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## RESEARCH ARTICLE

### KNOWLEDGE, ATTITUDES AND PRACTICES OF ENVIRONMENTAL EDUCATION IN MEDICAL STUDENTS OF THE AUTONOMOUS UNIVERSITY OF GUERRERO, MEXICO

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## INTRODUCTION

The present investigation is focused in the evaluation of knowledge, attitudes and environmental practices in the students of the Faculty of Medicine of the Autonomous

University of Guerrero, Mexico. It also tries to investigate if the topic of the environment is present in the learning units of the curriculum and in the teaching task of the academic institution, which represent concrete actions on the care of the environment.

The purpose of this work is to know the level of knowledge of environmental education and the actions they carry out in their school environment, information that will undoubtedly be useful to promote the participation of the school in the care of the environment. It is necessary that in the environmental assessment important aspects such as the subjects included in the study plan are taken, which help us to form an environmental education, mention that the school, in its pedagogical work, must put the student in contact with the environment natural and the environmental problems of their school-community, that is, offer them the experience through a series of activities aimed at the conservation of the environment (Espejel, 2012). In different studies it has been pointed out that the school can be the best opportunity to get information to the students about the care of the environment, as they point out (SOSA, 2010, p.44). "The school represents the main source of environmental information for students, unlike the general population of Mexico, who have their main means of scientific information on television, radio and newspapers (DE LA PEÑA, 2005). This points out the importance of formal education for students to achieve an adequate environmental education, taking into account that the mass media are important sources of environmental information, but not necessarily environmental education, given the elementary and diverse nature of the information that manage (COYLE, 2005). However, the potential of media such as television and the internet to improve the educational process can not be ignored. Therefore, the use of information and communication technologies as well as alternative education modalities are options that higher education institutions could implement to promote environmental culture, taking advantage of the fact that most of them have the necessary infrastructure to carry it out "(ESPEJEL, 2008) point out that it is important to seek that students understand and know the environmental issues and acquire knowledge, values and practical skills to participate and influence, in a responsible and effective way in the prevention and solution of environmental problems.

The accomplishment of the environmental knowledge evaluation in the Faculty of Medicine of the Autonomous University of Guerrero, is framed in what establishes the educational model of the institution that indicates the need for the environmental component to be a transversal axis during the formation of the students in the University, which could be a starting point for the design of strategies to achieve this institutional purpose (MODELO EDUCATIVO UAG, 2013). A research carried out at the Autonomous University of Guerrero, whose objective was to identify the incorporation of sustainability and the environment element as a transversal axis in the formal curriculum of three educational programs at the undergraduate level in which the curricula of said programs were analyzed. Interviewed managers, teachers and students, concluded that these curricular plans are not contemplating the insertion of the environment and sustainability element as stipulated in the Educational Model document of the UAGro, therefore, teachers do not have the competencies to promote the care of the environment, biodiversity and health prevention, consequently, students do not develop sustainable competences (BEDOLLA, et-al 2017). Currently, much is published on sustainable development, mainly in the field of education. According to Quiroz, (2011), the terms that make up this concept are specified so that its meaning can be understood. We will begin by defining development as a concept that is used in all spheres and countries and whose first

meaning is growth, change or improvement in a given period. Sustainability, in the eighties, is introduced in the ecological literature to qualify development and economic growth, especially referred to developing countries, sensitive to environmental problems. One of the best-known definitions of such a concept is "the ability to achieve sustained economic prosperity over time, while at the same time providing the natural systems of the planet and providing a high quality of life for people". Sustainable development, the first definition used and widely disseminated, is the one used in the Brundtland report in 1987, where sustainable development is considered as: "development that meets the needs of the present, without compromising the capacity of that future generations can meet their own needs. "As a result of the analysis and discussion of the concepts reviewed, the terms sustainability, sustainability and sustainable development can be used interchangeably, since for practical purposes they mean the same thing (QUIROZ, 2011). Environmental education is a tool that helps people develop a sense of responsibility, in terms of their actions with the environment (Foladori, 2011). In addition, Covas, in 2004, pointed out that environmental education should be based on community, systemic and interdisciplinary approaches. The purpose of this study is to measure knowledge, attitudes and environmental practices in students of the Faculty of Medicine of Guerrero, Mexico, which serves as a baseline measure to take action in favor of the environment. The following question was posed: What are the knowledge, attitudes and practices in environmental education in Medicine students of the Autonomous University of Guerrero.?

## **MATERIAL AND METHODS**

A cross-sectional, descriptive and observational study was carried out in a sample of 105 students chosen at random from the eighth semester with an enrollment of 1300 students during the period September to November 2016, of the Medicine career. Information on knowledge was obtained through the application of a survey for which 5 students (15 students per semester) were randomly selected in each school group. The survey was structured in three blocks, a section to assess attitudes, another for knowledge and the last environmental practices, using the scale of likert with a score of 1 to 5 considering the five as a rating of much and 1 as nothing. To observe and record environmental attitudes and practices, collateral sheets and diary books were used. The Faculty of Medicine of the Autonomous University of Guerrero located in the city and port of Acapulco, Guerrero, Mexico. The information obtained was organized in an Excel database and the analysis was subsequently carried out using percentages.

## **RESULTS**

The majority of the participants were women, with 64% and 36% men, it should be mentioned that the students collaborated voluntarily and respectfully with the study. It was found that 78% of the students mentioned that during the race they had some subject related to the environment, this is contrasted because when reviewing the contents of the Learning Units of the curriculum of the educational program at present none integrates the environmental component. To facilitate comprehension in the data analysis an adjustment was made to the original likert scale from 1 to 5 and it was preferred to consider 1 as nothing, 2 and 3 as regular and 4 and 5 as much.

**Table 1. Aspects related to environmental training at the Faculty of Medicine of UAGro. 2016**

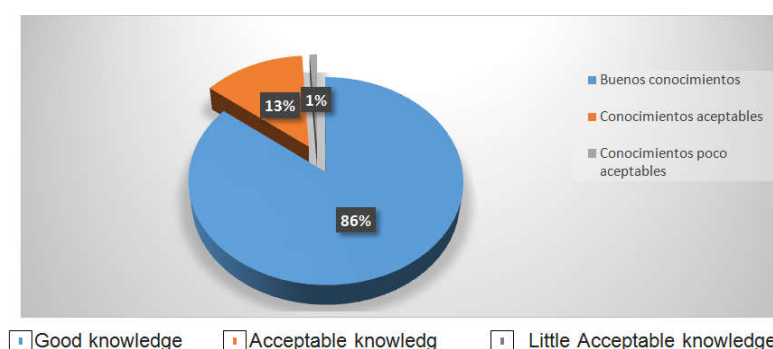
EVALUATION CRITERIA	Nothing	Regular	Much
Amount of materials related to the environment	47%	24%	29%
Knowledge about the current crisis of the environment	27%	31%	42%
Knowledge about the social dimension of environmental problems	27%	37%	36%
Work done on environmental issues	36%	31%	33%
Debates between colleagues about environmental problems	44%	29%	27%
Assistance with environmental practices with your teachers	54%	22%	24%
Study of the environmental problems of Acapulco	50%	15%	35%
Depth of learning about the environment	47%	23%	30%

Source: Prepared by the authors based on the survey conducted at the Faculty of Medicine of Guerrero, Mexico. 2016

**Table 2 Perception on the Importance of some actions in favor of the environment in the school environment of the Faculty of Medicine of UAGro**

EVALUATION CRITERIA	Not important	Less important	Very important
While you brush your teeth, do you think it's important to close the water tap?	1%	12%	87%
Do you think it is important to save electricity?	0%	3%	97%
Do you think that the consumption of electrical energy has negative consequences on the environment?	2%	16%	82%
Do you think it is important to use public transport instead of private transportation?	18%	39%	43%
Do you think it is important to classify garbage, reduce environmental impact?	5%	12%	83%
Do you think it is important to recycle to improve the environment?	0%	9%	91%
Do you think it is important to avoid throwing garbage on the ground?	1%	7%	92%

Source: Prepared by the authors based on the survey conducted at the Faculty of Medicine of Guerrero, Mexico. 2016



Source: Prepared by the authors based on the survey conducted at the Faculty of Medicine of Guerrero, Mexico, 2016.

**Figure 1. Evaluation of environmental knowledge in the medical students of UAGro**

The importance of the integration of subjects to the educational program with the environmental component is almost nil 47% nothing and 24% regular this could be without a doubt one of the explanations for the lack of environmental culture as more than half of the students consider having between nothing and regular knowledge about the current crisis of the environment (Table 1). A note to note is that 36% of students do not perform work on environmental issues, likewise, only 31% perform them on a regular basis (Table 1). To mention some example of work, we can name the debates held between colleagues about the environmental problems, when examining our databases and graphs we realize that more than half of the population studied makes debates related to the environmental issue. The discussion of works, debates or practices with colleagues and teachers can be an excellent reflective activity that will allow each student to express their opinion and reach collective conclusions. In relation to the saving of resources such as water, 87% believe that it is very important to close the tap while washing their teeth. It could be observed that among the problems that most concern the students are the contamination of soils since 91% and 92% believe that it is very important to recycle and not to throw garbage respectively.

The saving of energy is another aspect for the conservation of the environment 82% of students consider of utmost importance their responsible use. Speaking out of the educational environment, 39% of the students do not think it is of great importance to use public transport instead of private. It is worrisome that students consider that only bad practices related to garbage, water and electricity are what affect the environment. In general, we can say that 86% of students have good knowledge about the environment and if this knowledge is good applied, there should be positive results in relation to attitudes and practices in daily life (Figure No. 1). 13% had acceptable knowledge. However during the observation rounds it was found that even though the school buildings were well cared for, there is still carelessness and failures in the saving of electrical energy since after finishing school work, some classrooms had air equipment. Conditioned running and lamps lit at night. Regarding water saving, it was observed that when the clean water tanks are filled by pumping, there is waste of the vital liquid for a long time, leaks or badly closed faucets, with respect to the green areas they were found in good condition and with constant watering, what we can consider as good practices. On the other hand, the practice of environmental education is deficient in another sense, because

it still follows the problem of a poor disposal of garbage, garbage baskets without separating properly, the general containers reach 2 tons weekly and although it was separated as already Once in the school, the municipal public garbage collection service brings it back together, this discourages the incipient efforts. The containers of the RPBI are placed in inappropriate places. In addition to the above, students are willing to perform environmental actions with a low degree of complexity and with minimal involvement.

## DISCUSSION

In recent years the deterioration of the environment has aroused interest in various groups of the population, among which the educational centers stand out. As a result, some investigations have emerged in relation to this problem, focusing mainly on situations and / or causal agents. Among the main findings are three factors that are involved in the problem being these: the lack of knowledge, attitudes and environmental practices of the population in relation to the care and preservation of their environment, this work contains the elements that allow understanding and analyzing the level of knowledge, attitudes and practices of environmental education in students of the Faculty of Medicine of the Autonomous University of Guerrero. There have been few investigations at higher level institutions focused on knowing the environmental aspects that allow determining the capacity that students have for the preservation and care of their environment, for this reason there has been increasing interest in addressing this problem as a line of research, with the purpose of proposing and putting into practice initiatives with the purpose of minimizing the damage to the environment that directly and indirectly is caused by the activities of daily life.

One of the main objectives of the study presented here is to determine the level of knowledge held by the students of the Academic University of Medicine of the Autonomous University of Guerrero, which is closely related to the level of culture of each of the students in relation to the environment, undoubtedly this point has already been analyzed by other universities in the country, which have been interested in determining the level of knowledge and from this analyze the ability of students to environmental problems, such is the case Public University of Northern Peru, with its research called "Environmental attitudes and behaviors in nursing students of a public university of north of Perú", developed a descriptive study to determine attitudes and behaviors related to environmental health, and obtained the following results, which have been compared with the results obtained in this research in the Faculty of Medicine of the Autonomous University of Guerrero the result for the appropriate environmental attitudes was 96%, while for the Public University of Northern Peru was 92.3%.

The Autonomous University of Campeche, who in his research article entitled "Higher education and environmental culture in southeastern Mexico" also refers to the importance of determining the level of culture that students have in relation to the environment, all of the above allows establishing new initiatives that motivate to increase the level of knowledge in the University population to provide the necessary tools and cope with environmental problems. The respondents from the University of Campeche obtained as a result: in environmental attitudes a high score of 8.4, in contrast to our results we can see that the respondents had a good rating that shows that there

are positive attitudes in favor of the environment. A qualification of 5.8 in environmental knowledge considered as low for the Autonomous University of Campeche, unlike our institution in which students obtained 86% that is equivalent to good knowledge according to the scale used. In the results on the environmental practices in the Autonomous University of Campeche the students obtained a low qualification, the same was for the study of the University in Guerrero. In order to find a relationship of the institution with the environment in both universities; the students of the Environmental Biochemical and Sustainable Development Engineer courses have subjects that deal with the subject about the environment, while the careers with a focus on health as a Dental Surgeon and a Licentiate in Nursing do not have any matter related to the environment. with the results of the Faculty of Medicine of the Autonomous University of Guerrero which does not include the environmental component in the subjects of the curriculum. Another research, such as the one carried out by the University of Cartagena, through a qualitative study carried out an environmental project called "Green University" in which not only focused on determining the level of knowledge, attitudes and environmental practices of the Students, but this project allowed to contribute to sustainable development, and allowed students to acquire the ability to propose action alternatives for social development, which was reflected in the institutional vision in which this result was included; considering that this research experience could be an example so that as an educational institution we can implement actions that include the sustainability approach, which allow the entire school population to contribute enthusiastically to environmental educational development.

Undoubtedly the environment has been an issue that in recent years has aroused interest because its deterioration directly affects the population; the educational centers have taken initiatives to carry out research that allows the implementation of actions that promote the preservation and conservation of the environment, with Higher Education Education Centers having the highest growth. The studies reviewed show that the environmental interest is global, so Mexico has been one of the main precursors in conducting studies and initiatives in favor of the environment, which arise mainly in university educational institutions. For all the above, the research presented here is not intended to be a study on the environment but rather to take actions aimed at improving the school environment. It highlights the importance and the coincidence of the authors in taking into account environmental education as part of professional training, as well as starting to undertake new actions that allow their preservation and conservation.

## Conclusion

The students obtained a relatively high qualification in environmental knowledge and attitudes, despite this their perspective towards the integration of environmental education in the subjects of the academic program is deficient. Regarding environmental education practices, there is still the problem of poor disposal of garbage, baskets of garbage without separating properly, general containers reach 2 tons each week. Students are willing to perform environmental actions with a low degree of complexity and with a minimum involvement. This means that the school community has not yet understood the importance of relating environmental issues to the programmatic contents during their training, so the school needs an environmental education program to make

authorities, teachers and students aware and promoters. of health actions in favor of the environment as the training of teachers to integrate the environment axis to the Learning Units could contribute to a better management of solid waste, energy saving and conservation of natural resources. Likewise, it contributes to the integral formation of the health professional who will be inserted and participate in the decision making of a hospital or in the community.

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