



## Interface between environmental sanitation and health: participant study with nursing students

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### ABSTRACT

**Aim:** describe the perception of nursing students on the interface of environmental sanitation with human health. **Method:** The participating study, World Café technique and thematic content analysis were employed. Twenty-three nursing students from Fluminense Federal University, Rio das Ostras campus, participated from August 2017 to May 2018. **Results:** The participants' limited perception of the physical, biological, toxicological, social and political dimensions that involve the sanitation-health relationship reveals a training dedicated to the biomedical and depoliticized model of socio-environmental issues that impact health. **Conclusion:** The importance of student-centered environmental education and active learning methodologies for critical thinking and skills training of future nurses for actions aimed at reducing health risks related to environmental sanitation was observed.

**Descriptors:** Nursing Students; Sanitation; Environmental Health.

## INTRODUCTION

Access to water and the proper management of solid waste and sanitary sewage are global environmental challenges that require great efforts to involve various social actors (scientists, health professionals, education, the environment, the general population, and governments) in order to achieve the guarantee of these human rights, particularly for socially vulnerable populations<sup>1</sup>.

In this environmental scenario, nurses are health professionals essential to the process of transformation and improvement of the socio-environmental determinants of the health-care process in the territory, including conditions and environmental factors conditioned by the requirements of basic sanitation. The importance of the role of these professionals in providing assistance to individuals and groups affected by environmental and health promotion problems that permeate environmental care should be highlighted<sup>2-4</sup>.

All over the world, the demands of environmental sustainability have impacted resources and health systems, requiring nurses' skills and abilities to manage health needs and situations, risks and responses of health services and territories, according to the precepts of sustainable development<sup>4</sup>.

In this sense, the knowledge of how nursing students perceive the discussion of environmental issues related to sanitation and public health is fundamental so that the educational actions and curricular matrices of undergraduate courses can be reformulated in the direction of the development of a critical, competent and responsible professional for these issues.

The perception of nursing graduates is one of the aspects that enables the evaluation of nursing training on complex and routine situations related to the environmental health field. The relationship between the environmental perception and the environmental attitude of students should be explored in order to know and evaluate the factors that influence the human perception-action and, consequently, impact the educational process and professional training<sup>5</sup>.

In this line of reasoning, socio-environmental perception studies should precede environmental education actions and can be characterized as a teaching and learning tool in the university nursing context. However, it is recognized that the environmental perception of students is not simply the result of information obtained in curricular subjects or other moments of academic life, but it is also the result of interests, experiences and knowledge learned in their social coexistence<sup>6</sup>. Based on this knowledge, this study aims to describe the perception of nursing students about the interface of environmental sanitation with human health.

## METHOD

This is a qualitative approach study of the participant type, which was conducted using the *World Café* technique and data content analysis in the thematic modality. Studies with a participatory approach have been increasingly used to assess the environmental perception of students and nursing professionals<sup>2-3</sup>.

World Café consists of a participatory technique of qualitative research, still incipiently used by researchers in the area of health

sciences and nursing in Brazil. This technique is based on the flexible and dialogical interaction between its participants from different subgroups, which are created by reproducing the relaxed environment of a conversation in a coffee shop. The exchange of information, values, ideas and knowledge is carried out through the movement of its participants among the subgroups and by opening the space for general listening, reflections and collective perception on a problematic topic<sup>8</sup>. World coffee is structured from the formation of small groups of participants who gather around a table, consider and discuss issues or problem situations of interest. After a certain period, participants or at least one representative rotate the group and listen to the ideas expressed by previous participants so that they can give their opinions on the answers. This is followed by a discussion and an exchange of ideas within the same group to build new knowledge. At the end of the coffee, each spokesperson presents the results in a synthesized way for all the groups and thus the knowledge is shared with all the participants through a large group conversation in order to obtain the collective perception of the group. The snack can be made available at each table or at the end of the World Café<sup>9</sup>. There were 11 nursing students in the second semester of 2017 (Class 1) and 12 students in the first semester of 2018 (Class 2). The participants' inclusion criteria were: to be a student enrolled in the subject Nursing in Public Health and Environment in the fifth period of the Nursing undergraduate course at Fluminense Federal University, Rio das Ostras campus, and to be 18 years old or older. The exclusion criterion is to be a student whose

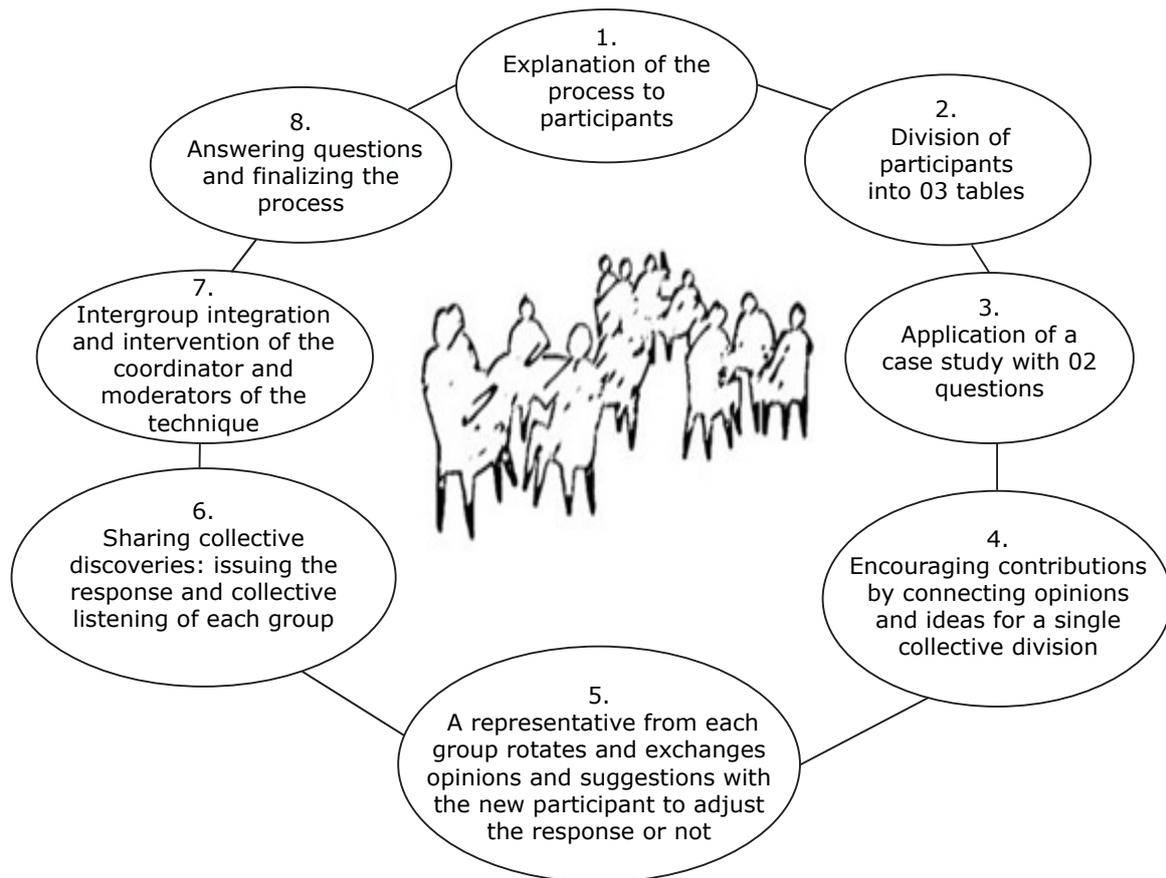
enrollment in the subject is cancelled.

Data collection took place at two different times: in September 2017 with class 1 and in May 2018 with class 2, in class, with an average duration of 2 hours. The World Café scheme applied in this study in each class demonstrates the reproduction of a dialogical coffee environment among its participants, according to Figure 1.

The case study and the questions proposed to the students were prepared by the café researchers/moderators on the basis of an inadequate sanitation situation diagnosed in a previous survey conducted with a family health team from a territory close to the university. A flowchart scheme (Figure 2) was constructed according to the study by Moniz et al.<sup>10</sup> to demonstrate a structural analysis of the problem of inadequate sanitation in the analyzed territory, according to the cause-effect relationship of the socio-environmental problem prioritized by health professionals.

The questions used in the World Café were: What health promotion actions can be undertaken by nurses in this health setting? Would you include any other health effects as a consequence of inadequate environmental sanitation? Which one? Justify it.

The recorded speeches of the large group were transcribed and, together with the comments of each group written on a separate sheet along with the field records, the data were categorized in light of the content analysis in the thematic mode<sup>11</sup>. This analysis technique presupposes three sequential phases: pre-analysis; exploration of the material; and treatment of the results, inference, and interpretation<sup>11</sup>.



**Figure 1.** World Café scheme with nursing students. Rio das Ostras, RJ, Brazil, 2017-2018

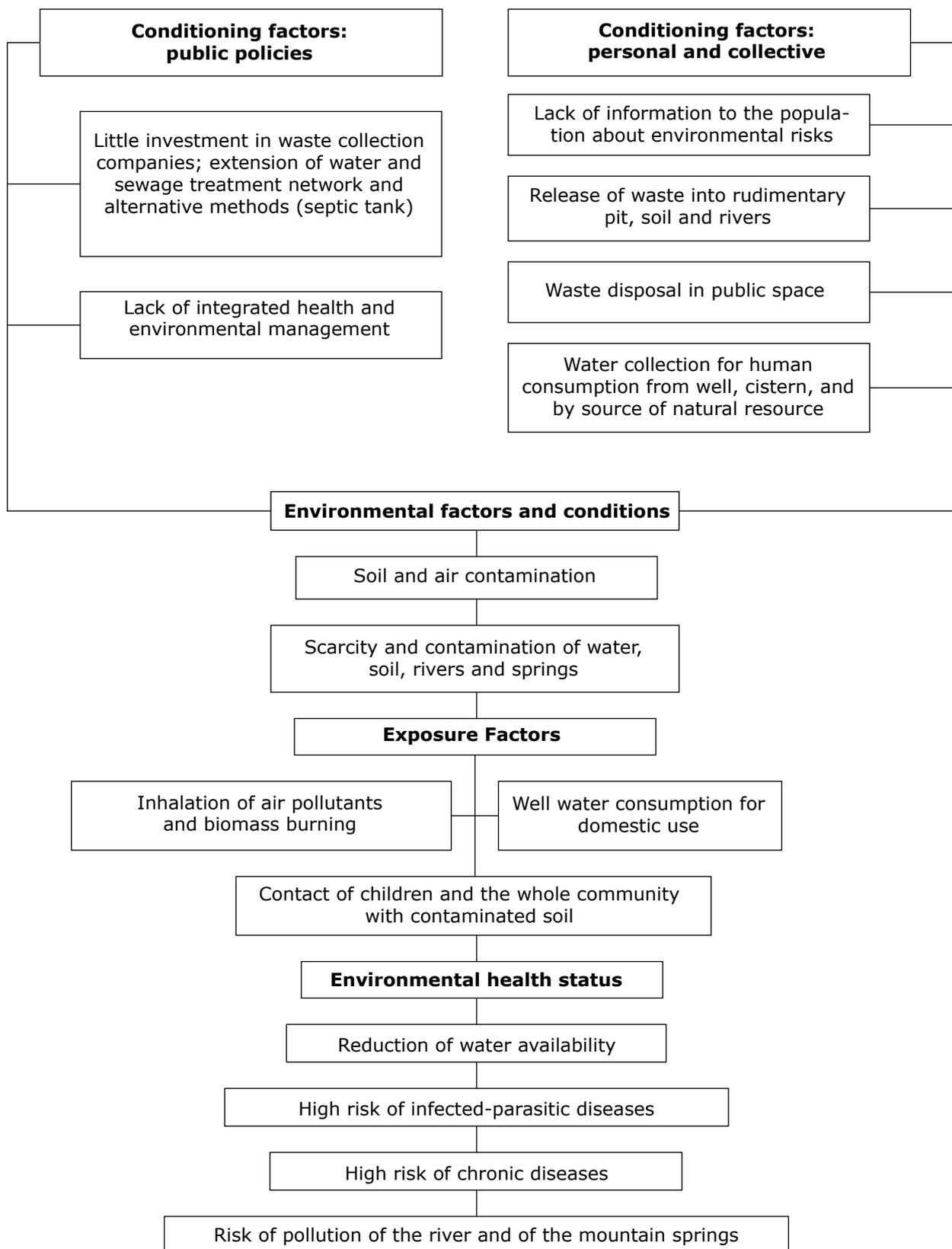
In the first pre-analysis phase, the indexes identified in the contents, which originated the analysis nuclei, were: sanitation services, nurse's performance, environmental analysis of the territory, health risks and effects, and transmissible and non-transmissible diseases. Then, in the exploration phase of the material, there was the thematic codification with the appearance of the units of meaning and context, and the categorization. In the last phase of analytical treatment, the data were examined in depth and confronted with the literature. At the end of the analytical process, two final categories emerged.

### **Ethical aspects**

This study is part of the project entitled Environmental Education and Nursing: Path to

Ethics, Sustainability and Health Promotion, of the *PET Conexões Enfermagem Puro* (Pure PET Nursing Connections) group linked to the Tutorial Education Program of the Fluminense Federal University of Rio das Ostras. The research project was approved by the Research Ethics Committee of the Fluminense Federal University, under the opinion number 1,934,809, in February 2017, in accordance with Resolution 466/2012, of the National Health Council.

The anonymity of the participants was respected, by means of their identification in the groups, which was done through stickers with their respective numbers, and in the results, in which they were identified as Class 1 or Class 2. Each participant mentioned their number of identification before issuing



**Figure 2** - Structural analysis of the environmental sanitation problem inadequate for the case study, according to Family Health Strategy professionals. Casimiro de Abreu, RJ, Brazil, 2017

their opinion in the large group, so that the transcribed statements would ensure the confidentiality and anonymity of the information. Participation in the research was authorized by signing the Free and Informed Consent Form.

## RESULTS

The study was attended by 23 nursing graduates aged between 18 and 35 years. Two analytical categories were developed: Nurse's work on the territorial situation of environmental sanitation; and identification of health risks related to inadequate environmental sanitation.

### **Nurses' action on the territorial situation of environmental sanitation**

Inadequate sanitation was identified by students as a situation still common in most urban and rural areas of southeastern Brazil and as a determining factor for several communicable and non-communicable diseases in the case study presented. However, the participants presented insufficient knowledge on the issues in this sector. Most of the participants related sanitation only to the supply of public services of water treatment and sanitary exhaustion:

In relation to basic sanitation, for example, the use of the well is very common in this location. People there use the wells and in these houses they do not have a sewage system; so there is this issue of the drain. This will pollute the soil, the water table of that place and it can contaminate the wells of people who are drinking water at home. So they have a sinkhole and a well, and there's

this relationship: what is the quality of the water that they are drinking? Perhaps the distance not only from the sinkhole of her house, but from the neighbor's, can contaminate the sinkhole of her own house; therefore, the sanitation issue within the houses is important (Participant 3).

According to my understanding, environmental sanitation would be the basic services related to waste collection, sewage and everything related to problems that can cause damage to the health of the residents of a certain place (...) (Participant 5). These are factors and measures that provide adequate basic sanitation for people, including drinking water and measures that are less harmful to health, bringing a better quality of life to the population (Participant 3).

Although three students provided information on the flood problem, none of the participants cited rainwater drainage as one of the sanitation issues. This perception is evidenced in the following passages:

(...) There is also the question of the flood, when the person lives near the place (Participant 4).

We see that the place floods due to the dam there, from a river that comes from a reserve and disembogues there (...) (Participant 7).

(...) when the person lives very close to the open sewer, at the time of rain, that open sewer will fill up and the sewage will get into the house (Participant 6).

At the end of the discussions, the participants commented on the importance of political

investment in the sanitation sector; however, they stated that this duty of the State has not been fulfilled, since this is a fact evidenced by the sanitation crisis in Brazil. Thus, the students corroborated with the perceptions of the professionals regarding the need of expanding the network of services for water and sewage treatment and of applying alternative methods, such as the installation of septic tank in locations with difficulties of sewage treatment network implementation.

You can see that basic sanitation has to have infrastructure, because if you even think about the sewage issue, it demands a workforce from the management of the construction department; if you mess with the infrastructure, you mess with the paving part, that is, you mess with everything (Participant 10).

The guarantee of this environmental and social right of the population regarding the extension of the coverage of sanitation services seems to be a detached aspect of the assistance actions carried out by nurses.

However, it was also noted that the discussion on nurses' actions in the field of health promotion, including environmental education, contributed to the students' realization that such actions are fundamental to stimulate a change in people's and communities' attitudes towards social participation and the transformation of reality. This result was identified in the following statements:

(..) The nurses have a great role in the promotion of health, as in the realization of lectures, home visits, notifications and joint efforts with the

residents to stimulate their participation (Participant 06).

(..) The role of nurses is to conduct health surveillance, such as identifying measures to prevent and control health risks and planning educational measures and community actions to include the population in addressing these factors (Participant 1).

### **Identifying health risks related to inadequate environmental sanitation**

It was found that the majority of the participants related the risk of parasitic diseases in the community studied to the absence of sanitation services. However, there was limited knowledge regarding the types of infectious morbidities that could be triggered by inadequate sanitation. The risk of getting sick from leptospirosis, cholera, typhoid fever, and hepatitis A and E was not mentioned.

(...) exposure to verminoses through direct contact with contaminated soil, in addition to pigeon outbreaks that may cause cryptosporidiosis (Participant 4).

Gastrointestinal diseases that can cause diarrhea, vomiting, lethargy, and nausea due to contamination of untreated water... (Participant 8).

Only one person linked the flooding problem to the risk of arboviroses (infection with the Zika virus, Dengue, and Chikungunya):

(...) reduced water availability and risk for viral diseases caused by arthropods (dengue, Zika and Chikungunya) (Participant 4).

The chronic non-infectious diseases and the reported health problems were: hypertension, dermatological, fungal and respiratory diseases, accidents, and mental disorders.

Regarding the asphalt, and the potholes, you have to think a little further about the rains, the garbage accumulating in that hole and that contamination which may cause damage to the health of that population and the dust that remains from the transportation, when the bus passes, the lack of asphalt, and which will cause impacts on the health of that population (Participant 6).

The slurry itself that will be produced by the degradation of garbage can cause innumerable damages to health (Participant 10).

The open sewer is going to get into his house, so that's a very big mental disturbance; so that stress can cause other diseases like hypertension, because she got very stressed with it and her blood pressure went up. This garbage thing, the rain, and the lack of basic sanitation generate a lot of diseases (Participant 8).

The risk of acute poisoning and cancer was not cited as possible health problems resulting from inadequate sanitation. No students reported health problems that could arise from the risk of exposure to agrochemicals in the water. Only one student linked the risk of child exposure to environmental contamination to substances.

Sewage affects children because you don't know what kind of substance exists in them (Participant 10).

## DISCUSSION

The collective idea of the participants concerns the exclusive responsibility of the State on the sanitation situation in the cities. The social participation and the need for representativeness of the health professionals segment of the locality studied in decision-making spaces in health and environment were not mentioned by the students as possible solutions to the problem in question. This fact reveals the unpreparedness of the students to act in the constitution of collective actions and movements in different socio-political spaces inside and outside the territory, which are indispensable to guarantee the rights of access to sanitation services.

These results are corroborated by the fact that health professionals do not perceive themselves as co-responsible actors in this process of fighting for the social rights of the assisted population. The representativeness of health professionals who work in Primary Health Care services in the organs and deliberative instances of health seems to be an isolated and unrelated aspect of the attributions of these professionals<sup>3</sup>.

In the Brazilian context, social control is one of the fundamental legal measures to achieve the rights to health and its determinants, such as access to drinking water. The conduct of public sanitation policy in terms of social control is limited and can benefit from practices in the field of health that guide more effective mechanisms for this control<sup>12</sup>.

One of the situations that exemplify the importance of the participation of health professionals in deliberative health instances is the growing influence of the proposals and discussions of the last national health con-

ferences on public policies on environment and health information and thus on the relationship between information, health and environment<sup>13</sup>.

Nurses have not demonstrated involvement with health problems possibly arising from global and local environmental conditions, nor with the implementation of sustainability practices that prevent such problems<sup>14-15</sup>. Nevertheless, the focus on criteria, contents and teaching-learning strategies in the undergraduate nursing curricula on social and environmental sustainability is still rather restricted<sup>16</sup>.

In this sense, the results of this study show that there are gaps in the teaching-learning process and in the training context of nurses, with regard to developing the skills of a critical and participatory professional to care for the environment and the health of the Brazilian population, since the search for the guarantee of environmental rights related to sanitation is also part of primary care actions for the health of the population.

In the line of thought in which teaching is tied to research, the low scientific productivity on sanitation by researchers in the health sciences<sup>17</sup> may be another factor associated to the low and/or non-inclusion of environmental issues such as sanitation in the training process of nursing professionals.

This low knowledge production on sanitation and health in the last decades may reflect the lack of interest in sanitation as a relevant environmental determinant of human diseases, to the detriment of others that have been explored and discussed more intensively by the academy, such as occupational and envi-

ronmental exposure to agrochemicals, heavy metals, and air pollution<sup>17-18</sup>.

Although the number of deaths of people, mainly children under five years of age, caused by diseases related to inadequate sanitation has declined over the last 20 years in the world, there are still emerging situations of diseases, epidemics, tragedies and human suffering due to inadequate environmental sanitation conditions<sup>17</sup>.

A large part of the Brazilian population still falls ill and dies as a result of diseases and events caused by water and soil contamination by various pathogens and toxic substances, and by floods and disasters that could be prevented by the consumption of drinking water and the proper destination of solid waste, sanitary sewage, and the management and drainage of rainwater<sup>18</sup>.

The risk of environmental exposure to pesticides, drug residues and heavy metals is high in communities without access to public sanitation services. Such exposure, in turn, increases the risk of chronic diseases such as cancer and metabolic disorders. In children, exposure to environmental chemical contaminants (lead, mercury, agrochemicals, dioxins and furan's polychlorides, and biphenyl polychlorides), characterized as endocrine disrupters, can cause hormonal changes and damage to growth and physical and neurocognitive development in children<sup>1,9</sup>. These public health problems are still invisible to many health professionals and managers<sup>9</sup>. This reality is in line with the restricted view of students on the risk of infectious diseases due to poor sanitation conditions in the analyzed territory. Thus, the absence of content on the relationship between sanitation and human he-

alth in the training of nurses is probably due to the unpreparedness of teachers to develop environmental education actions effectively to the point of sensitizing academics on professional values and attitudes essential to overcoming local and global environmental problems<sup>2</sup>.

Nonetheless, a study has shown that teachers have confirmed that the content on socio-environmental determinants of health, from a global perspective, should be compulsory and included in the curriculum of nursing degree courses, so that future nurses value this knowledge<sup>15</sup>.

Another study revealed that nursing students considered that their training curriculum presented a superficial and incipient approach to environmental issues and their relationship with collective health<sup>4</sup>.

Therefore, the reformulation of the nursing undergraduate curriculum and the insertion of socio-environmental pedagogical practices in this process should consider the students' perception and environmental attitudes, so that they can contribute to the construction of knowledge and the development of students' skills on contemporary sustainability issues, from a holistic and systemic socio-environmental perspective<sup>2,6</sup>.

The study by Betül Sayan & kaya<sup>5</sup> found that the perception of environmental risks and the environmental attitude of nursing students were related to the following factors: gender, interest in environmental problems, participation in environmental activities, lack of knowledge of environmental non-governmental organizations and approximation of the notion of environment by the course. Therefore, there is an urgent need to include

contents related to the subarea of knowledge Nursing in Environmental Health and to apply appropriate active teaching methodologies to optimize the pedagogical process on these contents in the curricular matrixes and in the political-pedagogical projects of the undergraduate nursing courses<sup>16,19</sup>.

It is recommended that the methodological approach to teaching about sustainable development in the nursing curriculum be based on problematizing and student-centered learning, and that effective environmental education be planned in a multidisciplinary and cross-curricular manner at all stages of nurse training<sup>2,4,16</sup>

A study has shown that environmental education practices based on the methodology of problematization, in line with the precepts of Freirean pedagogy, have culminated in results of environmental perception of the students close to reflectivity and criticality on environmental issues and social change<sup>20</sup>. Furthermore, the use of active teaching methods with nursing students may be linked to visiting practices and assistance in the territory and health services. The study by Nalom et al.<sup>21</sup> showed that the insertion of students in primary health care settings as an active learning mechanism enabled them to broaden a systemic view on determinants of the health-disease process.

Other studies<sup>2,6,19</sup> revealed that teaching practices associated with extensionist and research activities can make it feasible for nursing students to contact the territory and complement classroom learning, and thus constitute valuable resources for the applicability of the active problem-based methodology for teaching environmental health care.

In the meantime, between theory and practice, the opening of academic spaces may contribute to prepare nursing students to understand and act on the living and complex dynamics of the health-disease process in the territory, given the complexity of environmental factors that impact human health. Thus, the importance of carrying out extension activities, research and theoretical-practical teaching, based on active methodological proposals for environmental education, aimed at empowering and engaging nursing academics, within universities and health services, in actions that reduce the health risk conditions associated with environmental sanitation services, is highlighted.

In this way, the academic environment has the function of promoting relations and actions necessary for the understanding of the complexity that involves care, ethics and environmental sustainability and their interface with the quality of life and human health<sup>22</sup>.

## **CONCLUSION**

The results show that there are gaps in the teaching-learning process and in the training of nurses with regard to the skills of critical and participatory professionals to adopt preventive actions for diseases related to environmental sanitation.

The limited perception of the physical, biological, toxicological, social and political dimensions of the sanitation-health relationship by the participants reveals a training that is also dedicated to the biomedical and depoliticized model of socio-environmental issues that impact health.

It is suggested that innovative pedagogical teaching strategies, in addition to extension

and research actions, which contemplate active learning methodologies, and transversal proposals in the curriculum matrices of nursing undergraduate courses be used as tools that enable the expansion of critical capacity and technical-scientific knowledge of nursing graduates on the promotion of health, care, and environmental sustainability, including the interface between sanitation and health. Thus, training institutions should foster the development of future nursing professionals for the understanding of the phenomena and the search for improvement of environmental and health conditions of individuals and groups assisted in contexts of socio-environmental vulnerability associated with the absence of sanitation services.

Limitations of this study are signaled due to the fact that the data collection took place only with students from two classes of a discipline foreseen in the fifth period of the curricular matrix of a Nursing undergraduate course at a university campus in the interior. In view of this, the need for future investigations to approach nursing graduates in different learning periods of the course and from different Brazilian universities is highlighted, in order to highlight in a more visible way the situation of teaching and training of nurses to act on contemporary issues of health and environment.

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