ORIGINAL ARTICLE

A Survey of the Safety Conditions of Student Housings: A Case Study in a Type One University in Shiraz, Iran

Mehdi Jahangiri[1], Kourosh Azizi[2], Parvaneh Yekzamani[3], Seyedeh Fatemeh Ahmadi[3], Bahare Mahmoudabadi[3], Fariborz Behbood[3], Mahdieh Delikhoon[3]

[1]Research Center for Health Science, Department of Occupational Health, School of Health, Shiraz University of Medical Sciences, Shiraz, Iran;
[2]Research Center for Health Science, Department of Medical Entomology and Vector Control, School of Health, Shiraz University of Medical Sciences, Shiraz, Iran;
[3]Student Research Committee, School of Health, Shiraz University of Medical Sciences, Shiraz, Iran

Correspondence:
Mahdieh Delikhoon,
Department of Occupational Health, School of Health, Shiraz University of Medical Sciences, P.O.Box: 71645-111, Shiraz, Iran
Tel/Fax: +98 71 37251020
Email: mdelikhon@yahoo.com
Received: 20 October 2016
Revised: 7 November 2016
Accepted: 8 December 2016

Abstract

Background: This study aimed to investigate the extent of implementation of safety measures in 14 student housings in one of the largest universities in Fars province, Shiraz, Iran.

Methods: A cross-sectional study was conducted in 14 student housings of one of the largest universities, located in Shiraz, Iran. Audit checklists were completed and rated thought field inspection and interview. Safety Requirement Index (SRI) was then used to evaluate the safety of student housings. SRI was graded on five scales (0-19%: very poor (unsafe); 20-39%: poor (relatively unsafe); 40-59%: moderate; 60-79%: good (relatively safe): and 80-100%: excellent (safe)).

Results: The mean SRI score was 71.01±15.46%. The highest and lowest level of SRI was 94.11±6.60% for dimensions of public health and 47.70±18.42% for elevator safety.

Conclusion: None of the studied housings was completely safe in all dimensions. Most of the studied housings were categorized as safe in the dimensions of public health and ventilation and air-conditioning systems; relatively safe in the dimensions of electrical, building, fire and kitchen safety; and moderate in the elevator safety and emergency response. Establishment of safety management system is necessary to promote safety in the studied housings. The results of this study indicated the need to inform the authorities about the safety priorities in housings, to promote the safety conditions. The results could also be used to raise awareness regarding their role and responsibilities about the safety of housings.

Please cite this article as: Jahangiri M, Azizi K, Yekzamani P, Ahmadi SF, Mahmoudabadi B, Behbood F, Delikhoon M. A Survey of the Safety Conditions of Student Housings: A Case Study in a Type One University in Shiraz, Iran. J Health Sci Surveillance Sys. 2017;5(1):38-42.

Keywords: Housing, University, Safety

Introduction

Safety is defined as the degree of freedom from hazards and practically means the series of acts, regulations and activities in order to prevent and reduce the accidents by eliminating or controlling the hazards.[1,2] Life without risk has always been the aim and desire of all people throughout their lives, and man has always looked for ways and means to have a life without accident and does what is necessary to achieve it.[3]

According to the International Building Code, student housings are facilities containing more than two sleeping units, or dwelling units, where the occupants are permanent residents.[4] These facilities could be considered as high risk due to a variety of hazards arising from building characteristics, use of elevators and electrical equipment, cooking activities, maintenance and cleaning affairs, and operation of ventilation and air-conditioning systems.[5,6] These hazards can sometimes lead to various accidents including fire, electrocution, food poisoning, asphyxiation, falling elevators, STF (Slip, Trip and fall), as well as adverse

health effects that have serious consequences in the case of non-compliance with safety regulations. For example, poorly designed architectural features were found to be the cause of 11% of unintentional injuries throughout the world in 2004. Faulty smoke alarms, unstable handrails, and broken steps are all features of housing units that can contribute to both injuries and death.[7] In addition, emergency escape routes for students in emergency situations, including earthquake and fire, are very vital due to congestion and the high number of students in housings.[8-10]

Safety risks in student housings could be attributed mainly to the large number of students at one location, the high fire load in the rooms, and design characteristics and maintenance of the facility. Although the occurrence of these accidents seems to be relatively rare, sometimes they could have catastrophic consequences because of the large number of people accommodated in these places. Therefore, provision of safety programs in these places is crucial and it is required to ensure optimum safety of different aspects.[11-14]

There is no official and published statistics about the number and type of accidents in student housings. However, a quick search in the media and internet websites shows numerous incidents in these places including death by electric shocks due to failure in electrical system of air-conditioners,[8] amputation as a result of falling the elevator cabin,[9] poisoning as a result of carbon monoxide emission from the chimney ventilation system,[10] and deaths caused by fire due to electrical shortcut in a student housing in Iran.[15]

To the best of our knowledge, no previous studies have been done to determine the full extent of safety problems associated with student housings in Iranian universities. Therefore, this study aimed to investigate the extent of implementation of safety measures in 14 student housings in one of the largest universities in Fars province, Shiraz, Iran

Materials and Methods

This cross-sectional study was conducted on all 14 students housing belonging to one of the major universities in Iran with the population of 3,690 students. Required data on occupational safety and health measures in each housing were collected using an audit checklist constructed based on the national safety and health regulations. Initially, during a preliminary audit, the most important safety concerns in the student housings were identified. The validity of the checklist was approved by 10 safety experts. The checklist covered 8 dimensions including Fire safety (27 items), Electrical safety (21 items), Building safety (21 items), Emergency response planning (18 items), Heating and cooling safety (50 items), Elevator safety (14 items), Public health (9 items), and Kitchen safety (15 items) (Table 1).

In order to calculate the level of provided safety measures in the studied housings, an index called Safety Requirement Index (SRI) was created as follows:

$SRI=\Sigma x/\Sigma n$ Equation 1

$SRI\ T=\Sigma SRIi$ Equation 2

SRI T; Total safety requirement index

SR; Safety requirement index for each dimension

X: Obtained score for each item

n=Maximum score of each item

SRI is a percentage of completion or compliance degree in the audit checklist, and it is simply the sum of points for all items of the checklist divided into maximum points possible to score. The SRI was also used successfully in a recent study to determine the percentage of provided occupational safety and health measures in an Iranian hospital[16] and Micro-scale enterprises.[17]

SRI was then graded on five scales (0-19%: very poor (unsafe); 20-39%: poor (relatively unsafe); 40-59%: moderate; 60-79%: good (relatively safe); and 80-100%: excellent (safe)). This categorical classification was applied to judge about the level of provided safety measures in the studied student housings.

In order to check the reliability of the checklist, internal consistency of all dimensions was measured by Cronbach's alpha test. Inter-rater reliability was checked by Intra-class Correlation Coefficient (ICC). For this purpose, 10 housings were randomly selected

Table 1: The main issues investigated by each dimension of the safety checklist used in this study

Dimensions	Items
Fire safety	Fire extinguishers, training students to use fire extinguishers, standard and reachable areas to place extinguishers, periodic inspection of the equipment, etc.
Building safety	The constructional strength of housings, having safety guards and resistance against fire, etc.
Electrical safety	Electrical box, lines, cables and earthing system status, etc.
Ventilation and air-conditioning systems	Heating and cooling systems safety, piping connections, existence of inflammable materials , boilers' safety, safety valve inspection, thermostat, smoke detection sensors , periodic inspection of fuses, water pumps and their components, periodic inspection, etc.
Emergency response planning	Emergency exits, signs, training, etc.
Public Health	Time and location of insecticide use, sanitation
Kitchen safety	Refrigerator and stove location, fuel type for gas stove, connections, etc.
Elevator safety	Ventilation, lighting and electrical systems, elevator locking and warning systems.

and rated by four experts.

Audit checklists were completed by filed inspection as well as interviews with the official staff and housing supervisors. In each housing, at least 10 stations were audited. The checklist items were rated by a four trained safety auditor from Shiraz University of Medical Sciences using a five-point scale; 0 (critical), 1 (Unsafe), 2 (Relatively unsafe), 3 (Moderate), 4 (Relatively safe), and 5 (Safe).

The study protocol was approved by Shiraz University of Medical Sciences ethics committee. Housings' officials were informed about the objectives of the study and were asked to provide a written informed consent prior to the study.

Results

Reliability test results revealed that the checklist had an acceptable internal consistency range. The relevant Cronbach's alpha coefficient was recognized to be 0.85. Table 2 shows the values of SRI for all safety dimensions as well as distribution of SRI in different safety levels. The highest and lowest values of SRI were related to public health (94.11%), and elevator (47.70%), respectively. According to this study, most of the studied housings (11 of 14) were classified at a good (relatively safe) level (Figure 1.)

Figure 1 shows the status of various aspects of safety status in the studied housings including Fire safety, Electrical safety, Building safety, Emergency response planning, Ventilation and air-conditioning systems, Elevator safety, Public Health, and Kitchen safety.

Discussion

The aim of this study was to investigate the level of provided safety in student housings in one of the largest universities located in in Fars province, Shiraz, Iran. The average score of safety requirement index was calculated to be 71.01±15.46%, which is classified as relatively safe. According to the findings, the highest

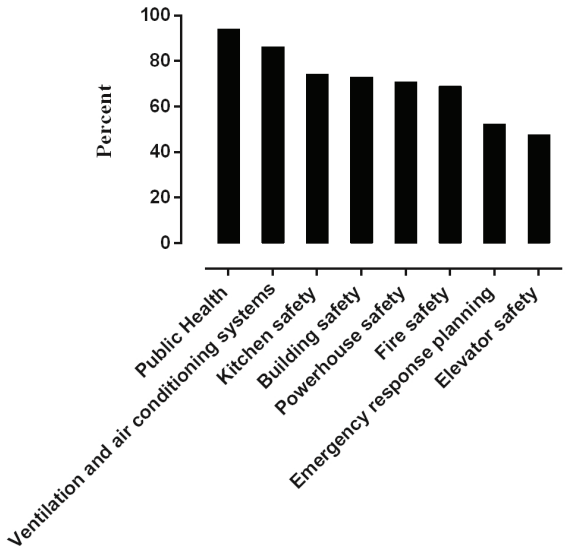

Figure 1: Average values of safety requirement index in different safety dimensions in the studied students housings

value of SRI among various aspects of safety was related to public health (94.11%). In contrast to our study, a similar study in Kenya that had evaluated the safety status of Classrooms, Dormitories, Sanitation Facilities, Laboratories and Kitchen in public secondary schools, the majority of the managers, teachers and students had reported unsafe conditions in student housings. Unlike the present study in which public health had the highest mean of SRI, they reported undesirable condition in the field of public health, especially lack of water and unsanitary services.[18]

In this research, elevator area (47.70%) had the lowest mean SRI score. Most non-compliance states registered in this regard were related to the lack of an efficient system in order to support the elevator cabins in emergency situations such as special emergency power source, phone, and exit doors as well as failure to periodically test the earth system performance. In a recent accident which had occurred in one of the largest universities in Iran, the elevator cabin fell and 6 individuals were severely injured.[19]

Table 2: The values of Safety Requirement Index and its classification among the studied student housings (n=14)

Safety Dimensions	SRI Mean±SD	Safety level - number (%)				
		excellent (Safe); 80-100%	good (relatively safe); 60-79%	moderate; 40-59%	poor (relatively unsafe); 20-39%	very poor (unsafe); 0-19%
Elevator safety	47.70±18.42	1 (12.5)	1 (12.5)	3 (37.5)	3 (37.5)	-
Emergency response planning	52.38±9.84	-	4 (28.57)	9 (64.29)	1 (7.14)	-
Fire safety	69.44±6.36	-	12 (85.71)	2 (14.29)	-	-
Kitchen safety	74.23±9.62	3 (21.43)	8 (57.14)	3 (21.43)	-	-
Public Health	94.11±6.60	12 (85.71)	2 (14.29)	-	-	-
Ventilation and air-conditioning systems	86.30±7.51	9 (64.29)	5 (35.71)	-	-	-
Electrical safety	70.95±8.32	1 (7.14)	11 (78.57)	2 (14.29)	-	-
Building safety	73±6.73	2 (14.29)	11 (78.57)	1 (7.14)	-	-
Overall Safety	71.01±15.46	1 (7.14)	11 (78.57)	2 (14.29)	-	-

Analysis of the checklists in the area of emergency response represented the moderate level of SRI. This finding is consistent with those of the study in Kenya which reported lack of space in an emergency situation. At the macro level, this can be due to lack of safety management system, the managerial structure of the housings affairs, and lack of safety experts in the organizational structure. This has led to the absence of a comprehensive plan for preparedness and emergency responses, such as formation of an emergency response team and maintaining safe conditions in housings according to the existing standard in the country. Other safety problems including absence of emergency assembly point (EAP), and absence or blocked emergency exits are also due to insufficiency of the existing safety management system governing the housings and lack of knowledge about emergency response amongst the students.

In contrast to the findings of Jane et al. in Kenya[18] and also the study of Madrzykowski et al. in USA,[20] this study revealed a much better level of fire safety among the studied housings. However, various non-compliance items were observed, including lack or failure in fire alarm systems, lack of fire boxes, inappropriate status and insufficient number of fire extinguisher cylinders, and lack of student training about fire safety and operation of fire extinguishers.

In addition, the results of Flynn's study on dormitories, fraternities, sororities and barracks in USA indicated that although only 5 percent of the fire cases had started in the rooms, but 62% of mortality and 26% of damages were related to these fires.[21]

In this study, among the surveyed safety areas, the status of public health, ventilation and air-conditioning systems, kitchen, building, fire and electrical safety areas was classified as relatively safe level. This could be attributed to regular public health inspection as well as maintenance plan for ventilation and air-conditioning systems in the studied housings.

Nonetheless, for improvement of the level of safety, control measures in accordance with the standards and safety requirements are necessary. In the field of electrical safety, these measures include modifying the earthing system, securing mobile wiring, installing appropriate protection on high voltage switches and fuses, installing warning signs on the electrical panel, and improving the switches and sockets.

For more detailed evaluation of students' housings safety, more powerful safety assessment tools such as hazard identification techniques and risk assessment methods are suggested to be used in the future studies.

Conclusion

In conclusion, this study showed that the provided safety facilities in the studied student housings were not satisfactory. Most housings were classified at a safe level in the areas of public health and ventilation and air-conditioning systems; relatively safe level in areas of electrical, building, fire, and kitchen safety; and moderate level in the elevator and emergency response planning domain. In order to promote the safety level among student housings, a safety and health management system should be established. The results of this study indicate a need to inform the authorities about safety priorities in housings to promote the safety conditions. The results could also be used to raise awareness regarding their role and responsibilities about the safety of housings.

Acknowledgment

This study was extracted from the approved project with the code of 93-7313 and was financially supported by Shiraz University of Medical Sciences, Shiraz, Iran. The authors wish to thank the Research Consultation Center (RCC) at Shiraz University of Medical Sciences for their invaluable assistance in editing this manuscript.

Conflict of Interest: None declared.

References

1 Arghami SH & Bouya M. Principles of safety for industry and services. Hamedan: Fanavaran Publication; 2006: 32-4 [Book in Persian]

2 M.Jahan-Giri&M.Amin Norozi.Integrated, Health Safety and Environmental Management Systems (IMS & HSE-MS); 2012 [Book in Persian]

3 Halvani GH, Ketabi D. Comparison of the Safety Levels of Governmental and Non-Governmental Schools: Study in Yazd City, Iran, 2009. International journal of occupational hygiene. 2010; 2(1):6-9.

4 IBC, 2012. International Building Code. International Code Council, USA

5 Sanni-Anibire, M.O., Hassanain, M.A., 2015. An integrated fire safety assessment of a student housing facility. Struct. Surv. 33 (4/5), 354–371

6 Mohammad A. Hassanain , Mohammed Abdul Hafeez, Muizz O. Sanni-Anibire, A ranking system for fire safety performance of student housing facilities, Safety Science 92 (2017) 116–127

7 Johnson E, Cole EC, Merrill R. Environmental health risks associated with off-campus student-tenant housing.J Environ Health. 2009 Jan-Feb;71(6):43-9; quiz 51-2.

8 Aftabnews [Internet]. accessed 4 nov 2011. available from: http://www.aftabir.com/news/view/2011/nov/04/c9_1320407776.php

9 Iranian Student's News Agency [Internet]. accessed 27 January 2015. available from: http://isna.ir/fa/news/93110100195/. Page

10 Aftabnews [Internet]. accessed 17 octo 2011. available from: http://aftabnews.ir/vdcf0edyjw6dmya.igiw.html. Page

11 Hammond JS, Hickman C, Ward CG. Burns in school-age children: demographics and burn prevention. J Burn Care Rehabil 1987; 8: 330–2.

12 Home fire Safety [Internet]. accessed year: 2006. available from: http://www.usfa.fema.gov/ public/ factsheets/ facts.shtm. Page

13 Bektas T. Ilkögretim Okullarinda Ögrenci Güvenligi: Büyükçekmece Ilçesi Örnegi. Yüksek Lisans Tezi, Yildiz Teknik Üniversitesi Sosyal Bilimler Enstitüsü, Istanbul, 2007.

14 Barhan A. Ilkögretim Okullarinda Ögrenci Güvenliginin Saglanmasi. Yüksek Lisans Tezi, Ankara Üniversitesi Sosyal Bilimler Enstitüsü, 2007.

15 Kurdpress [Internet], 2013, January,30. available from: http://www.kurdpress.com/Fa/NSite/FullStory/ News/?Id=39625#. Page

16 Norozi MA, Jahangiri M, Ahmadinezhad P, Zare Derisi F. Evaluation of the safety conditions of shiraz university of medical sciences educational hospitals using safety audit technique. Journal of Payavard Salamat. 2012 May 15;6(1):42-51.

17 Jahangiri M, Rostamabadi A, Malekzadeh G, Fahandej Sadi A, Hamzavi G, Rasooli J, Momeni Z, Ghaem Maralani H. Occupational safety and health measures in micro-scale enterprises (MSEs) in Shiraz, Iran. Journal of occupational health. 2016(0).

18 Gatua JW. Assessment of Safety Status of Physical Infrastructure (Classrooms, Dormitories, Sanitation Facilities, Laboratories and Kitchen) in Public Secondary Schools in Nairobi West Region, Kenya. Assessment. 2015; 5(3).

19 Tabnaknews [Internet]. accessed 03 October 2016. Available from: http://www.tabnak.ir/fa/news/628496. Page

20 Madrzykowski D, Stroup DW, Walton WD. Impact of Sprinklers on the Fire Hazard in Dormitories: Day Room Fire Experiments. US Department of Commerce, Technology Administration, National Institute of Standards and Technology; 2004 Jun.

21 Flynn JD. Structure Fires in Educational Properties. National Fire Protection Association, Fire Analysis and Research Division; 2009 Aug.

Erratum

Mohammad Esmaeeli, the author of the article “Comparison of Perfectionism in Patients with Cardiovascular Disease and Normal Subjects: A Case - Control Study” published in volume 4 isuue 4 Is encouraged to correct his affiliation to “Department of psychology, Yazd Branch, Islamic Azad University, Yazd, Iran”.