



## Interface between health and environment in professional education in health\*

*Interface entre saúde e meio ambiente na formação profissional em saúde*

*Interfaz entre salud y medio ambiente en la formación profesional en salud*

Silviamar Camponogara<sup>1</sup>, Paola da Silva Diaz<sup>2</sup>, Gabriela Camponogara Rossato<sup>3</sup>, Roger Rodrigues Peres<sup>3</sup>, Sabrina de Aguiar Soares<sup>4</sup>, Graciele Erthal<sup>4</sup>, Cibelle Mello Viero<sup>4</sup>

### ABSTRACT

**Objective:** To understand the conception in the academic health area about the health and environment interface, and how this is expressed in the academic experience. **Methods:** A qualitative, descriptive and exploratory study, conducted with 24 students in the area of health of a public institution of higher education. The data collected, during the period from August to September 2010, by means of semi-structured interviews, were analyzed according to the reference of content analysis. **Results:** Subjects related understanding that there was a strong interface between health and environment. They pointed out that the socioeconomically disadvantaged populations are more predisposed to the effects of environmental problems, which led to the occurrence of many diseases. Some subjects, however, had difficulty in expressing an idea about the theme. **Conclusion:** A thematic approach is necessary in the educational process of health professionals, aiming at the acquisition of social and environmental responsibility.

**Keywords:** Nursing; Environment; Education, higher; Environmental health

### RESUMO

**Objetivo:** Conhecer a concepção de acadêmicos da área da saúde sobre a interface saúde e meio ambiente, e como isso se expressa em sua vivência acadêmica. **Métodos:** Estudo de abordagem qualitativa, descritivo-exploratório, realizado com 24 acadêmicos da área da saúde de uma instituição pública de ensino superior. Os dados coletados, no período de agosto a setembro de 2010, por meio de entrevista semi-estruturada foram analisados de acordo com o referencial da análise de conteúdo. **Resultados:** Os sujeitos relataram compreender que há uma estreita interface entre saúde e meio ambiente. Apontaram que as populações menos favorecidas socioeconomicamente estão mais predispostas aos efeitos da problemática ambiental, o que leva a ocorrência de muitas doenças. Alguns sujeitos, entretanto, apresentaram dificuldade de manifestar uma ideia sobre o tema. **Conclusão:** É necessária uma abordagem da temática no processo formativo de profissionais da área da saúde, visando à aquisição de responsabilidade socioambiental.

**Descritores:** Enfermagem; Meio ambiente; Ensino superior; Saúde ambiental

### RESUMEN

**Objetivo:** Conocer la concepción de académicos del área de la salud sobre la interfaz salud y medio ambiente, y cómo se expresa en su vivencia académica. **Métodos:** Estudio de abordaje cualitativo, descriptivo-exploratorio, realizado con 24 académicos del área de la salud de una institución pública de enseñanza superior. Los datos recolectados, en el período de agosto a setiembre de 2010, por medio de una entrevista semi-estructurada fueron analizados de acuerdo con el referencial del análisis de contenido. **Resultados:** Los sujetos relataron comprender que hay una estrecha interfaz entre salud y medio ambiente. Apuntaron que las poblaciones menos favorecidas socioeconómicamente están más predispuestas a los efectos de la problemática ambiental, lo que lleva a la ocurrencia de muchas enfermedades. Algunos sujetos, entre tanto, presentaron dificultad para manifestar una idea sobre el tema. **Conclusión:** Es necesario un abordaje de la temática en el proceso formativo de los profesionales del área de la salud, visando a la adquisición de responsabilidad socioambiental.

**Descriptores:** Enfermería; Ambiente; Educación superior; Salud ambiental

\* Study extracted from the research report titled "The health and environmental education interface in health professionals qualification," funded by the Foundation for Research Support of the State of Rio Grande do Sul (FAPERGS).

<sup>1</sup> Associate Professor of the Nursing Department and in the Nursing Graduate Program, Federal University of Santa Maria – UFSM – Santa Maria (RS), Brazil.

<sup>2</sup> Graduate Student (Masters) Nursing Graduate Program, Federal University of Santa Maria – UFSM – Santa Maria (RS), Brazil.

<sup>3</sup> Undergraduating Nursing Student, Federal University of Santa Maria – UFSM – Santa Maria (RS), Brazil.

<sup>4</sup> Nurse. Federal University of Santa Maria – UFSM – Santa Maria (RS), Brazil.

## INTRODUCTION

A discussion about the current environmental issues is a reality in many parts of the world, bringing various impacts to the human life. This ecological crisis does not only have a repercussion on biological order, because it involves a multiplicity of aspects: social, economic and cultural. It is a crisis that has required a review about postures of humans, since those that relate to human existence itself (ontological) to the way of knowledge production (epistemological), going through different aspects of everyday life, and relying on the understanding about the past, present and future <sup>(1)</sup>.

Although different sectors of society are related to the ecological problems, what we see is that some knowledge fields and areas of action have not discussed this issue strongly yet, for example, the health area. However, it is increasingly evident that there is a close interface between environmental problems and health, which cannot be neglected by governments, researchers and health professionals. There are already studies that indicate strong evidence about population impairment for diseases such as cancer, heart diseases, respiratory diseases related to environmental causes <sup>(2,3)</sup>. Another study<sup>(4)</sup> highlights a number of consequences for the health of populations from climate change, including: deaths from thermal stress; injuries and deaths due to disasters; increased incidence of hydric transmission diseases; emergence of infectious disease; spread of diseases transmitted by vectors; hunger; malnutrition and associated diseases, and mental illness.

The World Health Organization considers the global climate change a challenge to the protection of human health, highlighting that, the consideration of environmental-climate risks should play a central role in the discussion of the sustainability transition. This requires the implementation of adaptation strategies in order to protect the public health, including, besides financial resources, technology and infrastructure, activities directed to education and public awareness <sup>(5)</sup>.

However, despite this obvious concern, it seems that there is a certain distance between health area and effective practices related to environmental protection or to minimize its effects. Studies have shown that this issue is haven't been subject of concern when analyzing the scientific production in health area <sup>(6,7)</sup>. In this sense, the development of studies which discuss the issue of health and environment interface, both in the qualification scenario as in the context of nursing professional practice and health are essentials.

In this gap, this research was developed with the following question: what do academics from the health area think about the current environmental issues and what are the consequences for their academic forma-

tion? Therefore, among the objectives set for the study, we presented in this article, the following: understanding academics' conception from the health area about the health and environmental interface and how it is expressed in their academic experience.

## METHODS

This is a qualitative approach study that seeks to understand the meanings attributed by subjects to social phenomena. The research is classified as descriptive and exploratory, it has been conducted with 24 academics from the health area of a public institution of higher education in southern Brazil.

Data were collected during the months of August and September 2010, seeking to keep some proportionality between subjects. Accordingly, interviews were conducted with four academics from the Nursing course, five from the Medicine course, five from the Physiotherapy course, four from the Phonoaudiology course, three from the Pharmacy course and three from the Dentistry course. Constituting the inclusion criteria: be academic from a health area course in the researched institution, be attending the final year of their course and agree to participate in the study. The conclusion of data collection followed the criterion of data saturation.

Data collection occurred through semi-structured interviews with leading questions about the topic investigated. The interviews were conducted by trained interviewers, in a private room, being recorded and later transcribed by the interviewers. The subjects were identified according to their undergraduate course and the number corresponding to the interview.

Data were analyzed according to the proposed referential content analysis <sup>(8)</sup>, according to the following steps: organization of corpus analysis, conducting initial reading of the findings, and in-depth reading, in order to constitute the categories of analysis, and, interpretative analysis of categories and discussion with the relevant literature.

The study followed the ethical guidelines indicated for human research; data collection was performed only after Institutional and Ethics Research Committee approval (CAAE No. 0014.0.243.000-10). In this sense, the subjects were only interviewed after reading and signing the consent form.

## RESULTS

Overall, the data revealed that the academics were aware of the serious effects of the environmental crisis. Mostly, they obtained information about it through the media, as the study showed that the approach on the subject during the professional qualification is quite

fragile. In order to meet the objectives of the study, respondents were addressed to reflect about the health and environmental interface and its expression in the academic experience.

The data revealed to be evident to academics; there is a direct interface between health and environment, as an example of one of the exposed testimonials below:

*"Wow, it is directly related, I cannot discern these two, especially the issue of health is directly related to the environmental conditions to which you are inserted, the issue of clean air, unpolluted, the issue of water quality which you use, the issue of soil quality which comes your food. For me, they are directly related". (Physiotherapy 04)*

*"I think there are two things that walk together and that are important, very important. I think we can see like this, not preserving the environment can bring many diseases, can bring many, many things which can affect people's lives, then I think these two things are very important which combines and walk together ". (Nursing 04)*

It was noted that the academics had the notion that there is a connection between environmental problems and the health of populations. However, the idea of health and environmental interface is very present, or more precisely, the diseases caused by environmental damage directly affecting underprivileged populations. Thus, the demonstrations give conformation to the categories **health, environment and poverty**.

*"We just have to go to poor places, a place without basic sanitation, we'll see how much they are involved in disease we know there are problems with water, cholera and everything." (Nursing 01)*

*"I think that health is directly linked to the environment, because depending on where you live, depending on the conditions of where you live, places where you go, these factors will influence your health. For example, where there's open sewage, it is not the same thing where everything is well built not have the bugs that carry diseases and such, I think it interferes completely health ... think that's it. "(Dentistry 03)*

The testimonials above show an idea that environmental conditions that socioeconomically underprivileged people experience are directly related to increased likelihood of diseases.

When reflecting on the context that encompasses the overlapping risks of both cities, characterized by lack of sanitation, housing, among others; as those arising from environmental pollution, occupational, generated by the "modernization", among others, many academics have exposed a series of cases of diseases that they believe are directly related to environmental issues, including: cancer, respiratory and parasitic diseases. These expressions resulted in category: diseases related to environmental issues, as exemplified below.

*"The more we can preserve the environment more in balance we will be with our health. If the factories stop polluting so much,*

*pollute, if you had, for example, fewer cars in the world we would have fewer respiratory illnesses. If traffic is not so chaotic there will not be so much stress, so much hypertension, we will not have this kind of problem so much. "(Medicine 01)*

*"We know that pollution really harms health, so I think those who are having trouble breathing today, I think it's all because of pollution which is also increasing." (Phonoaudiology 02)*

We note that academics have made the link between the development of diseases and environmental problems. Accordingly, even though they emphasize diseases by environmental causes, resulting from the lack of socioeconomic and health conditions, in a sense also make an interrelationship with other aspects that are most at risk of becoming ill. However, the study showed some weakness in regard to this issue, as they observed the establishment of a linear view of cause and effect. There was not seen, among the respondents, an idea that refers to the complexity that goes through the process of being healthy and ill, and the health and environmental interface, consequently.

In this regard, we emphasize that although many respondents have shown a direct interface between health and environment, there were those who expressed vague terminologies on the issue, demonstrating a non-reflexive process or a structured knowledge in this regard. Thus, the category configuration gives vague notions about health and the environment.

*"I do not know very well, but I think it would be an example with water, if we could make it unpolluted, consequently, it wouldn't bring diseases to people ... we know that has any water treatment, has people living near rivers in that region showering and being polluted, I think this ends up causing more disease ... I think that's it ... I think that's health and the environment." (Dentistry 02)*

*"... I think not! I think it has, has relationship, which has an intimate relationship, but ... What I think, is that actions that may destroy the environment will be reflected in our health. Got it? Directly or indirectly. "(Medicine 01)*

In this context, there is the manifestation of a gap, particularly with regard to the achievement of professional actions on the matter. The testimonial below is an exemplary of this conception:

*"Wow, for me it's good, though I understand a little about the relationship between health and the environment, how the environment affects our health, I see a gap like that. I feel like there's a gap, I cannot see how I, as a health professional, could do something about it, you know? I understand how, let's say, pollution, even the use of pesticides, crops and such, can affect health. But I do not see it that strong in the health workforce, kind of concern for the environment, even I do not have much knowledge about it. "(Physiotherapy 02)*

Also with respect to this issue, expressions emerged referring to the clear idea that academics were affected by environmental problems, and realized the relation-

ship between environmental problems and human health, but they did not feel their potential to act on.

*It's an interesting thing to address, these climate changes are consequences of something, some actions of ours, some actions of mankind we can say, well, that is a global change. But we can perceive in our body, what it causes, the impact of this on people, which is something very easy to perceive. Sometimes we do not think that these climate changes, ... but it is far from me, the non-pollution of rivers has nothing to do with me or deforestation has nothing to do with me because I'm here, I'm in my apartment, getting running water, treated water and do not think too much on the rest, so to speak. [...] But I realize that in my life and in my health, also the health of my patients, and I worry a lot about it. (Physiotherapy 01) (authors' emphasis)*

Thus, it was explicated that there is a change in perception, including issues that affect people's health as a result of environmental concerns; however, a sense of distance between the subject and the environmental problems of great magnitude are produced (see italic's testimony). This feeling, allied with a lack of knowledge, as evidenced in this research by the lack of a thematic approach for professors of undergraduate courses, it may be the source of difficulties in the development of actions addressing environmental sustainability and adaptation to climate change of the population, during professional life.

## DISCUSSION

Based on the data obtained, we noted that the academics participating in the research established a direct relationship between health and the environment. It is noteworthy that respondents linked the vulnerability of the environment and their effects on health. In Brazil there are at least three dimensions of vulnerability between health and the environment. The first is linked to inadequate environmental sanitation in meeting the needs of sanitation, transportation and housing the majority of our population, which affects the prevalence of important public health problems; the second dimension is related to negative health effects in models developed in our country, leading to processes of rapid industrialization, uncontrolled land occupation and intense urbanization; the third dimension, affects the emerging threats resulting from global-scale environmental phenomena, especially the health impact resulting from global warming generated by climate change <sup>(9)</sup>.

Another issue to be discussed was the view of academics in relation to unfavorable conditions of life, pointing to poverty as an aggravation of the health and environment. The subjects have a clear relationship to the disease of the population, due to environmental problems; it has links with their socioeconomic status,

leaving the poorest not only more prone to different diseases, as well as more limited access to health care.

This view may also be related to the fact that many academics developed practical subjects and internships in services that attends underprivileged populations, insured exclusively to the Unified Health System (UHS). Study<sup>(10)</sup> performed with academics of health area, highlights, the hegemonic way that they perform the association between UHS and poverty. Obviously, with regard to the risks emerging from environmental issues, this ends up being a unilateral and even distorted vision, since environmental risks, although may affect certain segments of the population, it affects all people and nations indistinctly.

With the advent of so-called risk society, conflicts emerge relating the distribution of harm from it, triggering discussions on how they can be distributed, prevented, controlled and legitimized <sup>(11)</sup>. This issue should also be addressed from the point of view of ethics, since, despite the progress made by many health indicators, in knowledge and in possible solutions of avoidable death and disease, there is also a scarce intention of using knowledge and solutions in the interest of all. Consequently, the poorer portions of the population are the least benefit from scientific and technological advances, and also, they are more prone to the risks emerging from this progress <sup>(12)</sup>.

The health area literature is explicit about this conflict. In Brazil, in particular, we live with dilemmas of this nature. Technological and environmental risks generated by the processes of production and consumption, as well as environmental degradation and health problems which they cause, are irregularly distributed in space and among the population. Thus, different social segments are more vulnerable to these new risks, which are aggravated by factors such as nutritional status, education, access to information and coverage of public policies. Accordingly, poorer social groups are more prone to environmental problems emerging from local sources; whereas the richest occupy less degraded areas. Problems such as: lack of sanitation and waste disposal, pollution of air, water and soil lead to the occurrence of many diseases and congenital deformities, which aggravates the health status of these populations <sup>(13)</sup>.

There is a strong relationship between health problems and social disparity resulting from the economic model adopted by the society, which have produced more social exclusion, marginalization, impoverishment, and inability to obtain minimum conditions for a satisfactory quality of life. Although environmental problems, such as generators of health risks, do not respect differences in social class or geographical boundaries, the neglect of which they have been treated by public authorities, leads to intensification of the risks in so-

called peripheral countries and, consequently, for the poorer population, experiencing greater interaction with risk situations, including environmental <sup>(14)</sup>.

In short, by focusing on the question, we have the amplitude of the population prone to environmental risks, however, associating socio sanitary and economic factors; inevitably, the poorest are the most vulnerable, leaving the population unequally, and subject of their will. While environmental awareness has grown in recent decades, this has not happened with regard to health. The risks were exacerbated resulting from negative transformation in the environment, affecting everyone, even in different levels of individuals, classes or populations <sup>(12)</sup>.

Based on this context, we can say that there is a need to search for an environmental awareness on the part of the entire population. However, it is imperative that government agencies are also aligned for this purpose, in order to implement actions that minimize negative environmental problems that bring to the health of populations, especially to the most economically underprivileged ones.

The subjects in this study exhibited a series of diseases situations that they believed are directly related to environmental issues, including: cancer, respiratory and parasitic diseases. Obviously, we can relate this idea with the fact that the curricula of undergraduate courses, including nursing, are still oriented by teaching pathological situations, rather than a vision of health promotion and quality of life. Regarding the testimonials obtained, we clearly realize that academics identify environmental issues as an aggravation to health, emerging in the discussions environmental problems assuming it as risk factors, such as: exposure to pesticides and increased urban pollution. In general, it is clear the idea that there is a cause-effect relationship between environmental problems and diseases of populations, mediated by increased exposure to risks.

Evidently, climate changes may produce impacts on human health, by different ways. On the one hand it directly impacts, as in the case of heat waves deaths or other extreme events such as hurricanes and floods. But often, this impact is indirect, being mediated by changes in the environment, such as, changing ecosystems and biogeochemical cycles, which may increase the incidence of infectious diseases, but also non-communicable diseases, including malnutrition and mental illnesses <sup>(15)</sup>.

With data obtained in this study, issues of high relevance were raised by academics, pointing towards understand that there is strong evidence of interrelationship between health and environment. However, some respondents expressed terminologies which refer to vague notions of health and environment, demonstrating that there is still a gap with regard to the reflexive process

or a structured knowledge on the subject. This finding reinforces the importance of a systematic approach on the subject, during the qualification process, as a way of seeking to establish an effective process of promoting the health of populations.

Given the testimonials of deponents, we note that although there is an expression of concern about climate change and its relationship to health, it also reveals a gap of environmental problems on a larger scale. This view finds resonance in a current sociological contemporary thought which have deeper reflections on the subject. In this case, this can be considered a typical paradox of the social context in which we are immersed, considering that, most of the time and for most people, climate change is a problem that sits in a corner of the mind, even if it is a source of concern. The fact is that environmental problems are huge, and apparently, far from the life and action context of people, inhibiting the development of social practices aligned with the necessary environmental preservation <sup>(16)</sup>.

However, when strategies are offered to viably knowledge about environmental issues and the minimization of environmental impacts, the subjects have higher subsidies to reflect on their own behavior, motivating them to build responsible actions with the environment <sup>(17)</sup>. The environmental issue covers a complex of relationships that extend over the whole of social life and way of thinking of this whole. This perception of reality presupposes an interrelationship and interdependence of all essential phenomena, being them physical, biological, psychological, social and/or cultural which, in turn, includes people's health <sup>(18)</sup>.

In general, supported by the testimonials and contributions reinforced by several authors in the area, it is concluded that the academics have the idea of linking health and the environment, although in many cases, there are difficulties in expressing a more concrete idea about the subject. In this sense, the proposition, by various government agencies, strategies addressed at strengthening the debate on climate change in the health sector, corroborates to the need of broadening the debate and the development of effective actions as a result of reflection and conscious of compromised subjects in relation to health and environment interface.

## CONCLUSION

The debate over the health and environment interface is a rather fragile and embryonic matter between health professionals and between health academics in the qualification process. The data revealed that, although academics, mostly, have a sense of direct connection between health and the environment, the dominant view still directed to the diseases of individu-

als and populations. We realize that there is a perception that the environment may be a risk factor for the onset of disease and its spread, but we emphasize that there is much to advance in the discussions and concepts related to this context.

What draws attention is the fact that some academics presents very vague ideas on the subject, highlighting difficulties in expressing themselves more concretely, even as future professionals. The study indicates the urgent need to address to the issue during the qualification process, in a systematic and integrated way, with other essential aspects to the maintenance of a healthy life, in which there is great responsibility of health area professionals.

The studies that deepen the debate on the subject are essential in an attempt to seek subsidies to assist in the knowledge structuring about this important contemporary demand and its interrelation with the

health area. However, it is proposed as a starting point, the inclusion of the debate on the topic, transversely in the curricula of schools of health, in the sense of effectively use the interface between health and environment, comprehending the fundamental dimensions for a process of healthy living. This proposition needs to be aligned with the comprehensive conceptions and integrating health, health promotion and quality of life, risking to fall into a reductionist discourse, shaped by biological bias that only would reinforce the fragmented health practice and education, focusing on the concept of health as the absence of disease.

## ACKNOWLEDGEMENTS

We thank the Research Support Foundation of Rio Grande do Sul (FAPERGS) for funding the study.

## REFERENCES

1. Leff E. *Saber ambiental: sustentabilidade, racionalidade, complexidade, poder*. Petrópolis: Vozes; 2001.
2. Negrete BR, Rosa CC, Ikeuti DH, Delena PJ, Borba TM, Braga AL. [Air pollution and hospital admissions of adults and elderly due to congestive heart failure in Santo André (SP), Brazil]. *Arq Bras Ciênc Saúde*. 2010; 35(3):208-12. Portuguese.
3. Braga AL, Pereira LA, Procópio M, André PA, Saldiva PH. [Association between air pollution and respiratory and cardiovascular diseases in Itabira, Minas Gerais State, Brazil]. *Cad Saúde Pública*. 2007; 23 Supl 4:S570-8. Portuguese.
4. McMichael AJ, Woodruff RE, Hales S. Climate change and human health: present and future risks. *Lancet*. 2006; 367(9513):859-69.
5. Organização Mundial da Saúde. *Mudança climática e saúde humana – riscos e respostas: sumário revisado 2008*. Brasília: Organização Pan-Americana da Saúde; 2008.
6. Camponogara S, Kirchhof AL, Ramos FR. [A systematic review about the scientific production with focus on the relation between health and environment]. *Ciênc Saúde Coletiva*. 2008; 13(2):427-39. Portuguese.
7. Camponogara S, Kirchhof AL, Ramos FR. [The relationships between nursing and ecology: approaches and perspectives]. *Rev Enferm UERJ*. 2006; 14(3):398-404.
8. Bardin L. *Análise de conteúdo*. Lisboa: Edições 70; 2009.
9. Conselho Nacional de Saúde. *1ª Conferência Nacional de Saúde Ambiental: saúde e ambiente, vamos cuidar da gente*. Brasília: Conselho Nacional de Saúde; 2010. (Relatório Final)
10. Erdmann AL, Rodrigues AC, Koerich MS, Backes DS, Drago LC, Klock P. Students's point of view of their professional preparation to practice in the Brazilian Universal Health Care System. *Acta Paul Enferm*. 2009; 22(3):288-94.
11. Beck U. A reinvenção da política: rumo a uma teoria da modernização reflexiva. In: Beck U, Giddens A, Lash S. *Modernização reflexiva: política, tradição e estética na ordem social moderna*. São Paulo: Universidade Estadual Paulista; 1997. p.11-71.
12. Berlinguer G. *Bioética cotidiana*. Brasília: Editora da Universidade de Brasília; 2004.
13. Rigotto RM, Augusto LGS. [Health and environment in Brazil: development, territory, and social iniquity]. *Cad Saúde Pública*. 2007; 23 Supl 4:S475-501. Portuguese.
14. Fabel M, Campos M, Araújo C. A configuração (dilemas) dos riscos ambientais e de saúde: tendências e perspectivas no Brasil. *InterfacEHS [Internet]*. 2006 [citado 2012 Ago 4]. Disponível em: [http://bvs.panalimentos.org/local/File/INTERFACEHS\\_configuracao\\_riscos\\_ambientais\\_saude\\_Brasil.pdf](http://bvs.panalimentos.org/local/File/INTERFACEHS_configuracao_riscos_ambientais_saude_Brasil.pdf)
15. Organização Panamericana de Saúde. *Mudanças climáticas e ambientais e seus efeitos na saúde: cenários e incertezas para o Brasil*. Brasília: OPAS; 2008. (Série saúde ambiental, 1).
16. Giddens A. *A política da mudança climática*. Rio de Janeiro: Zahar; 2010.
17. Camponogara S, Ramos FR, Kirchhof AL. Um olhar sobre a interface trabalho hospitalar e os problemas ambientais. *Rev Gaúcha Enferm*. 2009; 30(4):724-31.
18. Sena J, Cezar-Vaz M.R, Bonow CA, Figueiredo PP, Costa VZ. [A pedagogical practice through social-environmental rationalities: a theoretical essay on nursing formal education] *Texto & Contexto Enferm*. 2010; 19(3):570-7. Portuguese.