whose experience in the research management was lower than two years were excluded.

The inclusion criteria for the third sample group were: to be in the last year of the undergraduate Nursing course in progress; exclusion criteria: student inserted in another professional category research group. Therefore, 25 participants were selected, divided into 10 care nurses, six nurses researchers and nine undergraduate students of Nursing. It is important to highlight that no potential participant refused to take part in the research after the invitation.

On the TFD it is possible to address new questions to the participants of the research each time new hypothesis in the analytical course of the data arise. For this reason, it is worth mentioning that there was no sample loss during the period comprising the research.

About the research scenarios, it is pertinent to consider that, as a science in construction and a social practice, Nursing has different performance settings,¹ where, for each one of them, there may exist some peculiarities for the development of the researches and for the convergence from the scientific results into the care dimension.

From this understanding, a search for a knowledge and intervention field that needs to be strengthened in the setting of Nursing research groups in Brazil was conducted. This sphere is the adolescence – not as an isolated area of knowledge, but as a natural step of the cycle of life, that requires investment in the formation and development of researches. The scarcity of nursing research groups in Brazil for this area of knowledge, in comparison to the other phases of the life cycle, corroborates this assertion.¹⁴

Thus, the scenarios for the research were: for the group composed of care nurses, a nucleus of studies and health care of the adolescent of a university hospital, in the capital of Rio de Janeiro. The activities developed in this center comprise the health care in the primary, secondary and tertiary attention levels, preconized by the *Sistema Único de Saúde (SUS)*.

For the nurses researchers, the scenario is limited to research groups enrolled in the CNPq, bounded to the universities of Rio de Janeiro. The third scenario was a Nursing course of a *Universidade Federal do Rio de Janeiro*, capital city.

The selection of the participants was guided by the theoretical, non-probabilistic sampling of the Grounded Theory, that consists of maximizing the comparative opportunities of facts or incidents to determine how a category varies in terms of their properties and dimensions.¹³ The data collection was concluded after reaching its theoretical saturation, namely: when the categories present explanatory density capable of answering to the problem of research.

The recruiting of the care nurses and undergraduate students was for convenience, by means of the snowball technique. In order to train the nurses researchers, a parameterized research was conducted in the *lattes* platform, in the field of the Directory of Research Groups of CNPq, using the following refining strategies:

For the capture of groups, the searching terms used were: "adolescents", "adolescent" and "adolescence". Search option: "any word". For the search option "name of the group", "certified groups"; southeast region, Rio de Janeiro; area of knowledge: Health Science (large area); Nursing (area). It is worth emphasizing that the consultation was made on August, 2014.

After selecting the research groups, each researcher was invited to participate in the study, upon *e-mail* enrolled in the *Curriculum Lattes*.

The semi-structured interview was used as a technique for the data collection, performed in the period from October, 2014 to March, 2015, individually, and recorded in digital media. The places of the interview were the previously described scenarios, in private locations. For the nurses researchers group, the place of collection was their own educational institution, to which research group was linked, The data collection was carried out only by trained researchers, with research experience in the same methodological design of the survey in question.

The data suffered a coding process that, in the Grounded Theory, consists of a comparative analysis in three levels: open, axial and selective.¹⁰ In the open coding, the concepts were identified by comparisons between properties and dimensions of the data. In this stage, preliminary codes aroused from titles attributed to each incident, idea or event. Preliminary codes were grouped into conceptual codes.¹³

In the axial code, a group of conceptual codes occurred to form the categories and subcategories¹³. In this stage, the re-

grouping process of the data that was separated in the open coding started, aiming at a deep explanation of the phenomenon.

The selective coding consisted of the comparison and analysis of categories and subcategories, such process being carried out in a continuous way, aiming at developing the categories, integrating and refining the theoretical matrix, thus emerging the central phenomenon.¹³

The categories were organized according to the paradigmatic model,¹³ which enables an explanatory coherence among the dimensions that support the theoretical matrix. Its structure comes from the components: phenomenon, causal conditions, intervening conditions, context, strategies of action/interaction and consequences.

In time, this research presents the morphological, technical, theoretical and epistemological elements that support the scientific rigor of the qualitative approach, so that it includes the consolidated criteria for qualitative research, described in the COREQ checklist, in its three domains, namely: expertise/training of the research team, study design, analysis and results.¹⁵

The research was approved in the second semester of 2014 by the *Comitê de Ética em Pesquisa (CEP)* of the *Escola de Enfermagem Anna Nery*, of the *Universidade Federal do Rio de Janeiro*, under the protocol No. 6665.516/CAAE: 30438114000005238. The researchers complied with the Resolution 466/12 of the *Conselho Nacional de Saúde*. Participation was voluntary, after signing the Free and Informed Consent Term. Research participants were assigned alphanumerically, according to the sample group of origin and the sequence of the interview. Thus, 1st group (EANO.: Care Nurse); 2nd group (EPNo.: Nurse Researcher); 3rd group (EGNo.: Undergraduate Student).

RESULTS

The results come from the theoretical matrix supported by the doctoral thesis "Scientific Knowledge Management: connections between research and management of the nursing care in the context of adolescence", whose central phenomenon was outlined in "Connections for a Living Science of Nursing".

This phenomenon considers the Nursing science from a system perspective, permeated by meanings and actions that drive and organize the development of research and its connections with the social demands. However, given the theoretical depth, this article addresses the category that, when applying the paradigmatic model, is configured as a strategy for the development of research and connections between science and nursing praxis. Therefore, the category "Research groups: complex systems for knowledge management of nursing" is presented, based on the subcategories: nursing research groups: chaotic attractors for scientific development; and learning through research to develop science: challenges to knowledge management in nursing.

NURSING RESEARCH GROUPS: CHAOTIC ATTRACTORS FOR THE SCIENTIFIC DEVELOPMENT

The research groups' dynamics is structured from the interactions among their members. However, among the elements unfavorable to this reality is the negative perception of the care nurses about these systems. For them, the research groups are far from the reality of care, as described below:

It's very complicated because I do not know them. Despite being in a university institution [...] they do not reflect on exactly anything within my work (EA1).

These groups stay longer in the university. It's what I realize [...] I do not see it happening here (EA4).

Nursing research groups produce a lot, but I do not see them allied to practice (EA5).

I even think they are important, but they should seek more from our practice. I know it does not depend only on them, but it would be a start (EA10).

Care nurses also consider that this distancing is related to a supposed isolation of all the research groups.

I do not know these groups, I think they are very closed. They should be more opened, I do not know how, but they should be more opened (EA2).

These groups are very closed, so that now I think about taking a master's degree and I do not even know where to start, I do not know from where I start (EA3).

To be honest, I think these groups are just for the academics themselves, because it's another reality of discussion and that ends up limiting, closing, you know?! (EA8).

On the other hand, the nurses researchers recognize the contributions to the nursing care from the involvement of the care nurse in these systems.

Researches should be closer to their care practice (EP1).

The research group can help by bringing this articulation, promoting involvement, bringing the group to the scenario, bringing the care nurses closer to the research group, bringing the students of scientific initiation and students of the master's degree to the hospital (EP5).

These connections are valued by undergraduate students, while they can see the importance of research for nursing through the involvement of the care nurses.

We end up seeing that the presence of the nurse at the backend helps to understand how this research will influence his work, and that is good (EG4).

Having the care nurse in the group helps a lot in the discussion (EG3).

The discussions get richer when the (care) nurse participates [...] he brings another point of view, a complementary one (EG7).

When you see the research in practice it makes you want to search. This we can see in the group [...] there are master's degree students, PhDs who are nurses in practice (EG6).

Considering the opening movement and the possible isolation of the research groups as elements that influence the insertion and involvement of the care nurses in these spaces, the nurses researchers pointed out elements of connection that enable the dynamics and functionality of these groups.

The nurses change shifts, they plan and help each other. It happens, but it is necessary to establish strategies for them to participate in the group (EP4).

It is necessary to make an itinerant group [...] to make it an ally, inviting it to participate, to be a co-advisor in the course completion papers, to take the master's degree course, to establish a relationship with the PhD, to insert them in the researches and strengthen the relationship of these nurses with the professors (EP5).

Considering the importance of the research group dynamics, from the connections between its elements, it is necessary to develop strategies that strengthen the interactions between care nurses and researchers, in order to configure the group itself as a chaotic attractor of the complexity when reordering elements dissipated from a system and, therefore enable conditions for its full development.

Among the possibilities favorable to the functionality of the research group is the ability to move this microsystem towards the care context. This dynamics seems to favor the complexity in networks of knowledge from itinerant groups.

One goal of the groups is to be itinerant to the hospitals [...] Even if they say it is a battle, it will be difficult [...]

first we have to show them [nurses] what we do, because they enter without knowing. Now this does not only involve our planning, but also it involves service policy (EP2).

The involvement of the care nurse in research groups is not limited to their insertion in these spaces, but it is strengthened when this is seen as an important element to the development of the group. For such, it is fundamental that the care nurse is engaged in all the steps of the research. Therefore, it is up to the group to enable conditions for learning through research to develop science, as evidenced in the next subcategory.

LEARNING THROUGH RESEARCH TO DEVELOP SCIENCE: CHALLENGES FOR THE KNOWLEDGE MANAGEMENT IN NURSING

The results consider that the research management, whose object presents inherence to the nursing care, should allow the involvement of the care nurses in all the stages of the research. This dynamics can stimulate the development of skills of these professionals for the Nursing science and, therefore, reflect in the practice of research consumption by them.

In the translation of knowledge we need to produce with the consumer, the user of this knowledge (EP4).

One strategy would be for the teaching institution to approach nurses a little closer to practice and to place them not only as authors, but to participate in fact (EP3).

By participating we learn better. It may be difficult at first [...] but once you get the hang of it, it should make it easier, I suppose (EA6).

In order to reach the involvement of the care nurse, throughout the scientific course of the research, the researchers suggest participative methodologies as facilitating strategies, mainly for the incorporation of research results into the care practice.

A research-action on the implementation of a pain scale was developed in the master's degree program [...] This methodology caused this product to be applied soon, but this is not common (EP2).

Strategies can be used to facilitate such involvement, for example, the evidence-based practice (EP6).

The connections between the updated science and the care practice, favored from the interactions established in the research groups, are pertinent in the process of educat-

ing through the research, in the formation of the Nursing undergraduate student. This reality meets the purposes that help developing a professional profile coherent to the social demands, from the immersion in the reality of the caring, due to the approach with the nurses beside inserted in the group. From this reality, it is important to know the meanings that undergraduate students attribute to research groups.

The research group is fundamental, because in addition to it helping you enter in this field, it guides you, directs you, because it directs you to the field of research (EG4).

It facilitates confronting reality. It is a shock of reality, because there you are already directed to other possibilities of knowing (EG2).

The research group is very supportive [...] I learned better how to do my graduation paper by participating in the group (EG1).

You have more contact with the reality of care because the care staff also participate (EG9).

The research group helps us to better understand everything we are seeing about research methodology (EG8).

I see it as something essential [...] to get out of that classroom routine and learn differently (EG5).

Regarding the research connections with the care nurses reality, the leaders of research groups emphasize the importance and implications of specific knowledge as an element of Nursing science and praxis. In the meantime, the context of adolescence.

In our research center, in children's and adolescent's health care, and here, especially the adolescent's, we have a demand of care nurses who seek the masters or doctorate degree, even because it is a specialized area, and we bring this dimension of care for discussions (EP2).

It is important for this student to know that the adolescent has particularities, both scientific and the approach method (EP5).

However, care nurses emphasized that the problem of the connections between research and care is not limited to the scenario of adolescence, revealing the totalizing characteristic of this reality for the scientific knowledge management in Nursing.

This difficulty of bringing research into care is not only in the area of adolescence, no. I see that it is in general, in nursing as a whole (EP2).

It's not just here. I work in another hospital, with other clientele and I see the same in relation to the research [...] the same difficulty to participate in research groups from other areas (EA7).

Look, this difficulty is beyond this reality here [...] my colleagues in other sectors can also affirm that (EA9).

Despite the possibility that the connections between research and nursing care are influenced by the context, the results highlight the research groups as systems that can turn around situations not favorable to the scientific development, based on the capacity of integrating all its elements into the thinking and making science.

DISCUSSION

Knowledge systems are self-adaptive and have mechanisms of natural openness and isolation for their dynamic balance.² In addition, to overcome the destabilizing elements of these systems, the intervention of chaotic *attractors* of complexity is required, and these mechanisms being the ones to restructure the dynamic balance in chaos, from the non-linear relations between cause and effect.¹⁶

Based on the results, the research groups seem to be valuable *attractors* that can rescue, in a sense of collaboration, the dynamics favorable to the development of knowledge management systems and training of human resources for nursing.⁶ However, the heterogeneity of these groups requires competencies of the leader to identify and understand the specificities of each member, as well as evaluate their expectations regarding research activities.^{5,7} This process is essential for the development of strategies that contribute to the excellence of the group and the science produced in this space.^{6,7}

Another important challenge is to make it possible for the principle of inertia among members and the philosophy of the group, in which the production of researches and the field of interest of the care nurses weight. This is because the difficulty in the participation of health institutions in research groups may be associated to the lack of interest of both instances, making it necessary to invest in priority research for nursing care, in this situation.¹⁷

In addition, research with transformation intent is only possible to the extent that it is capable of impacting the *modus operandi* of those who engage with it, in order to generate enough dynamic disorder to trigger changes and cause new

and better practices in the work process.¹⁸ For this, strategies are needed for the integration between care nurses and investigative practice.

Among these strategies is the importance of the active participation of this professional throughout the research management process. This measure may promote the understanding of the importance of scientific results and the scope they treat.^{5,17,18}

Still as an element of connection between these dimensions, we have the use of participatory methodologies, especially action-research, convergent-care research and evidence-based nursing. The importance of these methodologies lies in the possibility of facilitating the simultaneity between the construction of knowledge and its translation in practice,¹⁷ thus contributing to the perspective that knowledge can only be developed and incorporated when built collectively.⁶

In addition, in the field of connections, research groups favor the articulation between education and health systems. As a result, they integrate common strategies to solve social problems and strengthen the socioeconomic development policies of societies of knowledge.^{11,12} Regarding this reality, it should be highlighted that in Brazil, since the University Reform in the 1960s, there have been actions to strengthen the teaching/research/service integration in the training of professionals who can respond to the calls of that society, as well as of the knowledge economy itself. Over the years, this perspective has had successes and challenges with public policies and programs created and developed with a view to overcome the dichotomy between teaching and action scenario.^{11,12}

From these movements on, contextualization is sought as a paradigmatic fundamental inducing the critical-reflexive capacity of professionals capable of proposing, developing and implementing – from the systemic conception on – strategies that strengthen public health policies and economic development. This direction contributes to the breakdown of the reductionist practices, based on the pathology of knowledge,² since the competences are not developed in isolated laboratories, which produce disconnected knowledge,^{2,19} especially as the university projects beyond its walls, returning to the core of their existence.¹⁸ From this view, nurses will strengthen their practices and, in particular, their decision-making process, given the importance of reasoning based on up-to-date knowledge.^{20,21}

CONCLUSION

The dynamics of the knowledge systems in nursing is strengthened from the connections between research and care and, therefore, science and society. This reality, revealed by the perception of undergraduate students, care nurses and researchers, supports the knowledge management as a multifaceted phenomenon.

The research groups appear as complex chaotic *attractors* necessary to the dynamic balance of scientific knowledge systems in nursing. The involvement of Nursing undergraduates in these spaces was considered as a strategy that enables the training process based on the understanding of work reality. This is partly due to the quality of the interactions established with the nurses beside inserted in these groups.

It is up to the nurses researchers, especially the leaders of research groups, to value these strategies that enable better connections, so as to favor the maintenance conditions of its members in the dynamics of activities performed in these systems. From this process, it will be possible to reach the conditions for the nursing to strengthen its scientific basis of general and specific nature.

The study presents as a limitation the context from which the results emerge, since the sphere of public education and service may present elements that differ from the private network. Moreover, as another limitation, delimited knowledge and intervention, although the results do not signal depth in the health of the adolescent, while discussing cross-sectional aspects about the connections between research and care/science teaching through research, other knowledge situations may aggregate information pertinent to the phenomenon problematized in this research.

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