# The Survey of the Environmental Health Status and Safety of Public and Non- Public Elementary Schools in Mashhad, Iran

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## Abstract

*Background:* Providing health facilities and attention to the physical and mental health of students is very important and it can affect on their learning. The purpose of this study was the investigation of the environmental health status and safety of public and non-public elementary schools of Mashhad-Iran.

*Materials and Methods:* In this descriptive cross-sectional study, 100 public and non-public elementary schools were selected randomly in Mashhad, Iran, 2017. A validated checklist based on instruction from Ministry of Health and Medical Sciences was used for data collection. The checklists were completed in schools by the trained expert by interview and observation. Finally data were analyzed by SPSS software (version 19.0).

*Results:* The mean of the environmental and safety standards for public and non-public elementary schools obtained was $66.47 \pm 13.69$ and $63.54 \pm 9.59$, respectively (total score: 100). This shows the public schools have a better health status than non-public schools. Based on the results of this study, 36.85% of schools had favorable conditions, 33.9 % partly favorable and 24.45 % were undesirable. According to statistical tests, there was no significant difference between public and non- public schools in terms of environmental health status and safety ($P>0.05$).

*Conclusion:* Based on the results of this study, the environmental health status and safety in most schools were somewhat desirable. Thus, attention to issues such as the proportionality of the schools area with the number of students, the health status of the buffets and as well as the existence of an alarm with special signs in emergency situations seems necessary.

*Key Words:* Environmental Health, Elementary School, Iran, Safety, School.

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## 1- INTRODUCTION

The schools health includes all activities that are carried out to maintain and improve the health of students (1). The school environment should respond to the physical, psychological and social needs of students. If the school does not have healthy water, sanitation, adequate space, adequate equipment, the proper collection system of solid waste and wastewater, educational efforts of teachers will not be suitable (2). Given that the status of health in schools has a direct impact on the transmission of contagious diseases, and without regard to the proper physical environment, the progress of educational programs in schools will be difficult, thus Toilets, hand washing and drinking facilities need to be available in schools to provide a relaxing environment for students (3). The place to be considered for the construction of the school should be within a reasonable distance from the population centers and residential areas and it should have access to facilities such as water, electricity, gas, etc. (4).

Indicators of the environmental health status include hygiene of tools and equipment, food health and personal hygiene (5). Researchers found that the defective health facilities of the school are associated with an increase in bacterial pathogens(1, 3). Studies have shown that about 75% of absenteeism in schools is mainly due to respiratory and intestinal infections (6, 7). The results of the study showed that by using the alcoholic disinfectants in schools, about 20 to 50 percent of student absences are reduced. The results of another study showed that 60 percent of students' absence is due to the unhealthy school environment that is associated with the spread of infectious diseases (8). The lack of sanitary toilets is one of the factors that threatens the health of students at school (9). In the event of non-compliance with school safety factors, there is a risk of incidents such as fire,

electrocution, burns, cuts and falls from height (6). In general, observance of the environmental health and safety of elementary schools due to the weakness of the immune system of primary school students and their sensitivity to environmental exposures, as well as the fact that non-observance of any of the existing cases can cause illness and/or an incident for students, it is important (4, 10). So far, many studies have been done in this regard, each of which has been important in improving the health status of schools. For example, the results of Mirzaei et al.'s study showed that 76.6% of schools had a favorable situation (5).

Zare et al., report that more than 72% of primary schools in Yazd (Iran) have good environmental health conditions. Although the number of drinking fountains and sanitary toilets in schools was standard, only 45.7% of drinking fountains and 43.3% of toilets had health conditions (1). In a study conducted in rural schools in Mazandaran province (Iran), it was found that in 17% of schools, the minimum per capita level for each student was less than the standard (11). In similar study in the primary schools of Markazi province (Iran), it was found that the environmental health status and safety health of the schools were 21.1% and 18.1%, respectively which had a favorable status (12). Since there was no study on the state of health and safety of the primary and secondary schools in Mashhad city, this study was conducted to investigate the conditions of the health of the environment and safety of primary schools in Mashhad-Iran.

## 2- MATERIALS AND METHODS

### 2-1. Study design and population

This descriptive cross-sectional study was conducted to evaluate the environmental health status and safety of public and non-public elementary schools of Mashhad, Iran, in 2017. Mashhad has

900 elementary schools and 335,109 students studying at this stage. Of the 900 available schools, 100 primary schools, including 61 public schools and 39 non-public schools from seven areas of Mashhad, were selected randomly.

## 2-2. Methods

A validated checklist based on the instruction from the Ministry of Health and Medical Sciences was used to collect the data and to investigate the environment health status and safety (5). The checklist contained 69 questions in two parts. The first part included common school specifications such as number of students, school area, kind of construction of the schools and the number of school shifts that were completed in an interview with the school manager. The second part involved items dealing with desirability of various parts of the schools such as school environment (10 items), school buffet status (8 items), classroom conditions (13 items), water and wastewater collection and waste collection (19 items), and the safety status of the school including 19 items such as the presence or absence of fire-fighting equipment, window shields, first-aid boxes, stairwells and corridors, heating appliances and emergency routes, these checklists were completed by the two researchers of this study by going to the selected schools. This checklist was filled out during a period of 3 months by professionals in public health, evaluating the schools and interviewing the principals. To convert the collected data into a quantitative value, score 1 was assigned to answer which complied with the standard and score 0 was assigned to answer that did not comply.

## 2-3. Measuring tools: validity and reliability

A validated checklist based on the instruction from the Ministry of Health and Medical Sciences was used to collect the data and to investigate the environment health status and safety (5). The validity of the checklist was confirmed by experts' judgment (7 faculty members of the Faculty of Health), and the reliability was estimated to be 82% using Cronbach's alpha test in another study.

## 2-4. Data Analyses

The collected data were analyzed with one-way ANOVA and t- test using SPSS software version 19.0.

## 3- RESULTS

In this study, 100 primary schools were studied including 61 and 39 public and non-public schools, respectively. **Figure.1** shows the location of the public and non-public schools in different Education areas of Mashhad, Iran. Of all the total schools surveyed, 49% were girls' schools, 46% boys and 5% were mixed schools. The environmental health condition of the schools included the status of classroom environment, toilet, wash basins, etc. is presented in **Tables.1, 2**.

According to this table, 90.8% of the schools were <500 m away from disposal sites of waste, hospitals and noisy centers. The environmental health status of the public health showed that among these schools, 37.9% had favorable health conditions, 32.5% were somewhat favorable and 26.6% had unfavorable conditions. These results in non-public schools included 35.8, 35.3 and 22.3%, respectively. 42.6% and 75.5% of the schools in terms of water health and toilet health status were somewhat favorable and 57% of the washstands were in a desirable condition. 70.1% of schools also had favorable conditions in terms of the class environment.
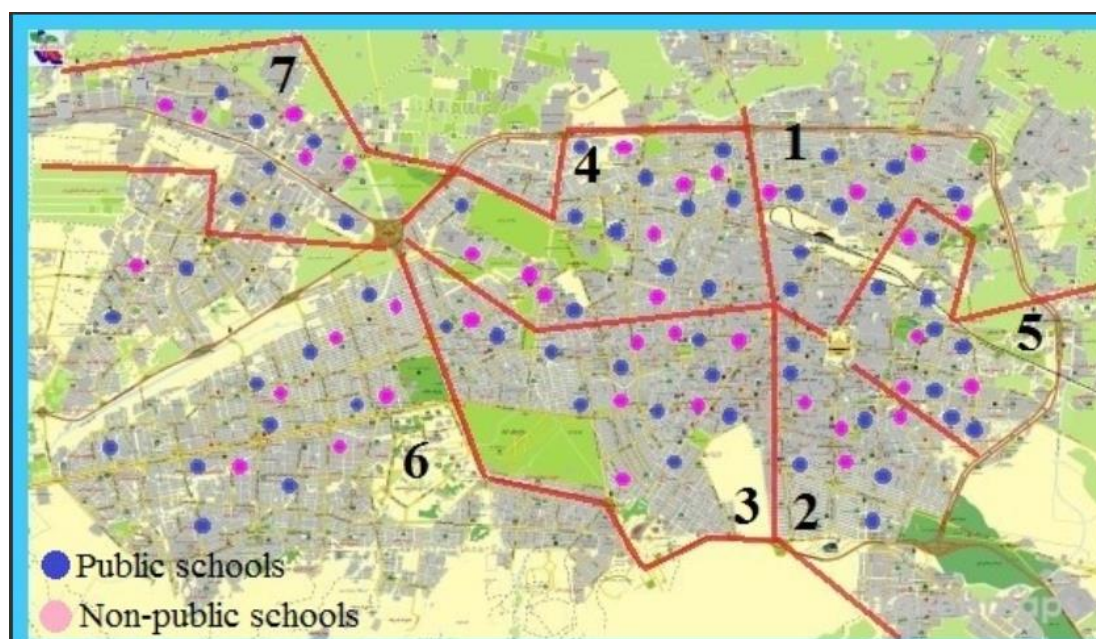
**Fig.1**: The location of the public and non-public schools in Mashhad, Iran.

**Table-1**: Frequency distribution of environmental health conditions in elementary schools studied in Mashhad, Iran (total: public and non-public).

| Environmental health status | Desirable | | | | Somewhat desirable | | | | Undesirable | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Public | | Non-public | | Public | | Non-public | | Public | | Non-public | |
| | Number | % | Number | % | Number | % | Number | % | Number | % | Number | % |
| Distance to unsecured place | 53 | 86.8 | 37 | 94.8 | - | - | - | - | 8 | 13.1 | 2 | 5.1 |
| t- test* | P-value=0.740 | | | | | | | | | | | |
| School environment | 8 | 13.1 | 1 | 2.56 | 10 | 16.3 | 8 | 20.5 | 43 | 70.4 | 30 | 76.9 |
| t- test* | P-value =0.68 | | | | | | | | | | | |
| Toilet | - | - | - | - | 50 | 81.9 | 27 | 69.2 | 11 | 18.0 | 12 | 30.7 |
| t- test* | P-value =0.841 | | | | | | | | | | | |
| washstand | 28 | 45.9 | 29 | 74.3 | 19 | 31.1 | 9 | 23.0 | 14 | 22.9 | 1 | 2.56 |
| t- test* | P-value =0.218 | | | | | | | | | | | |
| drinking fountains | 18 | 29.5 | 4 | 10.2 | 23 | 37.7 | 30 | 76.9 | 10 | 16.3 | 5 | 12.8 |
| t- test* | P-value =0.149 | | | | | | | | | | | |
| Buffet | 10 | 16.3 | 1 | 2.56 | 25 | 40.9 | 18 | 29.5 | 24 | 39.3 | 9 | 23.0 |
| t- test* | P-value =0.651 | | | | | | | | | | | |
| Class environment | 45 | 73.7 | 26 | 66.6 | 12 | 19.6 | 11 | 28.2 | 4 | 6.55 | 2 | 5.12 |
| t- test* | P-value =0.334 | | | | | | | | | | | |
| *Statistical tests between environmental health status of public and non-public schools. | | | | | | | | | | | | |

**Table-2:** Frequency distribution for the collection and disposal status of sewage and garbage of primary schools in Mashhad, Iran.

| Variable | Desirable | | | | Somewhat desirable | | | | Undesirable | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Public | | Non-public | | Public | | Non-public | | Public | | Non-public | |
| | Number | % | Number | % | Number | % | Number | % | Number | % | Number | % |
| Sanitary dustbins | 61 | 100 | 39 | 100 | - | - | - | - | - | - | - | - |
| Garbage collection | 61 | 100 | 39 | 100 | - | - | - | - | - | - | - | - |
| Sewage disposal and sanitary services | 61 | 100 | 39 | 100 | - | - | - | - | - | - | - | - |

According to **Table.3**, the lowest level of safety was related to heating devices in public and non-public schools with 24.5 and 5.1%, respectively and fire extinguisher in public and non-public schools with 24.5 and 20.5%, respectively.

To compare the average environmental health scores of public and non-public schools, t- test was used. The results showed that there was no significant difference between the scores of the two groups (p>0.05).

**Table-3**: Frequency distribution of primary school safety status in Mashhad, Iran (total: public and non-public).

| Safety status | Desirable | | | | Somewhat Desirable | | | | Undesirable | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Public | | Non-public | | Public | | Non-public | | Public | | Non-public | |
| | Number | % | Number | % | Number | % | Number | % | Number | % | Number | % |
| School environment | 58 | 95.0 | 36 | 92.3 | - | 6.5 | - | 7.6 | 3 | 4.91 | 3 | 7.69 |
| t- test* | P-value=0.138 | | | | | | | | | | | |
| First aid | 56 | 91.8 | 38 | 97.4 | - | - | - | - | 5 | 8.19 | 1 | 2.56 |
| t- test* | P-value =0.314 | | | | | | | | | | | |
| Safety stairs | 48 | 78.8 | 36 | 92.3 | 7 | 11.4 | - | - | 6 | 9.8 | 3 | 7.6 |
| t- test* | P-value =0.620 | | | | | | | | | | | |
| window protector | 28 | 45.9 | 33 | 84.6 | 19 | 31.1 | 2 | 5.1 | 14 | 22.9 | 4 | 10.2 |
| t- test* | P-value =0.183 | | | | | | | | | | | |
| heating devices | 25 | 40.9 | 37 | 94.8 | 21 | 34.4 | - | - | 15 | 24.5 | 2 | 5.1 |
| t- test* | P-value =0.819 | | | | | | | | | | | |
| Fire extinguisher | 46 | 75.4 | 31 | 79.4 | - | - | - | - | 15 | 24.5 | 8 | 20.5 |
| t- test* | P-value =0.756 | | | | | | | | | | | |
| *Statistical tests between safety status of public and non-public schools. | | | | | | | | | | | | |

**Table.4** shows the environmental health and safety status of primary schools in different districts of Mashhad. As you can see, 69% of public schools (n=69), and 56% (n-56) of non-public schools are somewhat desirable in terms of environmental health. T-test did not show any significant difference between environmental health scores in different school districts (p= 0.740). The mean Environmental Health and Safety scores of primary schools in different education areas of Mashhad are presented in **Table.5**. According to this table, the highest and lowest environmental health and safety scores were related to 7 districts with 68.88 ± 6.09 and 1 district with 59.16 ± 10.41, respectively.

**Table-4**: Frequency distribution of environmental health and safety status in elementary schools in different parts of Mashhad, Iran.

| Environmental Health Districts | | Desirable | | Somewhat Desirable | | Undesirable | |
|---|---|---|---|---|---|---|---|
| | | Environmental health Number (%) | Safety Number (%) | Environmental health Number (%) | Safety Number (%) | Environmental health Number (%) | Safety Number (%) |
| 1 | Public | 1 | 1 | 9 | 7 | 2 | 4 |
| | Non-public | 0 | 0 | 4 | 5 | 1 | 0 |
| 2 | Public | 4 | 6 | 7 | 4 | 1 | 2 |
| | Non-public | 0 | 1 | 3 | 2 | 0 | 0 |
| 3 | Public | 1 | 2 | 2 | 1 | 0 | 0 |
| | Non-public | 0 | 0 | 4 | 5 | 1 | 0 |
| 4 | Public | 2 | 3 | 5 | 5 | 1 | 0 |
| | Non-public | 2 | 5 | 6 | 3 | 1 | 1 |
| 5 | Public | 4 | 5 | 4 | 3 | 2 | 2 |
| | Non-public | 0 | 3 | 5 | 2 | 0 | 0 |
| 6 | Public | 2 | 2 | 4 | 4 | 1 | 1 |
| | Non-public | 1 | 2 | 3 | 3 | 2 | 1 |
| 7 | Public | 2 | 3 | 7 | 6 | 0 | 0 |
| | Non-public | 0 | 0 | 6 | 6 | 0 | 0 |
| Total | Public | 16 | 22 | 38 | 30 | 7 | 9 |
| | Non-public | 3 | 11 | 31 | 26 | 5 | 2 |

**Table-5:** The mean Environmental Health and Safety scores of primary schools in different education areas of Mashhad, Iran.

| Different education areas | Mean of Environmental Health and Safety Scores | Minimum | Maximum |
|---|---|---|---|
| 1 | 59.16±10.41 | 39.13 | 76.81 |
| 2 | 66.18±13.09 | 47.83 | 89.86 |
| 3 | 62.50±11.52 | 46.38 | 84.06 |
| 4 | 68.03±12.36 | 50.72 | 91.30 |
| 5 | 67.92±13.32 | 36.23 | 85.51 |
| 6 | 63.54±14.29 | 40.58 | 84.06 |
| 7 | 68.88±6.09 | 57.97 | 82.61 |

## 4- DISCUSSION

This study was conducted to study the conditions of the health of the environment and safety of primary schools in Mashhad, Iran. The results of this study showed that 90% of the studied schools were < 500 m away from places such as waste disposal, hospitals, factories, high voltage power lines, livestock farms, poultry farms and noisy centers. Therefore, about 10% of schools that are close to these centers should be taken into further consideration (13). Studies have shown that noise pollution can decrease the accuracy and level of learning and results in an increase in the stress (13, 14). The minimum required area of the schools for each student is 6 m in the primary school, 7 m for guidance and 8 m for high schools and colleges (5), in this study, 85.28% of public schools and 53.84% of non-public schools were standard. In Ganji et al.'s study, 91.7% of elementary schools in Khomeini Shahr of Isfahan had the standard area for each student (15).

Also, in a study conducted by Fadaei et al. in Shahre-Kord, the prevalence of the warts was 10.4%. The incidence of warts increases during school hours due to the close contact of students with each other (16). The ratio of the students to drinking fountains in 52.45% of the public and 61.53 of non-public schools were in accordance with the standard; 54.47% of public schools and 33.33% of non-public schools had a sanitary toilet and the number of toilets with the number of students were suitable. Tap water facilities distance to toilet in 40.98% of public schools and 69.23% of non-public schools was less than 15 meters. The proximity of the tap water facilities to the toilet leads to the transfer of pathogens to the drinking fountains. In a research conducted by Zare Jamalabadi et al. in Yazd, 23.8% of the schools had no separate drinking fountains (1). Zazoulli et al. in their study showed that 88% of urban schools in Mazandaran province had healthy tap water facilities. The minimum and maximum percentages of the number of sanitary toilets in urban and rural schools were 86% and 90%, respectively (11). Sohrabian et al. in their study surveyed the health status of Ilam schools and found that the tap water facilities, hand washing facilities and toilets in 38, 22 and 35% of schools were unhealthy (17). In present study, disposal waste in 100% of the studied schools was hygienic (Table.2). The results of the study by Zazoulli et al. showed that Sari primary schools (Iran) had a favorable situation in terms of wastewater collection and waste disposal (11). Sohrabian et al. in their survey revealed that 22% of Ilam schools require healthy sewage disposal and 15% of them need garbage collection and disposal (17). Also, the drinking water status in 100% of the studied schools was in accordance with the standard. Various studies have shown that by using healthy drinking water, the level of intestinal parasitic infections can be greatly reduced (18, 19). The sanitary buffet should have the following conditions: Seamless wall and shelf, convenient refrigerator for food storage and milk, have a health card, personal hygiene compliance, clean clothes, standard buffet building (20).

According to the results of the present study, 87% of the schools studied had a buffet that 33% of which had unfavorable conditions including the dirty clothes of the buffet staff and the absence of sanitary conditions on the floor, ceiling and wall of the buffet. Statistical tests did not show any significant difference between buffet health status in public and non-public schools (p=0.827). Improving the health status of the buffets is important because of their direct relationship to the health of students (19). Rahmaniyan et al. in their research to survey the school health status of Jahrom (Iran) reported that health status for 85.5% of the buffets was desirable (21). The results of the study conducted by

Safari et al., revealed that the health status of the buffet in 58.3% of the studied schools was in accordance with the standard (22). The survey of the health status of schools buffets of Isfahan (Iran) showed that 46.5% of schools had an unfavorable status in terms of personal health and 34.5% of schools had a poor health environment status (20). Also, the results of the environmental health parameters of villages in Mazandaran province (Iran) showed that 81% of the studied schools lacked any type of buffet (sanitary and non-sanitary) (11). Table.3 shows the safety status of the studied primary schools of Mashhad. Statistical tests showed that there was no significant relationship between the safety status in public and non-public schools. 93% of the schools had a staircase equipped with guard rails and 77.4% of schools had standardized fire extinguishing capsules that is consistent with similar studies (18, 19, 23). Although the school's safety status was at an acceptable level, the improvement of the safety status should be considered in future plans of the schools.

In present study, there was no significant difference between the girls and boys schools. In the study conducted by Zare et al. on the environmental health status, safety and ergonomics of the primary schools of Markazi province (Iran), a significant difference was reported between the urban and rural schools and also girls', boys' and schools. Urban schools and girls' schools received higher scores compared to rural and boys' schools, respectively (12). That is in contrast with our study. Based on the above mentioned cases, there were some differences in results between this study with other cities. The factors that affect these differences include: school management, school age, regular training by health officials, schools' budgeting status and so on. Therefore, these factors should be considered when comparing and interpreting the results of different cities.

## 5- CONCLUSION

Overall, the results of the present study on the health status of the public schools showed that among these elementary schools, 37.9% had favorable health conditions, 32.5% somewhat favorable and 26.6% had unfavorable conditions. These results in non-public schools included 35.8, 35.3 and 22.3%, respectively. The lowest scores in public and non-public schools were related to the school environment and buffet and the highest scores were related to distance to unsecured place and class environment status. The results of the survey of the safety status revealed that among the public schools, 71.3% had favorable health conditions, 13.9% somewhat favorable and 15.8% had unfavorable conditions. These scores in non-public schools included 90.1, 2.11 and 8.94%, respectively. The average of environmental and safety health scores in public and non-public schools among 100 scores were $66.47 \pm 13.19$ and $63.65 \pm 9.59$, respectively. According to these results, the managers of the schools to improve the health status of school buffets in different aspects, the improvement of classrooms and the existence of disaster emergency routes, should seriously address these problems. Also, it is suggested that, with the cooperation of education authorities, health centers and medical sciences universities, efforts be made to improve the environmental health and safety of primary schools in order to prevent the occurrence of illness and incidents for students in Mashhad city, Iran.

## 6- CONFLICT OF INTEREST: None.

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