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

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

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

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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.

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COMPETING INTERESTS

The authors declare that they have no conflict of interest.

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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.

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