



## REVISIONES

### Curriculum nurse and strategies training on environmental sustainability and climate change

Currículum enfermero y estrategias pedagógicas en materia de sostenibilidad medioambiental en los procesos de salud y cuidado

Carmen Álvarez-Nieto<sup>1</sup>  
Isabel M<sup>a</sup> López-Medina<sup>1</sup>  
Manuel Linares Abad<sup>1</sup>  
M<sup>a</sup> Luisa Grande-Gascón<sup>1</sup>  
Cristina Álvarez-García<sup>2</sup>

<sup>1</sup>Department of Nursing. University of Jaen. Jaen, Spain.

<sup>2</sup>Student Nursing Degree. University of Jaen. Jaen, Spain.

E-mail: calvarez@ujaen.es

<http://dx.doi.org/10.6018/eglobal.16.3.243151>

This study has been funded by the ERASMUS + programme (European Union). Title: NurSusTOOLKIT: A Teaching and Learning Resource for Sustainability in Nursing. Project code: 2014-1-UK01-KA203-001645.

Received: 18/11/2015

Accepted: 12/02/2016

#### ABSTRACT:

**Background:** Nurses should be knowledgeable about how it affects climate change to health. To acquire this knowledge it is necessary to define competences and educational strategies that tackle environmental sustainability in nursing training. The objective of this paper is to describe the dimensions that should be included in nurse education in the field of environmental sustainability, climate change and health care and determine the most appropriate pedagogical strategies.

**Methods:** A narrative review of publications on environmental sustainability in relation to nursing and health care has been carried out over the last 10 years. Search strategies have been designed for fifteen databases of Nursing and Health Sciences. The results were systematized in various data arrays.

**Results:** Nurse training in environmental sustainability should include contents such as globalization, environmental impact, promotion of health, use of resources and proper management of waste, food and influences of production processes, the effects of smoking and environmental effects on the health of children. Educational approaches, such as the participatory action research and problem-based learning, are more appropriate to include in the nurse training while covering environmental sustainability.

**Conclusions:** Nurse training in environmental sustainability should include competences at different levels: individual, understanding the rationale and scope of the problem as well as acting accordingly in the professional field and with personnel. Finally, at the social level, nursing has a key role in the promotion of environmental health.

**Keyword:** environment and public health; nursing care; curriculum; Competency-Based Education; emerging environmental problems

## RESUMEN:

**Fundamentos:** Las enfermeras deben ser conocedoras de cómo afecta el cambio climático a la salud. Para la obtención de estos conocimientos es necesario definir las competencias a adquirir y las estrategias pedagógicas que afronten la sostenibilidad medioambiental en la formación de Enfermería. El objetivo de este trabajo es describir las dimensiones que debe incluir la formación enfermera en materia de sostenibilidad medioambiental, cambio climático y cuidados de salud y determinar las estrategias pedagógicas más adecuadas.

**Métodos:** Se realizó una revisión narrativa de publicaciones sobre sostenibilidad medioambiental en relación a enfermería y cuidados de salud de los últimos 10 años. Se diseñaron estrategias de búsqueda para quince bases de datos de enfermería y ciencias de la salud. Los resultados se sistematizaron en matrices de datos.

**Resultados:** La formación enfermera en sostenibilidad medioambiental debe incluir contenidos sobre globalización, impacto ambiental, promoción de salud, uso de recursos y gestión adecuada de residuos, alimentos e influencias de los procesos de producción, los efectos del tabaquismo y los efectos ambientales en la salud de la infancia. Los enfoques educativos más adecuados para incluir la sostenibilidad medioambiental en la formación enfermera son la Investigación-Acción Participativa y el aprendizaje basado en problemas.

**Conclusiones:** La formación enfermera en materia de sostenibilidad medioambiental debe incluir competencias en diferentes niveles: en lo individual, comprendiendo los fundamentos y el alcance del problema y actuando consecuentemente en el ámbito profesional y en el personal; y en el plano social, Enfermería tiene un papel clave en la promoción de la salud medioambiental.

**Palabras clave:** salud pública y medioambiental, cuidados en enfermería, curriculum, formación basada en competencias, problemas ambientales emergentes.

## INTRODUCTION

The interaction of living organisms and their environments has always determined the vital processes of the human being. Ecology has studied for decades the effects of this interaction and it is already well known that the current mode of production and energy consumption, together with the changes in the use of the Earth, are generating climatic alterations and important impacts, both in the natural system, as well as in the social and economic. The evidence also shows the effects on human health as a result of climate change <sup>(1,2)</sup>, including injuries and illnesses as a result of extreme weather events such as storms and heat waves, the spatial distribution and dissemination of transmissible diseases, especially through the water, food and vectors, and increased prevalence of cardiorespiratory diseases <sup>(3-6)</sup>.

On the other hand, the production, collection, manipulation and distribution of food are determined by an economic dynamic, where the quality of what we eat or the context in which our food is produced matters very little. Foodborne diseases have increased significantly throughout the European continent over the past 10 years.

The implication and the human health impacts of these changes are already unquestionable and constitute the reason why the health sector has been included in its own entity in the search for solutions to the problem <sup>(7)</sup>. Therefore, the concept of sustainable development is fundamental for health systems, and for health professionals to know the concepts of sustainability and climate change, along with their relationship with people's health and well-being <sup>(8,9)</sup>. In particular, the nursing group is an agent of change that has the capacity to promote health and control the use of health resources. Therefore, in the nursing profession to improve the level of knowledge and skills in sustainability and the effects of climate change will make it

possible to change attitudes and modes of action in their daily work, which will improve the health of people <sup>(10)</sup>.

Universities are leaders in the development of forms of education in order to devise solutions to problems linked to sustainable development <sup>(11)</sup>. However, "nursing students are being poorly trained to understand the connections between climate change, sustainability and health" <sup>(12)</sup>. Therefore, it is necessary to break the existing educational gap, and pedagogical strategies are required, including the environmental sustainability for the Nursing Degree.

To address these issues, the following objectives were set: 1. To describe the dimensions that nursing education should include in terms of environmental sustainability, climate change and health care. 2. To determine pedagogical strategies that allow the integration of environmental sustainability in the competences of graduates in Nursing.

## MATERIALS AND METHODS

A narrative review of the scientific literature was conducted to identify evidence on environmental sustainability and climate change in nursing and health care. Firstly, a bibliographic search strategy was designed in the databases: Cochrane, Cumulative Index to Nursing and Alliance Health Literature (CINAHL), Public Medline (PubMed), Embase, Latin American and Caribbean Literature in Health Sciences (LILACS), Web of Knowledge (WOK), Scopus, Cuiden, Cuiden plus, Cuidatge, Spanish Medical Index (IME), Physiotherapy Podiatry Nursing (ENFISPO), Scielo, Consejo Superior de Investigaciones Científicas (CSIC), ProQuest and Directory of Open Access Journal (DOAJ). The search strategy is displayed in table 1.

**Table 1. Search strategy**

| Search terms  | Search string  |
|---|--|
| <p>In English<br/> <i>nursing, healthcare practice, midwife, sustainability, climate change, education, training, skills, pedagogy, educational approaches, higher education, university, ecology.</i></p> <p>In Spanish<br/> <i>enfermería, sostenibilidad, cambio climático, educación, formación, habilidades, salud ambiental, matronas, salud.</i></p> | <p>In English<br/> <i>"nurs* and environment", "nurs* and climate change", "nurs* and sustainability",</i></p> <p>In Spanish<br/> <i>"enfermería AND (cambio climático OR sostenibilidad OR medioambiente)".</i></p> |

The search was made in January 2015 and was limited to original documents, published in English, Spanish or Portuguese and published from 2004. The letters, journalistic articles and academic works were excluded.

A total of 2174 references were found and an inverse search process was carried out through which six additional references were identified.

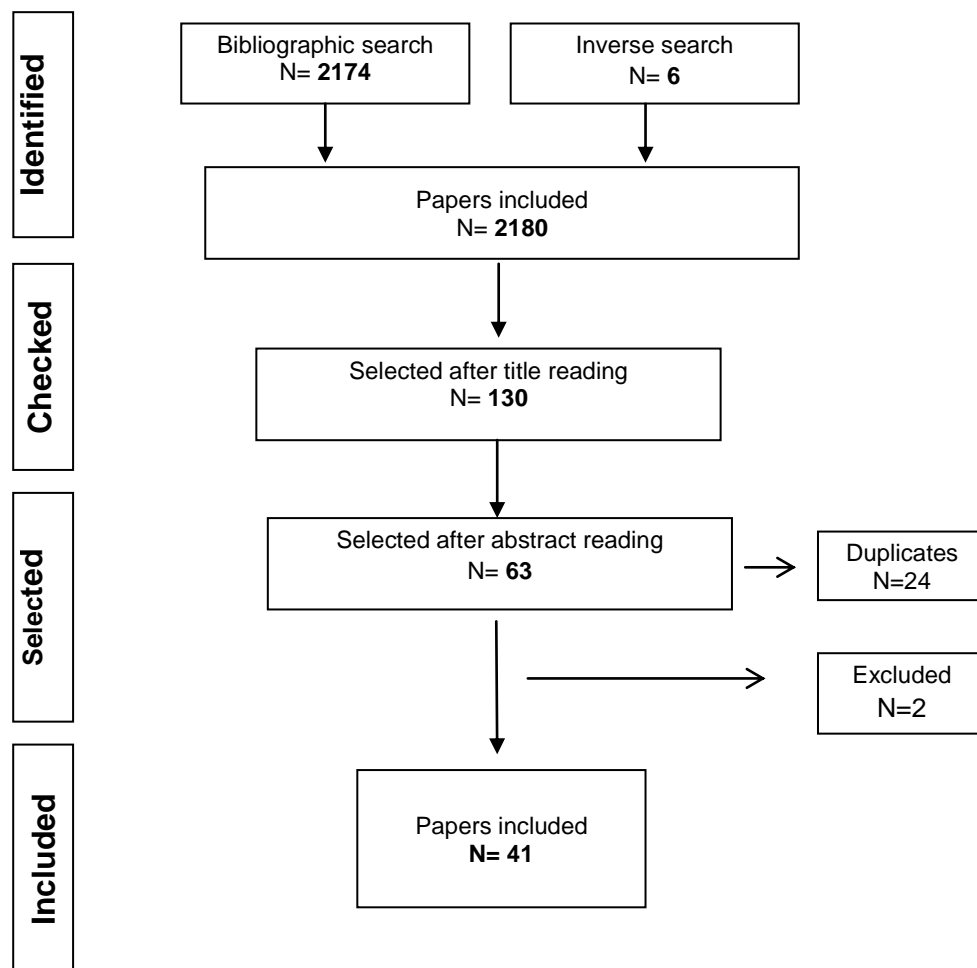
The titles of the references retrieved by the search were reviewed to check the eligibility, process after which 130 documents were selected. In the Embase, Cuiden,

Cuidatge and Proquest databases, results were obtained, but no publications were finally selected from these databases.

After reading the summary of these documents, 67 documents were selected and after eliminating duplicates, there were 43 documents for analysis.

For the extraction of the data, a data matrix was used in which the answers to the two questions that guided the search were recorded: what should nurses know about sustainable care?, and what pedagogical strategies are used to include issues of environmental sustainability in the curriculum of nursing? During this process, two publications were excluded because they did not respond to the research questions, resulting 41 papers finally analysed and included in this research <sup>(8-10,13-48)</sup> (Figure 1).

**Figure 1. Papers selection process**



The information extracted from the analysis of the papers was divided into two parts. The first focused on what nurses need to know about sustainability to provide appropriate care, differentiating the knowledge, skills, attitudes, competences and

behaviours they should have. To achieve this knowledge and training, a second dimension was developed, indicating the pedagogical approaches needed to integrate sustainability into nursing curricula, identifying the different educational strategies that can be followed, as well as the theoretical assumptions in which they are based and types of activities that are carried out to get this objective.

## RESULTS

### Nurses' knowledge about environmental sustainability in health care

Based on scientific evidence found, it has been identified that the nurses' knowledge, skills, attitudes, competences and behaviors about environmental sustainability that they should have.

First, the **knowledge** to be acquired is related to globalization (global village), environmental impact, health promotion, resource use and proper waste management, food and production process influences, effects of smoking and environmental effects on children's health. It is necessary to explore how the health of people, communities and populations are affected by social, political and environmental factors, and how to describe the interaction of the environment and human health at different levels. In addition, it is necessary to acquire knowledge about the guiding principles of sustainability and conservation of the environment (WHO's Ottawa Charter, 1986, Rio de Janeiro Declaration, 1992), related international and national legislation, and all in the context of inequalities in health and the social determinants of health (Table 2).

**Table 2. Knowledge for environmental sustainability in health care**

- Health in a globalized world
- Health inequalities
- Social determinants of health
- Ecological public health
- Environmental sustainability
- Social sustainability
- Triad "sustainability, climate change and health"
- Principles of the UN Millennium Declaration
- Principles of ecology according to the Ottawa Charter, 1986
- Global Cities
- Eco-literacy
- Sustainable economy
- Green movement
- Sustainable economic growth
- Influence of the feeding process on the environment
- Effects of environmental problems on children
- Environmental quality
- Sanitation
- Suitable temperature
- Ventilation
- Integral management waste processes
- Environmental management plans
- Separation of hospital waste

- Clinical environments, treatment settings
- Effects of passive smoking

In terms of **skills**, nurses must have communication skills and abilities to provide environmental health education and counselling. This also implies having skills for dialogue and influence in other groups and sectors, as well as for citizen awareness and mobilization. They should reflect on the consequences of climate change and the possible interventions to be designed from a holistic, ethical and critical perspective (Table 3).

**Table 3. Skills for environmental sustainability in health care**

- Health communication and advice
- Citizen mobilization
- Influence in groups and sectors
- Ability to dialogue
- Critical and ethical thinking
- Organization project management
- Detection of educational needs
- Elaboration of educational programs in environmental health
- Development and evaluation of specific community interventions
- Identification of available resources, including financial resources
- Establishment of intervention priorities
- Efficient use of resources
- Separation of waste at all stages
- Social awareness
- Adaptation to climate change and its consequences
- Identification of smoking habits and adequate record in medical records
- Anti-smoking advice
- Identify children at risk of health due to environmental problems

Following with the **attitudes**, it is remarkable the need to have a vision and an orientation towards the future, assuming high levels of responsibility, commitment to the environment, and orientation towards change. Also the predisposition to carry out interventions at different levels, from an ecological view of the social reality (Table 4).

**Table 4. Attitudes towards environmental sustainability in health care**

- Interventions at the individual, community and organizational levels at the national and international levels
- To follow the recommendations of the Kyoto Protocol
- To involve citizens
- To promote political changes
- Linkage with other sectors
- Trust in the future
- Commitment
- Responsibility
- Willingness for change
- Resistance

- To assume that any health problem is the subject of nursing care
- Ecological vision of social reality
- To improve the operational and resource management stages
- To control the production, marketing, distribution and consumption of processed products high in saturated sugars and fat
- Attitude contrary to smoking

In the same line of skills and attitudes, different **competences** in environmental health have been identified by the nurses. Based on the knowledge obtained, they should reflect on human action in the environment, and develop the capacity to interrelate and analyse the different parts of the problem as a whole. In addition, the ability to organize and manage projects, communication skills to promote healthy and sustainable environments and to be able to work with other experts in an interdisciplinary way are important (Table 5).

**Table 5. Competences for environmental sustainability in health care**

- Ability to explain the impact of social inequalities and climate change on health
- Ability to reflect on human action in the environment
- Ability to analyse and synthesize links between resources, climate change, sustainability and health
- Ability to discuss ethical issues about the allocation of health resources
- Capacity to discuss urgent issues of climate change
- To understand the context, with an ecosystem approach
- To understand environmental and social interrelations
- Specialization to address climate issues in various fields
- Ability to work interdisciplinary and communicate with experts in other areas
- To manage public subsidies
- To promote and participate in research
- To set priorities
- Ability to organize and plan environmental health activities in the community
- Ability to describe with examples the different types of environmental impact derived from health care
- Ability to describe the characteristics of a local environment that promotes health
- To identify potential synergies between policies and practices that promote environmental sustainability and health promotion
- Development of "citizen awareness programs"
- To promote access to green spaces, clean air and an active tourism infrastructure
- To promote a sustainable food production
- To promote food safety and protection of breastfeeding
- Ability to analyse and interpret pediatric environmental health history

Finally, the nurses' **behaviours** regarding environmental sustainability have been identified. Consistent with the knowledge, skills, attitudes and competences identified, nurses must proceed in an active, responsible and ethical manner, participating socially and individually. Thus, it is important to develop an ecological framework in nursing, and play the role of community nurse in environmental health. They should educate patients about environmental problems and health effects and advise them on

the efficient use of resources and waste management. These behaviours must be applied by nurses both in their personal life and in the health care provided as professionals (Table 6).

**Table 6. Behaviours for environmental sustainability in health care**

- To act under principles of democracy and dialogue
- Promoting social sustainability
- To participate in discussion forums on climate change and health
- To support regional policy initiatives for the treatment of wind power and sustainable agriculture
- To assess environmental risks at the local level
- To develop an ecological framework in nursing
- To act as responsible citizens
- To implement programs to improve environmental health knowledge
- Acting as teachers in the development of environmental health programs
- To educate patients on topics such as energy efficiency, responsible consumption, local consumption, etc.
- To develop the role of community nurse in environmental health
- Advising patients and society about environmental problems and their effects on health
- To create networks for nursing professionals to share their knowledge
- To work in multidisciplinary teams to encourage the creation of waste management policies
- To promote the achievement of sustainable hospitals
- To promote institutions to have storage rooms and waste incineration
- To review the supply, access, choice and distribution of food, as well as the loss of nutrients, especially in hospitals
- To encourage hospital menus consisting of food from local organic crops
- To reduce the amount of protein from the meat of the hospital menus
- To encourage patients to reduce the consumption of meat and products of animal origin
- To carry out tobacco prevention and treatment programs
- Home care to prevent smoking
- To make phone calls and video conferences for patient follow-up
- To encourage children's play in environments with quality air and safe water
- To use recyclable and / or reusable products
- To open only the packages of materials required in each procedure
- To reuse uncontaminated materials
- To minimize product packaging
- To avoid excessive and unnecessary use of gloves
- To dispose of each waste in the appropriate container
- To use public or collective transportation
- To use energy-efficient appliances
- To consume organic foods with minimal packaging
- To wear second-hand clothes
- To use of renewable and alternative energy
- To use of low power devices
- Efficient use of water
- To eliminate the use of bottled water



- To promote active tourism that respects the environment
- To apply sunscreen and protective clothing to minors
- To contribute to reducing the consumption of energy, water and carbon emissions
- To adjust facilities to achieve "clinical settings", "therapeutic environments", "environmental quality" and "friendly environments for the elderly"

## **Pedagogical strategies to address environmental sustainability in nursing**

Two educational approaches have been identified in programs for the inclusion of environmental sustainability in nursing education.

1. Participatory-Action Research (PAR): according to Cotton and Winter <sup>(13)</sup>, for nursing education on sustainability, work must be multidisciplinary, guided by a tutor and learning skills must be experience-based.

In this way, PAR can contribute to the learning necessary to transform the understanding of sustainability <sup>(13-19)</sup>, since it is a method of study and action that seeks to obtain reliable and useful results to improve collective situations, basing research on the participation of the groups to be investigated <sup>(51)</sup>.

2. Problem-based learning: problem-based learning <sup>(13,14,18,21)</sup> may be a methodological approach to be used, having to be student-centred, since it has a great responsibility in preserving the environment and is a key point in education for health <sup>(17,21-23)</sup>. It consists of an explanation by the teacher of some aspects of a subject they are dealing with and approaching a problem related to it, so that students, autonomously, must solve it through reflection and research, personal or small groups, interrelating all the subjects they study.

## **DISCUSSION**

The results of this narrative review allow identifying the knowledge, skills, attitudes, competences and behaviours that nurses must have about environmental sustainability, as well as the pedagogical strategies most appropriate for their acquisition. As a new contribution, we must point out that in a teaching context such as the current European Higher Education Area, it is of great interest to have a description of the competences needed to develop on environmental sustainability in the curriculum of nursing education.

Since the beginning of the 90's, it has been accepted that university education is decisive for achieving a culture of sustainability in future professionals in any field; this has been recognized and specified in a number of international publications, such as the Charter of Universities for the Sustainable Development in 1993, the Lüneburg Declaration in 1997, the Bonn Declaration in 2009 <sup>(11)</sup> and more recently the World Conference on Education for The Sustainable Development of Aichi-Nagoya in 2014. The truth is that all university students should be trained in their disciplines according to environmental and sustainable values <sup>(24)</sup>. But in addition, nursing is a discipline that has much to contribute to the health problems related to climate change. In this sense, nursing students, as future health agents, must acquire different knowledge that leads them to reach a central understanding of sustainability and to develop several special skills and competences in this field; for example, to communicate the problem to the

society or to possess a critical and ethical thought, so that in the future this perspective can be considered in their professional activity.

Therefore, it is fundamental that nursing achieve literacy in sustainability <sup>(8,10,13,18,25)</sup>, including in the curricula different key competences for sustainability, taking into account also that this is a requirement marked by the Spanish legislation (Royal Decree 1393/2007 the 29<sup>th</sup> of October, establishing the management of official university education) for the process of harmonization of higher education <sup>(11)</sup>. However, nursing curricula are still far from contemplating the dimension of environmental sustainability in the curriculum. As some authors point out, nurses are still poorly prepared in environmental issues <sup>(12)</sup>.

On the basis of this evidence, imminent changes in both undergraduate and postgraduate curricula are required. Numerous authors contribute with proposals, such as including theoretical and practical content, research based on experiences, problem-based learning or the use of various educational techniques <sup>(13,14,18,21,25,26)</sup>.

However, an issue that remains unclear is where to include sustainability contents. Possible proposals could be to create a subject in the last year of the degree in nursing or specific masters on environmental sustainability and health. Perhaps, since the environment affects many areas of health from different perspectives, initially the most feasible and beneficial would be to include the issue of sustainability transversally in different subjects such as those related to health promotion or community health, sexual and reproductive health, children's health or nutrition.

Although important steps are being taken, it is not enough to incorporate sustainability into the competences to be acquired in nursing; it is essential to have adequate learning environments, for example, creating "green" classrooms. This change must be accompanied by a responsible attitude and behaviour. Nurses must assume a proactive attitude towards environmental sustainability in their daily lives, with simple behaviours such as changes in their diet, reuse and recycling of materials or the use of public transportation.

At present, there are different models of food management and consumption that advocate sustainable land use and responsible and ethical feeding. To know and to spread this type of initiatives like Slow Food or Mensa Civic would be a subject to take into account in the promotion of health realized from nursing. They could even use the media to disseminate these problems that affect public health and alternative consumption patterns. Ultimately, management plans or policy changes could be promoted to achieve these goals.

Another issue is the need for training of teachers in environmental issues, since without them, adequate training would be impossible. The papers of Ull et al., Aznar et al. or Azcárate et al. <sup>(27)</sup> indicate that Spanish university teachers have deficient knowledge in environmental issues and that most of them have not yet joined the process of sustaining their own teaching practices <sup>(28)</sup>.

Equally important is the continuous training of professionals who already work in health institutions, to update their knowledge to the constant environmental changes that are occurring. In this sense, another series of more global changes are needed.

In order to achieve this, it is essential to consolidate the research in the field of nursing in environmental health, since this will be able to contribute results and to base the nursing leadership in this field. Based on this approach, a team from the University of Jaen, in cooperation with the Universities of Plymouth (UK), Esslingen (Germany) and Maastricht (Netherlands), are developing the NurSusTOOLKIT project<sup>(29)</sup>. The aim of this project is to enhance the availability/relevance of a sound learning offer in Sustainability Literacy and Competency (SLC) in nurse education by developing innovative teaching and learning approaches/materials, disseminating and promoting of good practices through strategic use of information technologies.

## CONCLUSIONS

Nursing training in environmental sustainability, climate change and health care should include competences at different levels. First of all, in the individual, understanding the fundamentals and the scope of the problem and acting accordingly in the professional environment and with the personnel. In addition, in the social sphere, nursing profession plays a key role in promoting environmental health.

## REFERENCES

1. Koppe C, Kovats S, Jendritzky G, Menne B. Heat waves: risks and responses. Health and Global Environmental Change. Series no 2 [Internet]. Copenhagen: World Health Organisation; 2004 [cited 2015 Mar 9]. Available from: [http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0008/96965/E82629.pdf](http://www.euro.who.int/__data/assets/pdf_file/0008/96965/E82629.pdf)
2. WHO Regional Office for Europe. Improving public health responses to extreme weather/heat-waves. Summary for policy-makers. EuroHEAT [Internet]. Copenhagen: Regional Office for Europe of the World Health Organization; 2009. Available from: [http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0010/95914/E92474.pdf?ua=1](http://www.euro.who.int/__data/assets/pdf_file/0010/95914/E92474.pdf?ua=1)
3. Patz JA, Frumkin H, Holloway T, Vimont DJ, Haines A. Climate change: challenges and opportunities for global health. JAMA. 2014 Oct 15;312(15):1565–80.
4. Rice MB, Thurston GD, Balmes JR, Pinkerton KE. Climate change. A global threat to cardiopulmonary health. Am J Respir Crit Care Med. 2014 Mar 1;189(5):512–9.
5. Semenza JC. Prototype early warning systems for vector-borne diseases in Europe. Int J Environ Res Public Health. 2015;12(6):6333–51.
6. Medlock JM, Leach SA. Effect of climate change on vector-borne disease risk in the UK. Lancet Infect Dis. 2015 Jun;15(6):721–30.
7. Intergovernmental Panel on Climate Change. Climate Change 2014. Mitigation of CLimate Change. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Internet]. Switzerland: Intergovernmental Panel on Climate Change; 2014. Available from: [http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR\\_AR5\\_FINAL\\_full.pdf](http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full.pdf)
8. Goodman B. The need for a “sustainability curriculum” in nurse education. Nurse Educ Today. 2011;31(8):733–7.
9. Barna S, Goodman B, Mortimer F. The health effects of climate change: What does a nurse need to know? Nurse Educ Today. 2012;32(7):765–71.
10. Richardson J, Grose J, Doman M, Kelsey J. The use of evidence-informed sustainability scenarios in the nursing curriculum: Development and evaluation of teaching methods. Nurse Educ Today. 2014;34(4):490–3.
11. Ull M., Martínez Agut M, Piñero A, Aznar Minguet P. Análisis de la introducción de la sostenibilidad en la enseñanza superior en Europa: Compromisos institucionales y propuestas curriculares. Rev Eureka Sobre Enseñ Divulg Las Cienc. 2010;7(No Extraordinario La Sostenibilidad en la Universidad):413–32.

12. Kirk M. The impact of globalization and environmental change on health: challenges for nurse education. *Nurse Educ Today*. 2002;22(1):60–71.
13. Anaker A, Elf M. Sustainability in nursing: a concept analysis. *Scand J Caring Sci*. 2014;28(2):381–9.
14. Andrews GJ. Global climate change: a framework for nursing action. *Aporia Nurs J*. 2009;1(1):22–9.
15. Barlow G. Nurses feel impact of climate change. *Aust Nurs J* July 1993. 2008;15(10):24–6.
16. Barrios S MM Cook M P. Educación en salud: en la búsqueda de metodologías innovadoras. *Cienc Enfermer [i]a*. 2011;17(Journal Article):57–69.
17. Butterfield P, Schenk E, Eide P, Hahn L, Postma J, Fitzgerald C, et al. Implementing AACN's recommendations for environmental sustainability in colleges of nursing: From concept to impact. *J Prof Nurs*. 2014;30(3):196–202.
18. Campbell S. Nursing the planet. *Prim Health Care*. 2008;18(3):41–8.
19. Camponogara S, Soares SGA, Viero CM, Erthal G, Diaz P da S, Peres RR, et al. Responsabilidade ambiental na visão de acadêmicos da área da saúde [i]pt; Environmental responsibility in the view of students in the health field [i]en; Responsabilidad ambiental en la visión de estudiantes del área de la salud [i]es. *Rev.enfermUERJ*. 2012;20(1):39–44.
20. Clarke U, Marks-Maran D. Nurse leadership in sustaining programmes of change. *Br J Nurs*. 2014;23(4):219–24.
21. Corrêa LB, Lunardi VL, De Conto SM. O processo de formação em saúde: o saber resíduos sólidos de serviços de saúde em vivências práticas [i]pt; The process of education in health: practical knowledge on solid wastes from healthcare services [i]en; El proceso de formación en salud: el tema resíduos sólidos de servicios de salud en vivencias prácticas [i]es. *Rev Bras Enferm*. 2007;60(1):21–5.
22. Cotton D WJ. Sustainability Education Perspectives and Practice Across Higher Education. In: Jones P SD Sterling S, editor. *It's not just bits of paper and light bulbs: a review of sustainability pedagogies and their potential for use in higher education*. Earthscan, London; 2010.
23. Crone M, Verlaan M, Willemsen M, van Soelen P, Reijneveld S, Sing R, et al. Sustainability of the prevention of passive infant smoking within well-baby clinics. *Health Educ Behav*. 2006;33(2):178–96.
24. Dunphy JL. Healthcare professionals' perspectives on environmental sustainability. *Nurs Ethics*. 2014;21(4):414–25.
25. Galiana Sánchez ME, Gascón Pérez E. La ecología como centro de interés: la enfermera comunitaria en salud ambiental. *Rev Rol Enferm*. 2004;(27(1)):21–8.
26. Future Skills Initiative Handbook (Nursing) Template Integrating "Sustainability" within Degree Programmes. University of East Anglia.;
27. Johnston N, Rogers M, Cross N, Sochan A. Global and planetary health: teaching as if the future matters. *Nurs Educ Perspect*. 2005;26(3):152–6.
28. Leffers J, Mitchell E. Conceptual Model for Partnership and Sustainability in Global Health. *Public Health Nurs*. 2011;28(1):91–102.
29. dos Santos Lopes Monteiro Dantas Da Silva CM, Suzelaine T, Picinini Santos NM, Ligia de Oliveira V. Consciência ambiental na Enfermagem Reconstruindo um mundo melhor com a contribuição dos estudantes. *Rev Enferm Refer [i]ncia*. 2010;III(Journal Article):35–43.
30. López Fernández MT, Pastor Torres E, Sánchez Saucó MF, Ferris Tortajada J, Ortega García JA. Enfermería en salud medioambiental. Experiencia en una unidad de salud medioambiental pediátrica. *Enferm Clínica*. 2009;(19(1)):43–7.

31. MacPhee M, Wejr P, Davis M, Semeniuk P, Scarborough K. Practice and academic nurse educators: finding common ground. *Int J Nurs Educ Scholarsh.* 2009;6(1):18p – 18p.
32. McCartney PR. Climate change and child health. *MCN Am J Matern Child Nurs.* 2007;32(4):255.
33. Middleton L, Howard AA, Dohrn J, Von Zinkernagel D, Parham Hopson D, Aranda-Naranjo B, et al. The Nursing Education Partnership Initiative (NEPI): innovations in nursing and midwifery education. *Acad Med J Assoc Am Med Coll.* 2014;89(8 Suppl):S24–8.
34. Pereira MS, Alves SB, Souza ACS e., Tipple AFV, Rezende FR de, Rodrigues Fërika Goulart. Waste management in non-hospital emergency units^ien Gerenciamento de res |duos em unidades n |úo hospitalares de urg |-ncia e emerg |-ncia^ipt Manejo de residuos en las unidades no hospitalarias de urgencia y emergencia^ies. *Rev Latinoam Enferm.* 2013;21(Journal Article):259–66.
35. Petersson Roldán M, Marrero Marrero M, Taboada Martínez C. Cambio climático y salud humana. 2010;32(Journal Article).
36. QAA763. Education for Sustainable Development: Guidance for UK higher education providers. The Quality Assurance Agency for Higher Education. London, UK; 2014.
37. Richardson J, Grose J, Jackson B, Gill JL, Sadeghian HB, Hertel J, et al. Effect of climate change and resource scarcity on health care. *Nurs Stand R Coll Nurs G B* 1987. 2014;28(45):44–9.
38. Sari V, Camponogara S. Desafios da educação ambiental em uma instituição hospitalar [Los desafíos de la educación ambiental en una institución hospitalaria]. *Texto Contexto Enferm.* 2014;(23(2)):469–78.
39. Sayre L, Rhazi N, Carpenter H, Hughes NL. Climate change and human health: the role of nurses in confronting the issue. *Nurs Adm Q.* 2010;34(4):334–42.
40. Sendall MC, Lidstone J, Fleming M, Domocol M. Nurses and teachers: partnerships for green health promotion. *J Sch Health.* 2013;83(7):508–13.
41. Stavrianopoulos T GO Gevrekı E. The role of nursing science in global climate Change. *Vima Tou Asklipiou.* 2010;09(4):460–72.
42. Strachan H, Dallest K. eCHIP: supporting clinical governance for Scotland's nurses. *Br J Healthc Comput Inf Manag.* 2003 Feb;20(1):26–7.
43. Svaldi JSD, Zamberlan C, Siqueira HCH de. Ecosystemic approach: a chance to build sustainable knowledge in nursing/health. *Esc Anna Nery.* 2013;17(Journal Article):542–7.
44. Stavrianopoulos T. GO Papadimitriou M. The attitude of nurses on global climate change. *Interscientific Health Care.* 2010;2(4):155–62.
45. Stein Backes MT SBD Crespo Dragol L, Santos Koerich M, Lorenzini Erdmann A. Cuidado ecológico como um fenômeno amplo e complexo. *Rev Bras Enferm.* 2011;(Journal Article):876–81.
46. Sterling S MPIDSJ. Linking thinking: New perspectives on thinking and learning for sustainability. Scotland, UK: World Wildlife Fund (WWF); 2005.
47. Sterling S. The Future Fit Framework: An introductory Guide to teaching and learning for sustainability in HE. York, UK: The Higher Education Academy; 2009.
48. Sustainable Development Unit. Fit for the future: Scenarios for low-carbon healthcare 2030. Cambridge, UK; 2009.
49. Cotton D WJ. Sustainability Education Perspectives and Practice Across Higher Education. In: Jones P SDSS, editor. It's not just bits of paper and light bulbs: a review of sustainability pedagogies and their potential for use in higher education. Earthscan, London; 2010.

50. Sustainable Development Unit. Fit for the future: Scenarios for low-carbon healthcare 2030. Cambridge, UK; 2009.
51. Alberich Nistal T. IAP, redes y mapas sociales: desde la investigación a la intervención social. *Portularia Rev Trab Soc.* 2008;8(1):131–51.
52. Aznar Minguet P, Ull M. La formación de competencias básicas para el desarrollo sostenible: el papel de la Universidad. *Rev Educ.* 2009;(Número Extraordinario 1: Educar para el desarrollo sostenible):219–37.
53. Barna S, Goodman B, Mortimer F. The health effects of climate change: What does a nurse need to know? *Nurse Educ Today.* 2012;32(7):765–71.
54. Azcárate P, Navarrete A, García E. Aproximación al nivel de inclusión de la sostenibilidad en los currícula universitarios. *Profr Rev Currículum Form Profr.* 2012;16(2):105–19.
55. Solís-Espallargas C, Valderrama-Hernández R. La educación para la sostenibilidad en la formación de profesorado. ¿Qué estamos haciendo? *Foro Educ.* 2015;13(19):165–92.
56. NurSusTOOLKIT Project [Internet]. [cited 2015 Oct 26]. Available from: <http://nursus.eu/>

ISSN 1695-6141

© [COPYRIGHT](#) Servicio de Publicaciones - Universidad de Murcia