

Evaluating physicians' knowledge, attitude and practice of their ethical responsibilities towards the environmental problem and air pollution

Saeedeh Saeedi Tehrani^{1,*}, Bagher Larijani^{2,3}, Alireza Parsapoor^{3,4}, Roya Rashidpouraie⁴, Mansoureh Madani⁴

¹ Department of Medical Ethics, School of Medicine, Iran University of Medical Sciences, Tehran, Iran

² Endocrinology and Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran

³ Medical Ethics and History of Medicine Research Center, Tehran University of Medical Sciences, Tehran, Iran

⁴ Department of Medical Ethics, School of Medicine, Tehran University of Medical Science, Tehran, Iran

ARTICLE INFORMATION

Article Chronology:

Received 10 March 2021

Revised 15 May 2021

Accepted 04 June 2021

Published 29 June 2021

Keywords:

Environmental moral responsibilities;
Physician attitude; Physician practice;
Environmental problems; Air pollution

CORRESPONDING AUTHOR:

s.saeeditehrani@yahoo.com

Tel: (+98 21) 86703325

Fax: (+98 21) 86703325

ABSTRACT

Introduction: Today, 25% of diseases in the world are directly or indirectly caused by environmental problems. The present study attempts to clarify physicians' moral responsibility in this regard and the roles they can play to decrease environmental problems. It also evaluates their attitudes towards and performance of these roles. The clarification of this issue paves the way for interventions through effective education or policy-making, as well as directing useful research.

Materials and methods: A questionnaire was developed based on the results of qualitative study. The questionnaire assessed physicians' awareness, attitude, and performance with regard to their environmental moral responsibilities.

Results: Physicians with longer work experience had better performance. Those who worked in offices or at universities had also better performances compared to those working in hospitals. Physicians with more awareness had better performance, especially those who had acquired this awareness through books and educational workshops.

The source of information was an effective factor on the gap between physicians' attitude and performance scores those who had acquired information from books had the narrowest gap and those who had received information from social networks had the widest gap between attitude and performance scores.

Conclusion: The health system and the environment and its problems are intertwined and greatly influence each other. Thus this interrelation and the necessity of being concerned and having moral sensitivity were explained.

Introduction

Rapid advances in technology and ever-increasing changes of the modern world have caused many environmental hazards

including climate change, air, water, and soil pollution, unsustainable use of world resources, ecosystem change, drainage of rivers and lakes, extinction of animal and plant

Please cite this article as: Saeedi Tehrani S, Larijani B, Parsapoor A, Rashidpouraie R, Madani M. Evaluating physicians' knowledge, attitude and practice of their ethical responsibilities towards the environmental problem and air pollution. Journal of Air Pollution and Health. 2021; 6(2): 149-160.

species, and other problems. These hazards can affect the public health so profoundly that there is now a close correlation between environmental hazards and the public health. According to the World Health Organization (WHO), a quarter of all human illnesses and deaths are related to environmental factors [1]. All environmental crises will both directly and indirectly affect human health, and the health system must incur all the costs and consequences of environmental degradation [2]. Thus, the health system should take serious actions in the matter.

At the same time, there is a two-way relationship between the health system and the environment, and the health industry itself can pose serious risks to the environment. In fact, different parts of the health system cause many environmental problems, and the use of different products, technologies, and waste-producing resources made the health industry one of the major sources of pollution worldwide. The increasing use of detergents, hospital waste, observance of biosecurity in laboratories as well as genetic and biotechnological research and ecosystem changes are some cases of environmental impacts caused by the health industry [3-5]. Hence, physicians themselves can harm the environment. They also face the diseases caused by environmental crises every day. Both sides of this relationship, an effective principle of which includes physicians, must carefully be scrutinized [6]. Accordingly, a special ethical responsibility lies with physicians, who not only face environmental crises in general as citizens but also play professional roles in the matter in particular. In addition, special attention should be paid to the fact that physicians are role models in society. The professional commitments of physicians also include educational, research, supervisory, communicative, and managerial roles [7]. Physicians' awareness, sensitivity, attitudes, and performance in relation to their

ethical responsibility can play a significant role in protecting the environment. It is essential to know what personal and professional priorities the matter has for physicians and what attitudes and behavior they show toward their roles in reducing environmental crises. Since a few studies have been conducted on physicians' awareness, attitudes, and performance in relation to the environment, this study aims to analyze the awareness, attitudes, and performance of physicians, specialists, and other individuals involved in the matter. Such a study provides the means to develop appropriate interventions to change or reinforce the attitudes and behavior of this influential group and develops a framework for further research to find the barriers to the realization of right attitudes toward the matter.

Materials and methods

A cross-sectional analytical study was conducted in 2017 to quantitatively analyze the awareness, attitudes, and performance of physicians in relation to their environmental responsibilities. Since there were no valid measurement tools for this purpose in Iran and other countries, the research team decided to develop a researcher-made questionnaire. To this end, the initial questionnaire was based on the literature review and a qualitative study conducted in 2016 [7]. According to the results of focus groups (group interview), four categories and 20 themes were extracted in 4 dimensions. These dimensions were physicians as ordinary citizens, physicians as special citizens (role models), physicians as professionals with individual and social commitments, and physicians as the officials of the health system. The final version of the questionnaire was based on the principal components and the resultant instances. As the first validation step, the questionnaires were distributed to 35 experts) 20 ethicist, 10 methodologist, 5 clinical specialist(, 20 of whom completed and returned them.

After the data analysis, Two questions that did not receive the required statistical score were removed, and other items were revised. In the second validation step, the third draft of the questionnaire was sent to 30 experts, 20 of whom filled it out and returned it. At this stage, the validity of the content and the transparency and appropriateness of each question were assessed and expert opinions and comments were applied to items, and the fourth draft of the questionnaire was developed for the reliability evaluation. The questionnaire reliability was evaluated by using the test-retest method. After evaluating the resultant statistical index, the sample size was determined to be 200. The respondents were selected from the participants of three congresses held in Tehran. Since over 80% of items in some questionnaires were left unanswered, some of the respondents were selected via email and Telegram groups. The statistical data analysis was performed in SPSS 19.

Results and discussion

The questionnaire consisted of three parts: Part 1) consisted of two stages. The first stage asked the participants about the demographic information, and the second stage asked them about their environmental responsibilities, and if they had the information, the next question was where they got their information from. Part 2) Participants' attitudes toward their environmental responsibilities toward air pollution were assessed in 9 questions. Part 3) Participants' performance toward their environmental responsibilities toward air pollution were assessed in 9 questions.

Demographic characteristics

The results showed that 10 respondents (4.9%) were under 35 years and that 148 respondents (72.9) were over 40 years. Regarding gender, 134 respondents (66.0%) were male, whereas

69 of them (34.0%) were female. The results also indicated that the physicians under study could have more than one workplace, a finding indicating why the total frequency was over 203. In terms of majors, 67 respondents (33.0%) were general practitioners, whereas 56 respondents (27.6%) were specialists, and the rest of them (39.4%) were dentists. Based on the frequency distribution and percentage of physicians' work experience, 56 respondents (27.6%) had less than 5 years of experience, and 128 respondents (63.1%) had more than 10 years of experience.

Awareness of environmental responsibilities toward environmental problem and air pollution and source of information

The results demonstrated that 100 respondents (49.3%) were aware of their environmental responsibilities. In addition, 22%, 32%, 41%, and 5% of respondents had acquired information on their environmental responsibilities toward environmental problem and air pollution at work through books, papers, social networks, and workshops, respectively.

Physicians' attitudes toward their environmental responsibilities

Table 1 indicates frequency distribution (%), mean, and standard deviation of physicians' attitudes toward their environmental responsibilities toward environmental problem and air pollution in different areas. From physicians' perspective, it was very important to conduct relevant studies on air pollution and its effects on human health (with a mean of 4.62), provide accurate data and reports for the health system (with a weight of 4.61), and modify individual behavior to protect the environment (with a weight of 4.62). The least important factor mentioned by physicians was writing scientific papers on environmental problems such as environmental problem and air pollution and its effects on human health.

Table 1. Frequency distribution (%), mean, and standard deviation of medical physicians' attitude toward their environmental responsibilities

No.	Items of attitude	Not at all	To a small extent	To some extent	To a large extent	Very much	Mean \pm SD
1	How important is my correct personal behavior for protecting the environment?	0 (0)	0 (0)	13 (6.4)	56 (27.6)	134 (66.0)	4.60 \pm 0.61
2	How important is raising public awareness about the environment (by direct education)?	0 (0)	1 (0.5)	38 (18.7)	41 (20.2)	123 (60.6)	4.41 \pm 0.81
3	How important is publishing scientific papers on environmental issues, such as air pollution, and their impact on human health?	0 (0)	1 (0.5)	51 (25.1)	78 (38.4)	73 (36.0)	4.10 \pm 0.79
4	How important is publishing awareness-raising articles on environmental issues in general-audience publications and media?	0 (0)	0 (0)	24 (11.8)	111 (54.7)	68 (33.5)	4.22 \pm 0.64
5	How important is presenting accurate and scientific statistics and reports in the health-care system?	0 (0)	0 (0)	5 (2.5)	67 (33.0)	131 (64.5)	4.62 \pm 0.54
6	How important is carrying out research on air pollution and its impact on human health?	0 (0)	0 (0)	14 (6.9)	52 (25.6)	137 (67.5)	4.61 \pm 0.62
7	How important is directly educating students about environmental issues and raising awareness at the university?	0 (0)	0 (0)	13 (6.4)	101 (49.8)	89 (43.8)	4.37 \pm 0.60
8	How important is it that I am well-informed about medical waste management protocols and workplace health guidelines?	0 (0)	1 (0.5)	30 (14.8)	112 (55.2)	60 (29.6)	4.13 \pm 0.69
9	How important is it that doctors follow and respond to environmental degradation accordingly and promptly?	0 (0)	1 (0.5)	51 (25.1)	72 (35.5)	79 (38.9)	4.13 \pm 0.80

Physicians' performance in relation to their environmental responsibilities

Table 2 shows frequency distribution (%), mean, and standard deviation of physicians' performance in relation to their environmental responsibilities toward environmental problem and air pollution in different areas. The results indicated that physicians showed the best performance in the observance of modified individual behavior to protect the

environment (with a mean score of (3.41) and adherence to biological waste management protocols and workplace health guidelines (with a mean score of 2.99). In addition, they had the worst performance in the procurement of accurate data and reports for the health system (with a mean score of 1.48) and implementation of relevant studies on air pollution and its effects on human health (with a mean score of 1.50).

Table 2. Frequency distribution (%), mean, and standard deviation of physicians' actions regarding their environmental responsibilities

No.	Items of conduct	Not at all	To a small extent	To some extent	To a large extent	Very much	Mean \pm SD
1	How much have I changed my personal behavior to protect the environment?	1 (0.5)	33 (16.3)	60 (29.6)	100 (49.3)	9 (4.4)	3.41 \pm 0.83
2	How much have I contributed to raising awareness about the environment by disseminating information as a form of direct education?	5 (2.5)	109 (53.7)	65 (32.0)	24 (11.8)	0 (0)	2.53 \pm 0.73
3	How much effort have I put in publishing research papers focusing on environmental issues, including air pollution and its impact on human health?	119 (58.6)	58 (28.6)	26 (12.8)	0 (0)	0 (0)	1.54 \pm 0.71
4	How much have I reached out to the general public through publishing awareness-raising articles on the environment?	83 (40.9)	102 (50.2)	18 (8.9)	0 (0)	0 (0)	1.68 \pm 0.63
5	How much have I managed to provide the health-care system with accurate statistics and scientific reports in this regard?	115 (56.7)	75 (36.9)	12 (5.9)	1 (0.5)	0 (0)	1.50 \pm 0.63
6	How much research have I conducted on air pollution and its impact on human health?	111 (54.7)	86 (42.4)	6 (3.0)	0 (0)	0 (0)	1.48 \pm 0.56
7	How much have I contributed to raising awareness in the university by directly educating the students about environmental issues?	55 (27.1)	110 (54.2)	30 (14.8)	8 (3.9)	0 (0)	1.96 \pm 0.76
8	How much have I adhered to medical waste management protocols and workplace health guidelines?	21 (10.3)	46 (22.7)	78 (38.4)	31 (15.3)	27 (13.3)	2.99 \pm 0.95
9	How much have I followed environmental issues and responded accordingly?	18 (8.9)	111 (54.7)	61 (30.0)	7 (3.4)	6 (3.0)	2.37 \pm 0.80

Comparison of attitude scores

The results showed that gender, age, workplace, major, and work experience made significant differences between the respondents in terms of the mean score of their attitudes toward their environmental responsibilities. There was also a difference between their attitudes with regard to the source of acquiring information on environmental responsibilities.

The results demonstrated that the mean

score of attitudes was significantly higher in physicians of older ages ($p < 0.001$), male physicians ($p = 0.006$), and those who were working in an office ($p < 0.001$). In terms of major, specialists obtained a higher mean score of attitudes than general practitioners and dentists ($p = 0.017$). Moreover, the mean score of attitudes was higher in physicians with more work experience ($p < 0.001$).

The results also indicated that the physicians who were aware of their environmental

responsibilities toward environmental problem and air pollution gained a higher mean score of attitudes than others ($p < 0.001$). At the same time, those who had acquired information on their environmental responsibilities toward environmental problem and air pollution through social networks exhibited more positive attitudes to this issue ($p < 0.001$).

Comparison of performance scores

The results showed that age, workplace, major, and work experience made significant differences among the respondents in terms of the mean score of their performance in environmental responsibilities. In addition, there was a difference between their performance with regard to the source of acquiring information on environmental responsibilities.

The results demonstrated that the mean score of performance was significantly higher in physicians of older ages ($p < 0.001$) and those who were working in an office or a university ($p = 0.005$). However, there was no significant difference between male and female physicians in this regard ($p = 0.38$). In terms of major, general practitioners and dentists obtained higher mean scores of performance than specialists ($p = 0.048$). Moreover, the mean score of performance was higher in physicians with more work experience ($p < 0.001$).

The results also indicated that the physicians who were aware of their environmental responsibilities toward environmental problem and air pollution gained a higher mean score of performance than others ($p < 0.001$). Furthermore, those who had acquired information on environmental responsibilities toward air pollution through books and workshops outperformed others in this regard ($p < 0.001$).

Comparison of the gap between attitude and

performance scores

The gap between physicians' attitude and performance scores in terms of demographic characteristics was analyzed by using the Mann–Whitney U test (for two groups) and the Kruskal–Wallis test (for more than two groups).

Table 3 shows the mean and standard deviation of the gap between physicians' attitudes and performance in relation to their environmental responsibilities toward air pollution in different demographic groups. The results indicated that gender, workplace, and major made significant differences in the physicians in terms of the mean gap score. In addition, there was a significant difference between the physicians in the mean gap score by the source of acquiring information on environmental responsibilities. Age and work experience had no effects on the mean score of the gap between physicians' attitudes and performance in relation to environmental responsibilities.

The results also demonstrated that there was no significant difference between physicians of different ages in the mean gap score ($p = 0.25$). However, the mean gap score of men was higher than that of women ($p < 0.001$). The mean gap score was lower in physicians working in an office or a university than those working in a hospital ($p = 0.004$). In terms of major, specialists obtained a higher mean gap score than general practitioners and dentists ($p < 0.001$). Work experience ($p = 0.87$) and awareness of environmental responsibilities toward environmental problem and air pollution ($p = 0.94$) did not significantly change the mean gap score.

Furthermore, the highest and the lowest mean gap scores were related to physicians who acquired information on environmental responsibilities toward environmental problem and air pollution through books and social networks, respectively ($p < 0.001$).

Table 3. Mean and median of the attitude-behavior gap and their comparison across groups

Variable	Groups	Mean \pm SD	Median (Min - Max)	P-value
Age	Below 35	66.25 \pm 81.8	62.50 (59.38–84.38)	0.25
	35 to 40 years	66.59 \pm 9.48	62.50 (59.38–84.38)	
	Over 40	57.05 \pm 14.29	62.50 (21.88–87.50)	
Gender	Male	60.82 \pm 12.99	62.50 (21.88–87.50)	0.001 >
	Female	54.03 \pm 12.99	62.50 (21.88–87.50)	
Working place	Private practice	61.59 \pm 8.96	62.50 (21.88–87.50)	0.004
	Hospital	64.32 \pm 13.75	62.50 (21.88–87.50)	
	University	54.27 \pm 12.31	62.50 (21.88–87.50)	
Specialty	Physician	54.99 \pm 12.85	62.50 (21.88–87.50)	0.001 >
	Medical Specialist	64.90 \pm 11.24	65.37 (37.50–87.50)	
	Dentist	56.99 \pm 13.72	62.50 (21.88–87.50)	
Professional experience	Less than 5 years	61.83 \pm 11.77	59.38 (34.38–84.38)	0.87
	5 to 10 years	61.78 \pm 5.63	62.50 (21.88–87.50)	
	More than 10 years	56.59 \pm 15.63	62.50 (21.88–87.50)	
Awareness	Yes	57.13 \pm 14.76	62.50 (21.88–87.50)	0.94
	No	59.86 \pm 11.75	62.50 (21.88–87.50)	
Source of information	Books	38.07 \pm 7.69	39.06 (21.88–62.50)	0.001 >
	Papers	55.76 \pm 9.69	62.50 (40.63–71.88)	
	Workshops	56.88 \pm 25.14	62.50 (59.38–84.38)	
	Social media	68.45 \pm 6.28	68.75 (43.75–87.50)	
Gap score	Total	58.51 \pm 13.25	62.50 (21.88–87.50)	

Relationship between attitudes and source of information

The results showed that there was a significant relationship between attitude toward different components and source of information ($p < 0.0001$). The physicians who had acquired

information on environmental responsibilities toward environmental problem and air pollution through social networks exhibited more positive attitudes toward different components. However, the physicians whose sources of information were books exhibited weaker attitudes.

Relationship between performance and source of information

The results demonstrated that there was a significant relationship between performance in all components and source of information ($p < 0.001$). The physicians who had acquired information on environmental responsibilities toward environmental problem and air pollution through social networks exhibited poorer performance in most components, whereas the physicians whose sources of information were books or papers showed performed better in different components.

Relationship of demographic variables and physicians' attitudes and performance in relation to the biological waste management protocols and workplace health guidelines

The relationships of age, gender, workplace, major, awareness, and sources of information with a positive attitude toward protocols were reported statistically significant. In addition, there was a significant relationship between positive performance regarding protocols and some demographic variables, including age, workplace, and work experience.

This study is premised on the assumption that one needs enough information and then incorporates it into their attitudes in order to achieve the best performance. A serious criticism of this assumption is that it ignores the restrictions [8, 9]. However, because of the paucity of similar studies conducted on the environment, this study did not go into more details and employed the same simple model.

Improper performance and wrong behavior can result from two factors, the first of which is the insufficient awareness of environmental responsibilities. It is obvious that cognition, knowledge, and awareness of environmental responsibilities toward environmental problem and air pollution are the prerequisites

for ethical performance. The second factor is the gap between attitudes and ethical actions. This can be attributed to the gap between knowledge and attitude or the gap between attitude and performance. Many individuals refuse to do ethical actions, despite having enough awareness and positive attitudes. This is the origin of most of the unethical behavior, which is referred to as the gap between attitudes and ethical actions. Such a gap is attributed to several factors like lack of ethical sensitivity and motivation, weakness of reasoning [10, 11], inability to oppose social norms, and a sense of inability or low ability [12, 13].

Some of the main findings of this study are as follows:

The most important research finding was related to physicians' awareness. The data showed that more than half of the respondents had received essentially no information about this issue. In this study, 103 respondents (53.7%) had formally obtained no information about their ethical responsibilities for the environment.

The study also suggested that most physicians had acquired their information on environmental responsibilities toward air pollution through social networks, and the minority of them were informed through books and papers. Workshops and universities played a negligible role in this regard, the fact which is corroborated by some other studies. For instance, in a study conducted on 415 students from different faculties of the University of Mazandaran in the academic year 2011-2012, the results indicated that there was no consistent pattern for the level of environmental literacy of higher education students [14]. Poor performance due to the gap between awareness and attitude or the gap between attitude and performance was another research finding. As discussed earlier,

this study aimed to analyze the environmental performance of physicians. It was observed that the respondents had performed poorly on their environmental responsibilities. In a study conducted on a hospital affiliated with Tehran University of Medical Sciences, the participants exhibited poor performance in the areas of health, safety, and the environment, despite having enough awareness and positive attitudes [15]. In another study conducted on the students of state universities in Mazandaran Province, there was a weak relationship between attitude and performance [14]. The data demonstrated that gender, age, workplace, major, and work experience made a significant difference between physicians in terms of the mean score of attitude. Moreover, the source of information led to different attitudes of physicians toward their environmental responsibilities. A study was showed that there was a direct relationship between educational attainment and attitude ($p < 0.05$) [15].

The physicians who were aware of their environmental responsibilities toward air pollution exhibited more positive attitudes than those who were unaware of such responsibilities. Therefore, it can be concluded that increasing physicians' awareness of their environmental responsibilities toward air pollution would make for more positive attitudes toward these issues. At the same time, the physicians whose sources of information were social networks exhibited more positive attitudes toward environmental responsibilities. This may be due to easy access to social networks, which is the source of information and awareness for many people in today's world. This means of communication is inexpensive and can be used at any place and time. Some previous studies have also reported the effect of virtual networks and TV on awareness of environmental responsibilities toward air

pollution [16]. This can be also attributed to the widespread publicity of virtual networks in relation to the environment. The effect of cyberspace on today's world and on changing people's attitude and character should not be overlooked. However, social networks may provide people with false and incorrect information. Hence, service providers are recommended to acquire information from credible and accurate sources in order to adopt correct attitudes.

The mean score of performance was significantly higher in physicians of older ages and those who were working in an office or a university. However, there was no significant difference between male and female physicians in this regard. In terms of major, general practitioners and dentists obtained a higher mean score of performance compared to specialists. Moreover, the mean score of performance was higher in physicians with more work experience.

The physicians who were aware of their environmental responsibilities toward air pollution exhibited better performance than others. It is obvious that people should have the necessary awareness and insight to perform properly. In addition, the physicians whose source of information was books and workshops showed better performance. It can be hence concluded that awareness is necessary for adopting a correct attitude and then proper performance, but the source of information is also important. In this study, the physicians whose source of information was social networks had adopted positive attitudes, but those whose source of information was books and workshops exhibited better performance. This means that although the media had led to more positive attitudes, they could not make for the best performance. This can be attributed to the fact the information provided

by the media is sometimes superficial and fake. The content of the media mostly aims to excite the audience, whereas books usually create more favorable and stronger attitudes. As a matter of fact, stronger attitudes are more likely to lead to actions. In addition, the attitudes that are more consistent with beliefs and become part of the personality can lead to better performance.

The physicians who were working in an office or a university performed better than those working in hospitals. Since the hospital codes of conduct do not contain environmental considerations, the hospital staff needs organizational protocols and codes for proper environmental performance. Given the fact that biological waste management in hospital is of special importance, hospital managers are advised to design a framework for correct organizational behavior. A major action that can be taken by the Ministry of Health and Medical Education in line with environmental protection is the construction of green hospitals.

From physicians' perspective, conducting relevant studies on air pollution and its effects on human health and writing scientific papers on environmental problems such as air pollution and its effects on human health were the most and the least important factors, respectively.

Since writing scientific papers on this subject can create reasonable and scientific evidence on the effects and risks of environmental problems on human health, something which can lead to scientific assumptions and theories, the necessity of this issue should be clarified for service providers and encourage them to pursue the issue.

Conclusion

This study aimed to acquire information on physicians' awareness, attitudes, and performance in relation to their environmental responsibilities toward air pollution in order to develop interventions for improving physicians' performance.

The research findings suggested that, unlike many other behavioral traits, poor performance in relation to environmental issues is attributed to low awareness rather than the gap between opinion and action. Unfortunately, environmental issues have been neglected by Iranian educational policymakers, especially in medical education. The low awareness of physicians is achieved mainly through virtual networks that do not make for favorable performance, as shown in this study.

Since environmental issues are closely linked to our individual lives and personal interests, it is not difficult to convince physicians and increase their sensitivity and ethical motivation. However, a few efforts have been made to promote correct behavior in the field of environmental protection. Iranian physicians may perform properly either based on their own general information or as they grow older.

The research findings demonstrated that the main problem is that the health system policymakers and authorities are not worried about environmental issues and develop any special intervention to improve the environmental performance of physicians.

It is necessary to conduct further studies to identify the existing research gaps and provide policymakers with the necessary information to develop the relevant interventions. Moreover, laws and executive mechanisms to protect the environment need to be revised.

Finally, effective training should now be considered the main intervention.

Financial supports

This study was not financially supported.

Competing interests

There is no conflict of interest among the authors.

Acknowledgements

This study was extracted from the researcher's Ph.D. dissertation supported by Tehran University of Medical Sciences.

Ethical considerations

This study has an ethics code from the ethics committee of the Tehran University of Medical Sciences. (No. 1686-1395).

References

1. Remoundou K, Koundouri P. Environmental effects on public health: An economic perspective. *International journal of environmental research and public health*. 2009 Aug;6(8):2160-78.. doi:10.3390/ijerph6082160
2. Ebi KL, Mills DM, Smith JB, Grambsch A. Climate change and human health impacts in the United States: an update on the results of the US national assessment. *Environmental health perspectives*. 2006 Sep;114(9):1318-24.
3. Eckelman MJ, Sherman J. Environmental impacts of the U.S. health care system and effects on public health. *PLoS One*. 2016;11(6):e0157014. Published 2016 Jun 9. doi:10.1371/journal.pone.0157014.
4. Thiel CL, Eckelman M, Guido R, Huddleston M, Landis AE, Sherman J, Shrake SO, Copley-Woods N, Bilec MM. Environmental impacts of surgical procedures: life cycle assessment of hysterectomy in the United States. *Environmental science & technology*. 2015 Feb 3;49(3):1779-86.
5. Sherman J, Le C, Lamers V, Eckelman M. Life cycle greenhouse gas emissions of anesthetic drugs. *Anesthesia & Analgesia*. 2012 May 1;114(5):1086-90.
6. Eckelman MJ, Sherman J. Environmental impacts of the US health care system and effects on public health. *PloS one*. 2016 Jun 9;11(6):e0157014.
7. Saeditehrani S, Parsapour A, Nedjat S, Kadivar M, Larijani B. Physicians' attitude toward their ethical responsibility regarding air pollution: a qualitative research. *Journal of medical ethics and history of medicine*. 2017;10.
8. Ajzen I. The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211.
9. Sanz-Barbero B, Prieto ME, Cambas N. Factors associated with a positive attitude towards receiving cancer information: a population-based study in Spain. *Health Expectations*. 2016 Apr;19(2):288-98. doi:10.1111/hex.12349
10. Madani M, Larijani B, Madani E, Ghasemzadeh N. Establishment of medical education upon internalization of virtue ethics: bridging the gap between theory and practice. *Journal of medical ethics and history of medicine*. 2017;10.
11. Johnson CD. Meeting the ethical challenges of leadership: Casting light or shadow by Craig E. Johnson. 2012:202-205.
12. Kuczynski L, Navara GS, Killen M, Smetana JG. *Handbook of moral development*. USA: Psychology Press; 2005. pp. 299–330.
13. Cislighi B, Heise L. Theory and practice of social norms interventions: eight common pitfalls. *Globalization and health*. 2018;14(1):83. Published 2018 Aug 17. doi:10.1186/s12992-018-0398-x.
14. Salehi S, Pazaki Nejad Z. Environment in Higher Education: Assessing the environmental knowledge of Mazandaran public university students. *Journal of Educational Planning Studies [In Persian]*. 2014; 2 (4): 199-221.

15. Rezaei MS, Golbabaei Fh, Behzadi MHassan. Survey of knowledge, attitude and practice of employees in the field of health, safety and environment in one of the teaching hospitals of Iran University of Medical Sciences (2013-2013). *Journal of Environmental Science and Technology* [In Persian]. 2017; 19 (Special Issue No. 4): 347-355. doi: 10.22034 / jest.2017.10736
16. Abdi Z. The Role and Function of Mass Media on Environmental Issues. *Social Welfare Quarterly*. 2015 Jan 10;14(55):315-50.