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# Determinants of the Public Environmental Issues and Concerns: A Case Study in Rafsanjan, Iran

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***ABSTRACT***

***Introduction:*** This study aimed to evaluate the most important public environmental issues and concerns, the public knowledge about these issues, as well as the quality of environmental issues in Rafsanjan, Iran.

***Materials and Methods:*** In this descriptive-analytical study, 384 people were randomly selected from Rafsanjan City and their public environmental issues and concerns were evaluated. The data were collected using a researcher-made questionnaire, with confirmed validity and reliability. The data were analyzed by Mann-Whitney and Kruskal-Wallis statistical tests using SPSS-18 software.

***Results:*** The findings showed that the most important environmental concerns in Rafsanjan included water quality and quantity, pesticides in agriculture, and air pollution, respectively. However, the quality of drinking water and water resources were not appropriate from the public's view point. The mean score of environmental knowledge and environmental issues' quality level were 5.91 ± 2.53 and 36.07 ± 7.21, respectively. Knowledge level and environmental quality level had a statistically significant relationship with education, occupation, and level of using public transportation ($P < 0.05$).

***Conclusion:*** It can be concluded that improving the quality of drinking water, promoting the farmer's knowledge and behavior about application of pesticides, as well as monitoring and controlling air pollution were among the most important needs and demands of Rafsanjan citizens. So, authorities should consider these issues attentively.

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## Introduction

Nowadays, increased population, urbanization, as well as industrialization have accelerated the technology advancement as well as environmental degradation. As a result, the Earth is facing more environmental problems [1, 2]. Consequently, environmental issues and problems have become increasingly important in recent decades [3, 4]. The most important environmental issues include air and water pollution, municipal and industrial wastewater, wastes' production, climate change, and global warming [4, 5]. Environmental degradation along with lack of paying enough attention to these issues can cause many health problems for humans and other organisms [6, 7]. Environmental pollutants have many effects, including development of various cancers and chronic diseases, such as congenital

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malformations, respiratory problems, and cardiovascular diseases, increase of the mortality risk in communities, and reduction of the labor and agricultural productivity [8, 9].

Environmental concern (EC) actually includes the extent to which people are aware of the environmental issues as well as their support and behaviors to address these problems [10]. Studies around the world reported that the public's concerns have increased in poor and wealthy communities regarding environmental issues [11]. Despite the rising concerns, the public's appropriate support and behavior are very poor [10, 12]. The public and their concern about environmental degradation and pollution play an important role in improving the environmental issues and problems [13]. Studies indicated that increasing the public's environmental concerns can play an important role in promoting the environmentally friendly behaviors [14]. In fact, reducing environmental problems and issues as well as achieving sustainable development goals require behavior changes in all individuals of the society. Moreover, policies of various governments around the world seek to increase the level of awareness, general behavior, and culture in order to improve the quality of environmental issues [15, 16].

Many studies were carried out on the importance of public environmental concern in the developed and industrialized countries [14, 17]. In a study by Liu et al., public environmental concern determinants were investigated and results showed that people with higher ecological paradigm values were more concerned about the environmental issues [14]. Liu and Mu studied the public environmental concern in china and found that the environmental concern was not the top issue in the china. Moreover, the environmental concern was related to the socio-demographic variables [17].

However, in the developing and less developed countries, such as Iran, limited studies were conducted in this area [18]. Since further studies are required to address all aspects of these concerns, this study was carried out to determine the most important environmental issues, concerns of the public, their awareness, quality of these issues, and factors affecting them in Rafsanjan City, Iran.

## Materials and Methods

In this descriptive-analytical study, the public's view point was investigated in terms of the most important environmental issues, people's knowledge about these issues, as well as the quality level of environmental issues in Rafsanjan City in 2019. In this study, the sampling size was calculated by Eq. 1 considering an error level of 5% (d = 0.05), confidence interval of 95% (Z = 1.96), and expected prevalence of 50% (P = 0.5).

$$n = \frac{Z^2 \times P\,(1-P)}{d^2} \qquad (1)$$

According to Eq. 1, 384 people were selected from different regions of Rafsanjan City using simple random sampling. Among these individuals, 312 people responded to the questionnaires completely.

Data collection was carried out by a researcher-made questionnaire that was administered among people referring to Rafsanjan City health centers. The questionnaire consisted of the participants' demographic characteristics (such as gender, age, education level) and questions about the most important environmental challenges, the knowledge level, and the environmental quality level of issues, including water, air, wastes, sewage, green space and parks, industry and industrialization of cities, household energy and fuel consumption, industry growth and associated pollution, as well as city cleanliness [4, 19, 20, 21]. The validity and reliability of this questionnaire were confirmed by 5 experts in the field of environmental health and health education using Cronbach's alpha coefficient of 0.82. In this questionnaire, the most important environmental issues in Rafsanjan were prioritized from 1 to 12 based on the importance of each issue. Later, these issues were ranked according to their importance percentage. Knowledge questions (9 questions with score range of 0-9) were scored from zero (unknowledgeable) to one (knowledgeable) and the environmental quality questions (13

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questions with score range of 13-65) were also ranked as excellent (score of 5), good (score of 4), average (score of 3), inappropriate (score of 2), and very bad (score of 1). After data collection, descriptive statistical indices (mean and standard deviation) as well as Mann-Whitney and Kruskal-Wallis tests were used by SPSS-18 software in order to analyze the data.

## Ethical Issues

This study is the result of a research project (research project No: 97220) approved by Rafsanjan

University of Medical Sciences with Ethics Code of IR.RUMS.REC.1397.132.

## Results

All of participants (n = 312), 62.5% were male, 71.4% were within the age range of 20 - 40 years, and 55.9% had a bachelor's degree and higher. The majority of participants (42.7%) were self-employed, 67.4% were homeowners, and 64.4% lived in the city for more than 15 years. In terms of the participants' satisfaction level, 34.5% were dissatisfied with the environmental status of Rafsanjan City, 16.7% were satisfied, and 48.7% were at the moderate level of satisfaction. Moreover, the majority of participants (55%) reported that the environmental status of Rafsanjan City was similar to that of other cities in Iran and 29.1% considered it worse than other cities. Moreover, 61.7% of the participants stated that they did not use public transportation even once during the week. Table 1 represents the most important environmental issues of this city that needs to be addressed according to the participants. Based on the findings, the most important environmental concerns were related to water quantity and quality (58.6%), application of pesticides and toxins (38.3%), as well as air pollution (33%), respectively.

**Table 1:** The priority of environmental issues from the participants' viewpoint in Rafsanjan City

| Issues and concerns | Frequency (%) |
|---|---|
| Water related issues (water quantity and quality) | 58.6 |
| Air related issues (air pollution) | 33 |
| Solid waste related issues (waste management and recycling) | 27.8 |
| Issues related to green space and parks (availability and protection level) | 13.1 |
| Issues related to city cleanliness | 18.1 |
| Issues related to traffic and congestion on urban routes and roads status | 13.4 |
| Issues related to population density and urban development | 9.9 |
| Noise related issues | 11.2 |
| Wastewater management related issues | 20 |
| Issues related to industry and industrialization of cities (industry growth and associated pollution) | 19.7 |
| Using pesticides and toxins in agriculture | 38.3 |
| Issues related to household energy and fuel consumption | 12.5 |
| Others | 10.2 |

The environmental quality of the city from the public's perspective is shown in Table 2. As it can be seen, the quality of access to green space and parks (55.2%) and safety of food, vegetables, and fruits (42.2%) were at appropriate levels. The quality of drinking water and water resources (55.1%) as well as access to cycling routes (72.3%) were not appropriate from the participants' view point.

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**Table 2:** Environmental quality level of Rafsanjan City from the public's view point

| Environmental issues | Quality level | | |
|---|---|---|---|
| | Appropriate | Medium | Inappropriate |
| Access to parks and green space | 55.2 | 34.3 | 10.5 |
| Drinking water quality | 19.2 | 25.7 | 55.1 |
| City quality in terms of cleanliness of the city and passages | 31.5 | 46.4 | 22.1 |
| Ease of commuting in the city | 40.3 | 36.8 | 22.9 |
| The amount of tree cover in the city | 34.6 | 38.6 | 26.8 |
| Access to cycling routes | 8.4 | 19.3 | 72.3 |
| Access to public transportation | 27.5 | 42.7 | 29.8 |
| Urban planning and neighborhood designing | 23.4 | 29.7 | 46.9 |
| Water quality of springs, wells, and aqueducts | 17.4 | 31.9 | 50.7 |
| Air quality | 29.7 | 26.3 | 44.0 |
| Solid waste status and management | 23.4 | 43.1 | 33.6 |
| Waste recycling status | 18.3 | 40.7 | 41.0 |
| Food, Fruits, and vegetables safety | 42.2 | 40.3 | 17.5 |

Table 3 includes the most important measures to improve the environmental quality of Rafsanjan City from the public's view point. The required environmental measures needed for the citizens were improving the air quality as well as increasing the public's culture and knowledge regarding environmental issues. Moreover, 23% of the participants stated that they could pay more than the annual municipal tax to improve their city's environment.

**Table 3:** Measures needed to improve the environmental quality of Rafsanjan City from the public's perspective

| Environmental measures | Priority(%) |
|---|---|
| Water quality improvement | 73.9 |
| Air quality improvement | 52.3 |
| Transportation improvement and traffic control | 31.9 |
| Noise pollution control | 10.6 |
| Improvement and increasing vegetation | 35.2 |
| Using alternative energy sources | 23.9 |
| Increasing energy efficiency | 23.2 |
| Increasing the level of public's culture and knowledge | 58.7 |
| No need for improvement | ≤1 |
| Others | 7.1 |

The level of public's knowledge and satisfaction with regard to environmental programs, plans, and services in Rafsanjan City is represented in Table 4. The highest level of the public's knowledge and satisfaction was attributed to programs, plans, and services for green space and tree planting (85.7% and 40%, respectively), as well as waste collection (77.4% and 36.6%, respectively). Furthermore, the lowest level of the public's knowledge and satisfaction was related to programs and plans for controlling traffic and air pollutants (41.7% and 18.7%, respectively).

**Table 4:** The public's knowledge and satisfaction with the environmental programs, plans, and services in Rafsanjan City

| Programs, plans, and services | Knowledge(%) | Satisfaction (%) |
|---|---|---|
| Solid waste collection | 77.4 | 36.6 |
| Household Hazardous waste disposal | 41.7 | 27.7 |
| Parks, green space, and tree planting | 85.7 | 40.0 |
| Wastewater collection and disposal | 59.5 | 26.4 |
| Air pollution control | 48.5 | 20.3 |
| Water management system | 69.5 | 18.7 |
| Improving public transportation | 66.1 | 31 |
| Waste recycling | 58.3 | 20.3 |
| Environmental protection related rules | 62.1 | 22.1 |

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Table 5 represents the relationship between the knowledge level and environmental issues quality from the participants' perspective in Rafsanjan City with regard to their demographic characteristics. The mean score of knowledge about environmental issues (score range of 0 to 9) was 5.91 ± 2.53 and the mean score of satisfaction from environmental quality (score range of 13 to 65) was 36.07 ± 7.21. The results indicated a significant relationship between education level, knowledge level, and environmental issues quality. Participants with higher education level had higher knowledge mean scores (P = 0.024), but the mean score of environmental quality of the city was higher from the viewpoint of the individuals with lower education level (P = 0.042). A significant relationship was also found between occupation and knowledge level. Moreover, knowledge level of the unemployed people was lower than other occupations (P = 0.008). The knowledge mean score of homeowners was higher than tenants and this relationship was statistically significant (P = 0.006). The knowledge mean5 score of those who do not use public transportation weekly was higher (P = 0.034) and the environmental quality level of the city was higher from their perspective and this relationship was statistically significant (P = 0.012).

**Table 5:** The relationship of participants' demographic characteristics with their knowledge level and environmental issues quality from the participants' viewpoint in Rafsanjan City

| Demographic characteristics | | Mean knowledge score (range of 0 to 9) | Mean quality level score (range of 13 to 65) |
|---|---|---|---|
| Gender | Male | 5.71 ± 2.45 | 35.99 ± 7.54 |
| | Female | 6.29 ± 2.66 | 36.21 ± 6.64 |
| | P-value* | 0.174 | 0.393 |
| Age (year) | < 20 | 5.53 ± 2.13 | 36.33 ± 6.93 |
| | 20-40 | 6.08 ± 2.62 | 36.11 ± 7.12 |
| | > 40 | 5.56 ± 2.25 | 36.13 ± 8.68 |
| | P-value** | 0.438 | 0.936 |
| Education level | High school | 5.91 ± 2.46 | 40.91 ± 9.38 |
| | Diploma | 5.02 ± 2.41 | 35.86 ± 8.13 |
| | Bachelor | 6.15 ± 2.37 | 35.37 ± 6.59 |
| | Master's degree and above | 7.09 ± 2.75 | 37.56 ± 5.32 |
| | P-value** | 0.024 | 0.042 |
| Occupation | Employee | 6.72 ± 2.41 | 36.61 ± 7.63 |
| | Unemployed | 4.71 ± 1.88 | 36.83 ± 4.71 |
| | Housewife | 6.75 ± 2.41 | 35.37 ± 8.01 |
| | Self employed | 5.97 ± 2.97 | 37.21 ± 4.41 |
| | P-value** | 0.008 | 0.582 |
| House Ownership | Homeowner | 6.19 ± 2.55 | 36.11 ± 6.78 |
| | Tenant | 4.99 ± 2.27 | 36.16 ± 8.22 |
| | P-value* | 0.006 | 0.827 |
| Public transportation use (weekly) | No use | 6.59 ± 2.74 | 36.08 ± 6.82 |
| | once to twice | 5.47 ± 2.29 | 33.64 ± 5.48 |
| | More than twice | 5.17 ± 2.12 | 32.77 ± 6.09 |
| | P-value** | 0.034 | 0.012 |

*Mann-Whitney test, **Kruskal Wallis test

## Discussion

Public environmental issue is among the most important problems among the people around the world [22]. This study aimed to determine the most important public environmental issues and concerns in Rafsanjan City, Iran. According to the findings, the most public important environmental concerns were related to water quantity and quality, application of pesticides and toxins, as well as air pollution, respectively. Moreover, the quality of drinking water and water resources, access to cycling routes, urban planning, and air



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quality were not at an appropriate level from the participants' view point, which require more attention from the authorities. The literature also showed that the issue of water quality and quantity is one of the most important environmental issues and concerns in Iran due to the excessive water consumption especially in agriculture and industry, recent droughts, as well as imbalanced and reduced precipitation in different parts of Iran [23, 24]. Excessive use of pesticides and toxins in Rafsanjan City of Iran (more than 700 tons per year) to control pistachio (as one of the most important agricultural crops in the region) pests has raised the public's environmental concerns regarding this issue [25]. Furthermore, air pollution is one of the most important environmental issues worldwide, especially in Iran, which has become more widespread due to industrialization and application of fossil fuels and motor vehicles. It also causes side effects on the environment, human health, and other organisms [26, 27].Air pollution condition is critical in Rafsanjan City due to its proximity to industrial centers and increased use of motor vehicles [28]; so, the public understands and is concerned about this environmental issue.

The results of this study showed that the environmental measures should be taken for the citizens to improve the air quality as well as to increase the public's culture and knowledge regarding environmental issues. Furthermore, the highest level of the public's knowledge and satisfaction was about the programs, plans, and services for green space and waste collection. However, the lowest level of the public's knowledge and satisfaction was attributed to air pollutants' control.

The knowledge mean scores were higher in people with higher levels of educational level and the mean scores of environmental quality of the city was higher from the viewpoint of participants with lower educational levels. In the study conducted by Liu and Mu over the public environmental concern in china, the findings showed that the environmental concern in people with higher income and education was higher than others [17], which is consistent with our study. Other studies also indicated that despite the public's increasing environmental concerns, the pro-environmental behavior is inappropriate in many societies. Based on the literature, this environmental awareness has not become an attitude and behavior that require to review the method of environmental education [10]. In environmental psychology, several studies were conducted on the effective ways of changing environmental behavior and the factors affecting them. This suggests that using appropriate educational theories and models can be very effective, including NAM (norm activation model), VBN (value-belief-norm), and TPB (theory of planned behavior) [11, 29]. Therefore, it is recommended to use these appropriate educational methods to improve the citizens' environmental behavior, especially in consuming water and pesticides in agriculture.

## Conclusion

In this study, a researcher-made questionnaire was used to evaluate the most important public environmental issues and concerns in Rafsanjan, Iran. The most important environmental concerns and issues were related to water quantity and quality, application of pesticides in agriculture, and air pollution. Therefore, management of water resources, improvement of the drinking water quality, proper education to promote behavior about application of pesticides for farmers, air quality monitoring, and pollution control are among the essential environmental activities.

### *Study limitation*

The main limitation in this research was low cooperation of people in completing the questionnaire.

## Acknowledgments

This study is the result of a research project (research project No: 97220) approved by Rafsanjan University of Medical Sciences with Ethics Code of IR.RUMS.REC.1397.132. Thanks are owed to Rafsanjan University of Medical Sciences due to its support in conducting this research project.

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## Conflict of interest

There is not any conflict of interest.

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