Journal of Air Pollution and Health (Spring 2017); 2(2): 81-86

Original Article

Available online at http://japh.tums.ac.ir

KNOWELEDGE AND ATTITUDE OF UNIVERSITY STUDENTS ABOUT AIR POLLUTION PROBLEM IN TEHRAN, IRAN (2015-2016)

Fatemeh Mohammadkhah[1], Akbar Babaei Heydarabadi[2], Mostafa Hadei[3], Sakineh Rakhshanderou[4], Mohammad Hossein Vaziri[5], Abbas Shahsavani[6,7]*

[1] Students' Research Committee, School of Public Health, Shahid Beheshti University of Medical Sciences, Tehran, Iran

[2] Department of Health Education and Health Promotion, School of Public Health, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

[3] Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran

[4] Department of Public Health, School of Public Health, Shahid Beheshti University of Medical Sciences, Tehran, Iran

[5] Department of Public Health, Faculty of Health, Safety and Environment (HSE), Shahid Beheshti University of Medical Sciences, Tehran, Iran

[6] Environmental and Occupational Hazards Control Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran

[7] Department of Environmental Health Engineering, School of Public Health, Shahid Beheshti University of Medical Sciences, Tehran, Iran

ARTICLE INFORMATION

Article Chronology:

Received 10 April 2017
Revised 9 May 2017
Accepted 14 June 2017
Published 29 June 2017

Keywords:

Particulate matter; attitude; perception; concern; behavior

CORRESPONDING AUTHOR:

ashahsavani@sbmu.ac.ir
Tel: (+98 21) 22432040
Fax: (+98 21) 22432037

ABSTRACT:

Introduction: Understanding public attitudes for planning policies and actions to control air pollution is important. Attitude is partially socially constructed and thus must be studied in each area separately, rather than inferred from other settings. This study was aimed to evaluate the knowledge and attitudes of university students about the air pollution sources and solutions in Tehran.

Material and methods: 200 students of Shahid Beheshti University of Medical Sciences (SBMU) during 2015 - 2016 years were selected by random sampling. The questionnaires were used to collect data consisted of four parts: demographic information, knowledge, attitude, and solutions for reducing air pollution.

Results: Most of the participants were 18 - 22 years old, male, single, studying in bachelor degree, and from Tehran. Significant correlations were found between attitude on one side and age, gender, marital status, and education level on the other side. The most approved solutions for air pollution by students were improvement of the quality of fuel (84.7%) and vehicles (79.7%), and development of green space (76.2%).

Conclusions: Educational programs must be designed to raise the level of public attitude about air pollution. Citizens should be a part of any solution for environmental problems.

INTRODUCTION

Environmental pollution is known as the main challenge of urban life, and imposes significant health and financial losses to countries. Among environmental risk factors, air pollution is introduced as the most important one [1]. According to a report by World Health Organization, indoor and outdoor air pollution cause 7 million deaths

Please cite this article as : Mohammadkhah F, Babaei Heydarabadi AA, Hadei M, Rakhshanderou S, Vaziri MH, Shahsavani A. Knowledge and attitude of university students about air pollution problem in Tehran, Iran (2015 – 2016). Journal of Air Pollution and Health. 2017; 2(2): 81 - 86

annually. The majority of these deaths occur in developing countries [2]. Acute and chronic exposures to air pollution lead to many health outcomes, such as cardiovascular, respiratory, and cerebrovascular disorders [3-7].

Air pollution originates from various sources, but mainly is caused by human activities such as vehicles, industries, etc. Solid, liquid or gaseous materials released into the air from natural resources or human activities, impose damages to human, plants and animals' health, and the ecosystem balance [8]. The most polluted cities cannot be determined based on available data. Although according to WHO's database, air pollution is high in a number of cities in China, India, Iran, etc [9].

The most important health burden of air pollution can be seen in developing countries [1]. Lack of knowledge about the health effects of air pollution is the biggest obstacle in defined activities and social organizations and international sources. The health sector plays a key role for leading a multi - pronged approach to prevent exposure to air pollution. It can encourage and support other sectors (transport, housing, energy and industry) in the development and application of long - term policies to reduce the health risks of air pollution [10].

In Iran, environmental pollution is one of the most important problems in different areas of the country, especially in Tehran's outdoor [9, 11, 12] and indoor places [13]. Tehran is a highly populated, and is considered as the center of business and commercial activities. There are about 3 million personal vehicles in Tehran, of which 25% are more than 10 years old and 75% have emissions with Euro 2 standard and less [14]. About 70% of particulate matter in Tehran during 2015 was emitted from mobile sources [15]. In addition, due to improper management of water resources [16], Middle Eastern dust storms increases the particulate concentrations in central areas of Iran such as Tehran [17-19].

Since air pollution is an anthropogenic problem, its solution should be decided through social sciences [20]. Awareness about environmental issues has been described as a complex of knowledge, values and attitudes in interaction with the environmental involvement [21]. Public knowledge about air pollution is a critical part in the challenge of air pollution control. Without cooperation of people, any plan for improvement of air quality will not be successful. Viewpoints of people, especially youths about nature and causes of air pollution, and its adverse effect on human health and national economy determine their next decisions and lifestyle [10]. Therefore, the decisions and behaviors of people lead to protection or degradation of the environment. Many of the ideas and beliefs of people are formed during the early years of life or school age. It is an excellent opportunity to consider these views and attitudes in the educational program [22].

This study was aimed to evaluate the knowledge and attitudes of university students about the air pollution sources and solutions in Tehran.

MATERIALS AND METHODS

In this cross - sectional study, 200 students of Shahid Beheshti University of Medical Sciences (SBMU) during 2015 - 2016 years were selected by random sampling. The only inclusion criterion was to be the student of SBMU. All grades of students were included in the study.

Questionnaires were used to collect data. The questionnaire consisted of four parts: demographic information, knowledge, attitude, and solutions for reducing air pollution. Demographic information questionnaire included five questions on the age, gender, marriage, university degree, and province of residence. The knowledge questionnaire contained 10 questions. Attitude questionnaire contained 9 questions, and was composed of written questions of the Ministry of Health and Medical Education to evaluate this training package. Attitude questions included two multi - part questions and a general question about quality of health information source. At the end, there was a multi-part question about air pollution reduction strategies.

Data from filled questionnaires were extracted,

and analyzed using SPSS 16. The correlations between various characteristics and knowledge / attitude were evaluated using Spearman Correlation coefficient.

RESULTS AND DISCUSSION

Tehran as the capital of Iran is facing a growing problem of air pollution. The concentrations of some criteria air pollutants are reported to be much higher than those recommended by WHO [23]. This poor quality of air necessitates planning and implementing actions to reduce the concentrations of air pollutants. An important part of each successful plan or project in a society is the knowledge and attitude of its people regarding that issue [24]. This study questioned 200 university students to evaluate their knowledge, attitude, and recommending solutions for air pollution problem in Tehran.

Demographic characteristics of the participants have been presented in Table 1. Most of the participants were 18 - 22 years old, male, single, studying in bachelor degree, and from Tehran.

Most of the participants believed that the informing quality of public media about the quality of air and related health recommendations is moderate (43.5%). 70 % of participants said that they have attended air pollution boards.

The results of Spearman's correlation showed that there was a significant correlation between the demographic variables of age and knowledge (R = 0.652) and the attitude (R = 0.269), the gender and the attitude (R = 0.035), marital status and attitude (R= 0.702), the education level and knowledge (R=0.763) and attitude (R=0.331) of the participants. In addition, significant correlations were found between the location of resident and knowledge (R = 0.059) and attitudes (R = 0.896).

The results showed a relatively good knowledge of participants about air pollution. Tehran Air Quality Control Company (TAQCC) reported that mobile sector was the main source of air pollution in Tehran [14]. Thus, any improvement in emissions of vehicles could have a significant impact on air quality. In 2013, Department of Environment (DOE) of Iran decided to improve the quality of vehicle fuels to EURO 4 standard [25]. This decision led to mitigation of air pollutants' concentrations in the few last years. However, these actions should be pursued more intensively [23].

There are few studies about the public knowledge and knowledge regarding environmental pollution in Iran. However, the results of these studies are mainly consistent with the few published ones. In another study, the authors investigated the knowl-

Table 1. Demographic characteristics of the participants

Investigated variable		Number	Percentage (%)
Age	18 - 22 years	126	62%
	23 - 27 years	55	27%
	28 - 45 years	19	11%
Sex	Male	60	30%
	Female	140	70%
Marital status	Single	163	83.20%
	Married	37	16.80%
Education level	Bachelor	174	85.10%
	Masters	18	10.90%
	General PhD	1	0.50%
	PhD or assistant	7	3.50%
Location	Tehran	108	54.50%
	Other	92	45.50%

edge and ideas of school students in Tehran about air pollution. Average cognitive score of students was + 2.97, which is weak, there was not significant statistical difference between female and male (P = 0.32). In response to the question "the most common gas in the clean air", nitrogen was mentioned by only 23.7 %, While 45.1 % of students mentioned oxygen. The authors concluded that the knowledge of students about air pollution is weak, and this important stratum of society of Iran has been received no sufficient and efficient education and sensitization on this matter [26]. While in another study, the knowledge of women about safe drinking water, waste management and air hygiene was higher than men. In addition, the knowledge of married participants about safe drinking water, waste management and air hygiene was higher than singles [27]. In another study, people's knowledge about environmental pollution and health effects had a significant association with education and information source [28].

In a study in New Zealand, people were more aware of smoking pollution in the inner - city area than in the outer suburbs. Comparison between residents of different parts of the city showed that residents of polluted areas were more aware of local problems than the general population. While, residents of the "clean" suburbs were more likely to stress this feature [29]. In another study, no significant difference was found between male and female graduate students in terms of environmental knowledge. In addition, there was no significant difference between the graduate students of art and science in terms of environmental knowledge of rural and urban graduate students in terms of environmental knowledge was similar [30].

Participants were questioned about the solutions for reducing air pollution in Tehran, and the answers are summarized into Table 2. About 85 % and 79 % of participants were completely agreed with improving the quality fuels and vehicles as the effective ways to reduce air pollution in Tehran, respectively. On the other hand, most of the negative opinions were expressed for transferring the capital to another city.

Table 2. The ideas of students for improving air pollution in Tehran

Solution	Number (Percentage)				
	A [a]	B [a]	C [a]	D [a]	E [a]
Increasing fleet of public transport	134 (66.3 %)	53 (26.2 %)	2 (1 %)	1 (0.5 %)	10 (6 %)
Reducing the number of personal vehicles	118 (58.4 %)	46 (22.8 %)	9 (4.5 %)	3 (1.5 %)	24 (12.8 %)
Increasing the quality of cars	161 (79.7 %)	24 (11.9 %)	1 (0.5 %)	1 (0.5 %)	13 (7.4 %)
Improving the quality of fuel	171 (84.7 %)	20 (9.9 %)	2 (1 %)	0 (0 %)	7 (4.4 %)
Extending the green space	154 (76.2 %)	34 (16.8 %)	2 (1 %)	1 (0.5 %)	9 (5.5 %)
Transfer of polluting industries from Tehran city	120 (59.4 %)	41 (20.3 %)	5 (2.5 %)	2 (1 %)	32 (16.8 %)
Transferring the capital	29 (14.4 %)	28 (13.9 %)	46 (22.8 %)	31 (15.3 %)	66 (33.6 %)
Implementation of odd and even traffic plan	53 (26.2 %)	84 (41.6 %)	14 (6.9 %)	8 (4 %)	41 (21.3 %)
Running the document of reducing air pollution in Tehran	74 (36.9 %)	49 (24.3 %)	2 (1 %)	2 (1 %)	73 (36.8 %)
Preventing immigration to Tehran	69 (34.2 %)	51 (25.2 %)	18 (8.9 %)	6 (3 %)	56 (28.7 %)
The proper management and more coordination among authorities	132 (65.3 %)	40 (19.8 %)	1 (0.5 %)	1 (0.5 %)	26 (13.9 %)

In the present study, most of the participants declared that improving the quality of fuel and vehicles is the major solution of the air pollution problem. In another study, the authors reported that most of the interviewees mentioned cars as the main air pollution sources, and more than half of them were aware that reducing car use can reduce air pollutant emissions. However, few of them reduced their car use for the sake of improving air quality [24]. This gap between knowledge and behavior is important. Because attitude consists of three components, including cognition, effect and behavior. According to this definition, public knowledge about environmental issues is not enough to make changes, if public behaviors do not change [31]. Therefore, educational programs must be designed to raise the level of public attitude about air pollution. Citizens should be a part of any solution for environmental problems.

CONCLUSIONS

Air pollutants' concentrations in Tehran are reported to be several times higher than those recommended by WHO. This results in cardiovascular, cerebrovascular and respiratory mortality and morbidity for the residents of this city. Adoption of any decision and pollution control solution should be with respect to the knowledge and participation of people. So this study was conducted to evaluate the students' viewpoints about the sources of air pollution, and solutions for air pollution reduction in Tehran. Participants had relatively good knowledge and attitude toward the concept of air pollution, and its present situation in Tehran. However, people did not see themselves as a part of air pollution control challenge. Educational programs must be designed to raise the level of public attitude about air pollution. Citizens should be a part of any solution for environmental problems.

FINANCIAL SUPPORTS

This study was supported by the Students' Research Committee, Shahid Beheshti University of Medical Sciences.

COMPETING INTERESTS

The authors declare that they have no conflict of interest.

ACKNOWLEDGEMENTS

The authors want to thank the Students' Research Committee due to encouragement and financial support and all the students who have cooperated in this project.

ETHICAL CONSIDERATIONS

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and / or falsification, double publication and / or submission, redundancy, etc.) have been completely observed by the authors.

REFERENCES

[1] Global Burden of Disease (GBD). Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. Lancet. 2015;385(9963):117-71.

[2] WHO. Seven million premature deaths annually linked to air pollution. Geneva, World Health Organization; 2014.

[3] Cesaroni G, Badaloni C, Gariazzo C, Stafoggia M, Sozzi R, Davoli M, et al. Long-term exposure to urban air pollution and mortality in a cohort of more than a million adults in Rome. Environ Health Perspect. 2013;121(3):324-31.

[4] Carey IM, Atkinson RW, Kent AJ, van Staa T, Cook DG, Anderson HR. Mortality associations with long-term exposure to outdoor air pollution in a national English cohort. Am J Respir Crit Care Med. 2013;187(11):1226-33.

[5] Raaschou-Nielsen O, Andersen ZJ, Beelen R, Samoli E, Stafoggia M, Weinmayr G, et al. Air pollution and lung cancer incidence in 17 European cohorts: prospective analyses from the European Study of Cohorts for Air Pollution Effects (ESCAPE). The Lancet Oncology. 2013;14(9):813-22.

[6] Chen G, Song G, Jiang L, Zhang Y, Zhao N, Chen B, et al. Short-term effects of ambient gaseous pollutants and particulate matter on daily mortality in Shanghai, China. J Occup Health. 2008;50(1):41-7.

[7] Naddafi K, Atafar Z, Faraji M, Ghanbarian M, Rezaei S, Ghozikali MG, et al. Health effects of airborne particulate matters (PM_{10}) during dust storm and non-dust storm condition in Tehran. Journal of Air Pollution and Health. 2017;1(4):259-68.

[8] Dimitriou A, Christidou V. Pupils' understanding of air pollution. J Biol Educ. 2007;42(1):24-9.
[9] WHO. Ambient (outdoor) air pollution in cities database. Geneva, World Health Organization; 2014.
[10] Wang R, Yang Y, Chen R, Kan H, Wu J, Wang K, et al. Knowledge, attitudes, and practices (KAP) of the relationship between air pollution and children's respiratory health in Shanghai, China. Int J Environ Res Public Health. 2015;12(2):1834-48.
[11] Hadei M, Hashemi Nazari SS, Yarahmadi M, Kermani M, Farhadi M, Shahsavani A. Estimation of Gender-Specific Lung Cancer Deaths due to Exposure to PM2.5 in 10 Cities of Iran During 2013 - 2016: A Modeling Approach. International Journal of Cancer Management. 2017;In Press(In Press):e10235.
[12] Hadei M, Nazari SSH, Yarahmadi E, Kermani M, Yarahmadi M, Naghdali Z, et al. Estimation of lung cancer mortality attributed to long-term exposure to ($PM_{2.5}$) in Iranian cities during 2015-2016; an AirQ+ modeling. Journal of Air Pollution and Health. 2017;2(1).
[13] Kermani M, Arfaeinia H, Nabizadeh R, Alimohammadi M, Aalamolhoda A. Levels of PM2.5-associated heavy metals in the ambient air of Sina hospital district, Tehran, Iran. Journal of Air pollution and Health. 2015;1(1):1-6.
[14] Shahbazi HB, Mahdi; Afshin, Hossein; Hosseini, Vahid. Tehran's air pollution emission inventory for the year 2013- Volume II: mobile sources [In Persian]. Tehran, Iran: Tehran Air Quality Control Company; 2015. Report No.: QM/94/04/03/(U)/02.
[15] Ahadi SR, Mohsen; Tadari, Maryam; Torbatian, Sara;. Annual report on the ambient air quality of Tehran, 2015-2016 (1394). Tehran Air Quality Control Company (TAQCC), Tehran, Iran; 2016. Contract No.: QM94/02/01(U)/1.
[16] Moghaddam VK, Changani F, Mohammadi A, Hadei M, Ashabi R, Majd LE, et al. Sustainable development of water resources based on wastewater reuse and upgrading of treatment plants: a review in the Middle East. Desalination and Water Treatment. 2017;65:463-73.
[17] Sowlat MH, Naddafi K, Yunesian M, Jackson PL, Shahsavani A. Source apportionment of total suspended particulates in an arid area in southwestern Iran using positive matrix factorization. Bull Environ Contam Toxicol. 2012;88(5):735-40.
[18] Sowlat MH, Naddafi K, Yunesian M, Jackson PL, Lotfi S, Shahsavani A. PM10 source apportionment in Ahvaz, Iran, using positive matrix factorization. CLEAN–Soil, Air, Water. 2013;41(12):1143-51.
[19] Shahsavani A, Yarahmadi M, Hadei M, Sowlat MH, Naddafi K. Elemental and carbonaceous characterization of TSP and PM10 during Middle Eastern dust (MED) storms in Ahvaz, Southwestern Iran. Environ Monit Assess. 2017;189(9):462.
[20] Sudarmadi S, Suzuki S, Kawada T, Netti H, Soemantri S, Tugaswati AT. A survey of perception, knowledge, awareness, and attitude in regard to environmental problems in a sample of two different social groups in Jakarta, Indonesia. Environ Dev Sustainability. 2001;3(2):169-83.
[21] Boyes E, Myers G, Skamp K, Stanisstreet M, Yeung S. Air quality: A comparison of students' conceptions and attitudes across the continents. Compare. 2007;37(4):425-45.
[22] Skamp K, Boyes E, Stanisstreet M. Students' ideas and attitudes about air quality. Research in Science Education. 2004;34(3):313-42.
[23] Hadei M, Hopke PK, Nazari SSH, Yarahmadi M, Shahsavani A, Alipour MR. Estimation of Mortality and Hospital Admissions Attributed to Criteria Air Pollutants in Tehran Metropolis, Iran (2013–2016). Aerosol Air Qual Res. 2017;17:2474-81.
[24] Xu J, Chi CS, Zhu K. Concern or apathy: the attitude of the public toward urban air pollution. J Risk Res. 2017;20(4):482-98.
[25] Department of Environment (DOE). Actions and programs of the National Center for Air and Climate Change [In Persian]. Deopartment of Environment (DOE); 2017.
[26] Yazdanparast T, Salehpour S, Masjedi MR, Azin SA, Seyedmehdi SM, Boyes E, et al. Air pollution: the knowledge and ideas of students in Tehran-Iran, and a comparison with other countries. Acta Med Iran. 2013;51(7):487.
[27] Raygan Shirazi AP, Saadat; Mari Aryad, Hossein;. Investigating the knowledge of people in Yasuj about environmental health in 2001. 4th national confrence of Environmental Health (In Persian)2001.
[28] Alireza Mesdaghinia MY, Simin Naseri, Ali Jafari, Ali Moradi, Farahnaz Farahdoust, Leila Yaghoubi. Investigating the awareness of Tehran's residents about environmental pollution and health effects, and determining their information sources (In Persian). Yafteh. 2007;9(1):3-13.
[29] Johnston R, Hay J. Spatial variations in awareness of air pollution distributions. Int J Environ Stud. 1974;6(2-3):131-6.
[30] Bhatia MG, Bhatia MM. A Study of Environmental Awareness among Post-Graduate Students of Distt Yamuna Nagar, Haryana. 2013.
[31] Eagly AH, Chaiken S. The advantages of an inclusive definition of attitude. Soc Cogn. 2007;25(5):582-602.