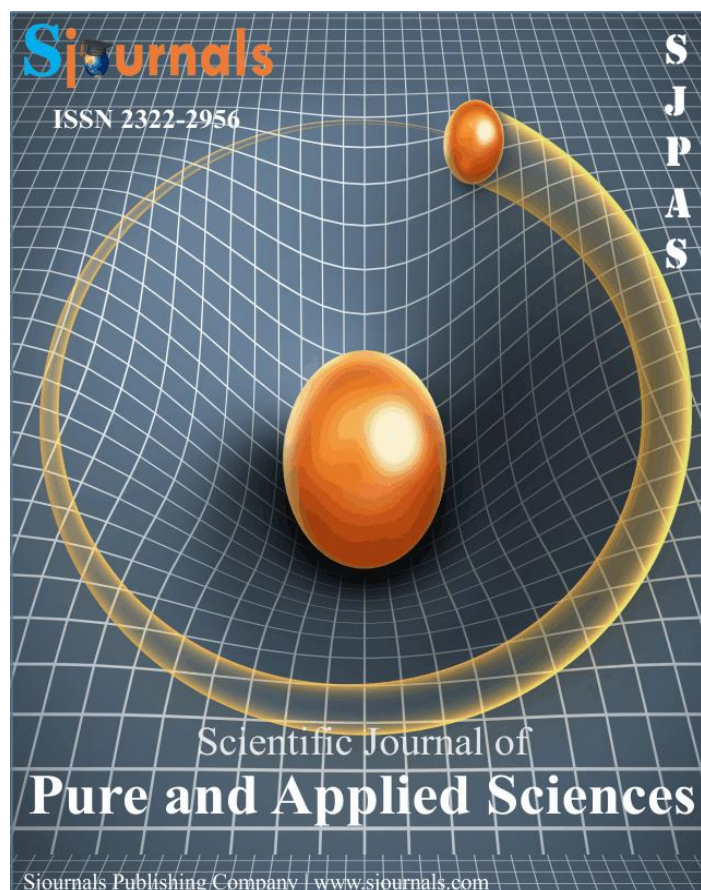


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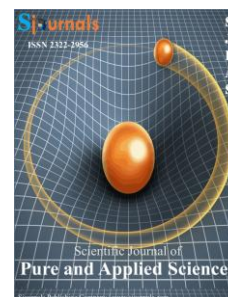
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### Case study

## Study of health, safety and environment (HSE) in kindergartens of Tabriz city

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### ABSTRACT

Nowadays, attention to preschools is increased. In the past, most of working mothers sent their children to kindergartens. But today for a better preschool education, mothers who do not work outside either prefer to send their children to kindergartens. The aim of this study is to investigate kindergartens of Tabriz in terms of health, safety and the environment. For this study, previous relevant studies thoroughly examined and a checklist of questions about the safety of building (35 questions), fire safety (4 questions), electrical safety (6 questions), protective equipment and first aid (3 questions), lighting (5 questions), weather conditions (2 questions), health (19 questions), ergonomics (6 questions) and the safety of toys (10 questions) was developed. In all surveyed kindergartens, 72.68% building safety, 68.34% fire safety, 84.45% electrical safety, 71.24% protective equipment and first aid, 76.47% brightness, 99.01% weather conditions, 69.75% health, 84.79% ergonomics and 90.63% safety of toys, are acceptable. The results show that the rules edited by the welfare organization have been greatly effective and this organization has been successful in monitoring the implementation of these laws.

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## **1. Introduction**

Nowadays, attention to preschools is increased. In the past, most of working mothers sent their children to kindergartens. But today for a better preschool education, mothers who do not work outside either prefer to send their children to kindergartens (Shafa, 2016). According to statistics, 8 million children under age 7 live in Iran. 750 thousand children benefit from the kindergarten services. Today 17800 kindergartens with 150 thousand personnel are responsible for keeping these children (News, 2016). Furthermore, children under 6 years old have no objection language and are highly vulnerable, but many of the hazards are preventable with proper monitoring (Shafa, 2016). Every year, over 200 thousand children cause by inappropriate use of trampolines which many of these injuries are preventable with proper monitoring (Hampton, 1985). Because of that kindergartens require greater attention and focus on (Shafa, 2016). Unfortunately, physical conditions of most of the country's existing kindergartens do not fit with children. Adverse conditions of kindergarten through unsafe equipment and environment, hygiene, facilities maintenance, inadequate health services and lack of sanitary conditions threat the health and safety of children (Shafa, 2016). The most important factors in assessing the health, safety and environment (HSE) in kindergartens are the level of play space, equipment design and their maintenance, water, nutrition etc. (Behnaz, 2006).

Unfortunately, few studies have been done in the field of kindergarten HSE. A study was done to survey the intestinal parasitic infections in children. The study noted that the intestinal parasitic infection is a common health problem among children. Especially in the case of pinworms which are seeing in places like centers that people are living together and are continuing to occur collision. A total of 393 people aged up to 6 years in public and private kindergartens were selected. The result of this study showed that health care environment is one of the effective factors in spreading the disease (Pang et al., 2008). Between 2001 and 2005 in Beijing, a study was done to analysis the situation of kindergarten children. The results showed that the health of children in Beijing is very unsatisfactory and should be given to obesity and oral hygiene more attention (Meng et al., 2007). The study was conducted in 2006 in Tangshan where 651 children were studied in four kindergartens. The numbers of tests such as hemoglobin, HbsAg, the number of decayed teeth in children 2 to 6 years in kindergarten were done. The results were different between boys and girls (Tabibi, 2008). In 2008 a study entitled "analysis of psychological safety training in Iran to children" was done. The research focused on the question of whether safety training is available for children in accordance with their needs and abilities. The results showed that the prevention of accidents through public education and enhancing safety culture is important. Children's events may be occurring indoor or outside (Kindergartens, schools, streets and resort). So, for the preparation of educational programs, the characteristics of the target group and type of accidents should be considered (Xuhui and Xiang, 2010).

As seen the safety and environmental issues received less attention in relation to health issues in kindergartens. Health, safety and the environment issues of kindergartens have a particular importance. The aim of this study is to investigate kindergartens of Tabriz in terms of safety, health and the environment.

## **2. Materials and methods**

This study is a case study that aims to check the status of HSE in Tabriz (A city of Iran) kindergartens. There are several methods to check the status of HSE and identify the hazards including Checklist, JSA, FMEA, HAZOP, BOWTIE etc. (Parvin et al., 2007; Alizadeh et al., 2015; Alizadeh and Moshashaei, 2015; Rasoulzadeh et al., 2015). For this study, Checklist method was used. Steps of this study are as follows:

- Checking international standards and national laws and regulations regarding the status of HSE kindergartens: In this step, using library studies, similar researches were searched and checked. As well as national and international standards related to kindergarten HSE were studied.
- Providing a list of kindergartens in the city of Tabriz: In this step, a list of about 250 kindergartens in Tabriz was prepared.
- Determining the sample size: After a pilot study, the sample size was determined 50 kindergartens.
- Selecting the samples randomly in each region: After obtaining the permission from welfare organization, samples randomly selected among 250 identified kindergartens. Samples proportionally divided among municipal areas.

- Preparing the checklist to evaluate the kindergartens HSE: For this study, previous relevant studies thoroughly examined and a checklist of questions about the safety of building (35 questions), fire safety (4 questions), electrical safety (6 questions), protective equipment and first aid (3 questions), lighting (5 questions), weather conditions (2 questions), health (19 questions), ergonomics (6 questions) and the safety of toys (10 questions) was developed (This checklist is provided in Appendix).
- Visiting the kindergartens and complete the HSE checklist: A separate checklist was completed for each kindergarten by close observation. Kindergartens in seven of the eleven regions were studied. Then answers to questions of all checklists were divided to the three categories of "acceptable", "unacceptable" and "not relevant".
- Entering data into SPSS 19 software and analyzing: Collected data entered into SPSS software version 19 and the final results were obtained. Percentage of each safety, health and environment items were calculated once for all of kindergartens and once for each region.

### 3. Results and discussion

In all surveyed kindergartens, 72.68% building safety, 68.34% fire safety, 84.45% electrical safety, 71.24% protective equipment and first aid, 76.47% brightness, 99.01% weather conditions, 69.75% health, 84.79% ergonomics and 90.63% safety of toys, are acceptable (Table 1).

**Table 1**

Percentage of kindergartens health, safety and environment items.

	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 7	Total
<b>Building safety (%)</b>	74	70.27	76.77	76.89	71.66	81.96	68.75	72.68
<b>Fire safety (%)</b>	61.11	56.62	68.57	76.66	87.50	100	100	68.34
<b>Electrical safety (%)</b>	88.88	88.09	77.77	83.33	83.33	95.83	100	84.45
<b>First aids equipment (%)</b>	73.73	71.87	70.37	70.83	66.66	66.66	66.66	71.24
<b>Lighting (%)</b>	69.56	81.55	74.41	72.50	77.77	84.00	60	76.47
<b>Air condition (%)</b>	100	100	100	93.75	100	100	100	99.01
<b>Health (%)</b>	75.28	69.05	67.08	72.26	65.52	64.51	66.66	69.75
<b>Ergonomics (%)</b>	81.81	87.93	85.18	86.66	83.33	83.33	83.32	84.79
<b>Play tools (%)</b>	87.50	91.63	84.09	92.40	94.44	100	80.00	90.63
<b>Kindergarten number</b>	5	21	9	8	2	4	1	50

The results show that the rules edited by the welfare organization have been greatly effective and this organization has been successful in monitoring the implementation of these laws. According to statements of kindergarten authorities no particular incident had happened till now, and none of kindergartens have registered accident statistics. However, these percentages are not good enough because the safety and health range of each kindergarten should be above 90 percent. A lot of new items which were not considered yet were found during the study. These new items are very important and will be included as follows:

- Most kindergartens don't have emergency exits so it is necessary to consider an emergency exit door for every kindergarten.
- There are no signs for the emergency routes. Emergency exit routes should be determined with green ribbons or yellow floor and wall-mounted signs to show the way.
- For health reasons in all kindergartens the floor is made of ceramic. Ceramic floor cause to slip and fall children. Instead of ceramic it is better to use polyvinyl chloride (PVC).
- In some kindergartens yard there are trees and branches of these trees are very dangerous for children. Dangerous branches should be trimmed.
- The keeping rooms walls of children under 2 years should be covered with foam and their floor should be covered with the carpet or soft materials.
- Educators should use gloves when are with children in health services.
- An adhesive on the cross should be used for all windows to secure them against break.

- It is better to use antimicrobial colors for all walls.
- Aluminum containers should not be used for cooking.
- The sufficient number of fire extinguishers is required.

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**Appendix**

Checklist for checking the HSE (Health, Safety, Environment) status of kindergartens.

No.	Question	Yes	No	N/A	Comments
<b>Building and equipment safety</b>					
1	Is kindergarten building earthquake-proof?				
2	Are the doors open outward of classes? (In case the influx of students during a disaster such as fire doors to be opened easily).				
3	Are the doors open easily?				
4	Are the classes doors handles suitable and healthy?				
5	Are always emergency doors open?				
6	Is there additional equipment such as desks, couches, cabinets on the emergency doors routes?				
7	Do check the door handles to prevent rust and loosening doors regularly?				
8	Are classes free of cracks and crevices in the ceiling and walls?				
9	Are the engineers comments used to modify the walls and intermediate blades in kindergarten?				
10	Translation error. Are the lockers have been installed in the wall?				
11	Is there an additional class or room by partitions?				
12	In case of positive answer for question 11, is partition wall resistant and shatterproof?				
13	Is the trenches and holes in kindergarten yard?				
14	Is the floor suitable for children playing?				
15	Is the class mosaic floor causing children slipping?				
16	Are appropriate slippers used (size, material, ...)?				
17	Are kindergarten walls and floors made of durable and washable material?				
18	Is the size of windows and doors suitable?				
19	Is the ceiling height less than 3 meters?				
20	Has the hand washing place appropriate height of 75-60 cm from the floor?				
21	Do the stairs have appropriate height and slope?				
22	Are the step dimension as below: Maximum height: 18 cm Minimum width: 30 cm Its length: 1.3 m				
23	Do stairs have suitable railings?				
24	Is the distance between two vertical bars in the handrail suitable in such a way that children don't fall through the bars?				
25	Is the classroom teaching panel wall mounted?				
26	Do windows have suitable protection?				
27	Are there any balconies and terraces for the classroom?				
28	Do the kindergarten balconies have protective fences?				
29	Does the heater located outside the path of children?				
30	Do the cold-generating equipment, such as coolers located in safe and appropriate place?				
31	Are the mobile fans used?				
32	Is there any water pool in the kindergarten yard?				
33	Are the kitchen environment safety rules following?				
34	In the case of using the radiators, are there safeguards to prevent children deal with it?				
35	Does the kindergarten have water, electricity, telephone and gas?				

<b>Fire safety</b>	
36	Is there at least one fire extinguisher for every room?
37	Are the fire extinguishers located in accessible and visible place?
38	Do the kindergarten teachers know how to use a fire extinguisher?
39	Do structural instruments in the emergency doors are fire resistant?
<b>Electrical safety</b>	
40	Is the electrical system safe?
41	Is the height of electrical sockets suitable?
42	Do electrical outlets safety covers?
43	Do control the causes of the electrical accidents?
44	Does the power meter have a protective case?
45	Is the kindergarten located outside of hazardous area (such as power lines, gas pipelines, high pressure fuel pump, warehouses, explosive chemicals,)?
<b>Protective equipment and first aid</b>	
46	Is there a first aid kit?
47	Is there a list of first-aid materials (standards) in the vicinity first aid box installed?
48	Do the coaches and staff know the emergency measures?
<b>Lighting</b>	
49	Does light shine in from the south (windows on the south side of the building)?
50	Is the window height 1.5 meters from the ground?
51	Is the window area a fifth of class area?
52	Do the corridors have light about 100-150 lux?
53	Is the tables surface smooth and clean and doesn't cause eyes glare?
<b>Weather conditions</b>	
54	Is the classroom temperature between 18-21 °C?
55	Is the classroom humidity between 50-60%?
<b>Health</b>	
56	Is the kindergarten located away from the industrial, livestock and poultry farms, landfills, etc.?
57	Is there a healthcare room in the kindergarten, which equipped with complete health care services for health and nutrition activities?
58	Is the kindergarten yard furnished with proper materials (to avoid dust)?
59	Are the walls covered with anti-microbial paint?
60	Does the kindergarten have health meeting held with the participation of health workers?
61	Are held the meetings once per month?
62	Are kindergarten teachers always recorded the accidents in accordance with standard forms?
63	Is kindergarten in compliance with the sanitary health rules?
64	Is kindergarten in compliance with the kitchen health rules?
65	Is waste collecting place located outside of the main kindergarten building?
66	Do any sedative and hypnotic drug used to control children?
67	Are detergents and cleaners for the cleaning of kitchens, bathrooms, classrooms and bedrooms, located in a place out of reach of children?
68	Are dinner plates of plastic or porcelain fragile?
69	Are food cutlery with sharp edges?

- 70 Are the teflon dishes completely healthy and without a scratch?
- 71 Are the aluminum containers used for cooking?
- 72 Do the raw materials used in baby foods thoroughly rinse?
- 73 Are the blackboard and chalk used?
- 74 Is the whiteboard used?

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**Ergonomics**

- 75 Are the class desks and chairs ergonomic?
- 76 Are the chairs and desks made of soft and safe material?
- 77 Do the size and height of desks are suitable for children?
- 78 Do children in the classroom at least 5 exercises every half hour?
- 79 Is the height of educational boards suitable for children?
- 80 Is distance of education boards from the first row of seats is 2.20 meters?

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**Safety of toys**

- 81 Does swinging have safety belt?
- 82 Do the roller coasters and equipment have protective fences?
- 83 Do children's play equipment made of compact rubber and plastic?
- 84 Do rocking play equipment, swings and slides sand on the soft mattress?
- 85 Are the kindergarten toys age-appropriate for children?
- 86 Is stationery color toxic and harmful to health?
- 87 Do children play with game pulps?
- 88 In case of positive answer for question 87, are children aware that they are not for eating?
- 89 Are children aware which manual tools such as scissors are appropriate for their age?
- 90 Are staff familiar with emergency procedures?