



Evaluation of knowledge, Attitude and Behavior of Qazvin University of Medical Sciences Students Towards Household Hazardous Waste Management

Reza Ghanbari ¹, Milad Mousazadeh² *, Zohreh Naghdali³, Seyede Parvin Moussavi⁴, Mohammad Mehdi Soheyl⁵ Reza Rostami⁶

1. Department of Environmental Health Engineering, Faculty of Health, Qazvin University of Medical Sciences, Qazvin, Iran
2. *Corresponding Author :Student Research Committee, Qazvin University of Medical Sciences, Qazvin, Iran: m.mousazadeh@qums.ac.ir
3. Student Research Committee, Qazvin University of Medical Sciences, Qazvin, Iran
4. Environmental Health Research Center, International Branch of Shahid Sadoughi University of Medical Sciences and Health Services, Yazd, Iran
5. Student Research Committee, Qazvin University of Medical Sciences, Qazvin, Iran
6. Student research committee, Kermanshah University of Medical sciences, Kermanshah, Iran

Original Article:

Received 30 March, 2018 Accepted 28 May 2018 Published 30 June, 2018

ABSTRACT

Background and Aims: One of the main sources of solid waste production, houses and residential areas is the management of this type of waste is one of the serious environmental challenges in developing and developed countries. Awareness of students about knowledge, attitude and behavior is very important in providing educational and policy guidance in this regard.

Materials and Method: In this descriptive cross-sectional study was conducted among the students of Qazvin University of Medical Sciences in 2017. The data gathering tool was a questionnaire with 37 questions that its reliability and validity was approved. In five sections: demographic (7 questions), knowledge (8 questions), attitude (8 questions), behavior (8 questions) and general (6 Question) was set. Data were analyzed by SPSS software version 18 using descriptive statistics, ANOVA and correlation tests.

Results: The mean score of knowledge was 6.16 ± 1.1 (out of 8 points) and the attitude was 8.75 ± 1.58 (out of 10 points) that the study community had a positive attitude. Knowledge ($p = 0.82$) was higher for girls than for boys, but boys had better attitude ($p = 0.041$) than girls.

Conclusion: Considering the level of knowledge and good attitude among students, and the importance of students as an influential group on family and society that it seems with the emphasis on the importance of teaching such issues to students, it would be possible to increase their performance and, in general, society in this category.

Keyword:

Knowledge, Attitude, Behavior, Household Hazardous Solid waste

* Corresponding author: m.mousazadeh@qums.ac.ir

Peer review under responsibility of UCT Journal of Research in Science, Engineering and Technology

1. Introduction

These days' social and financial crises are rooted in overpopulation, industrial development, technological advancement, and consumerism (1). Paying close attention to environment and keeping humans as well as other earthen creatures healthy is a principle survival key in life. On top of all, controlling environmental contaminations especially solid waste what is so particular in modern science and technology (2). Stretching cities and crowdedness leads to increasing solid waste growth per capita. Such a fact makes its gathering, transportation, and disposal rather sophisticated which needs meticulous regulations to arrange. Iran, owing to lack of appropriate and advanced infrastructures and resources, suffers from urban solid waste accumulation what endangers environment and humans' health (3, 4). One of the most important educational basis of environment is solid waste management. Thus, not paying attention to it causes financial deficiencies, wasting resources, and environmental pollution (5).

Solid waste management includes reducing resources of waste, recycling at place or out of it, storing, collecting, transporting, processing, and disposing. These items should go along well with each other in a reasonable cycle (4). Urban solid waste management is regarded as one of the serious environmental challenges in developing and developed countries. In some developed countries, switching from traditional system on the base of burial to uniform system of solid waste management has been successful (6). One of the main sources of producing solid waste is houses and residential areas (7). Perishable wastes from vegetables, fruits, animals' coats, bones and meats, fish and poultry are the most portion of household solid waste (8, 9).

Certainly, one of the most important health problems of cities and even villages is hygienic disposal of household solid waste. Mismanagement in this field leads to water, soil, and air pollution that make ground for breaking different kinds of infectious diseases out. Therefore, conducting an integrated system for collecting and disposing solid waste not only improve this process but also save raw materials (10-12).

From American Environmental Protection Agency point of view, whatever harms humans' health or damages environment is hazardous solid waste (13, 14). Recently, in Iran environmental consequences of urban solid waste has been paid more attention. Researches reveal that the most proportion of solid waste has been produced in cities of this country. Iranian produce solid waste half as much as European countries and America (with 410-760 kg per capita annually) (6). All corners of a house such as kitchen, bathroom, garden, and parking lot can be considered as highly probable centers for producing hazardous solid wastes (15). Tanks of chemical stuff under houses' staircases can cause a fire (16). Releasing chemical materials to the environment can endanger humans and other animals, health (17). Thus, families can play a key role in preserving and promoting social and environmental health by hazardous solid waste management. It would be possible by collecting and storing hazardous waste separately in houses in favor of reducing the amount of leachate (18). Alleviating the problems related to household solid waste and managing it

needs people got involved as main producers (19). One of the major basis of society is students who can be used to spread environmental information in community. Therefore, getting informed about their knowledge, attitude and behavior is greatly important in proposing educational strategies and exerting policies. According to such a point, this study aimed determining knowledge level, attitude, and behavior of students of Qazvin University of Medical Science (Qazvin, Iran) toward household hazardous solid waste management.

Materials & Methods:

In this descriptive study, first of all, initial information about research factors had been gathered with field study and delving into books and articles. Then, questionnaire was scrutinized. It should be mentioned that validity and reliability of questionnaires (questionnaires related to household hazardous solid waste) had been approved by Amouyi and colleagues (11, 15). Validity of questionnaires had been approved by an expert team. And Reliability of them had been confirmed with a pilot study about 25 people of selected sample, considering Cronbach's alpha. Questionnaire included 37 questions in 5 sections consisted of demographic section with 7 questions (age, sex, education, occupation, number of family members, accommodation's vastness, and type of accommodation), knowledge section with 8 questions and score domain from zero to eight (correct answer with score 1, and incorrect answer with score 0), attitude section with 8 questions with score domain, behavior section with 8 questions, and general section with 6 general questions. Testable people were justified about considered method, confidentiality, and purpose of study. Owing to becoming fully aware about aspects of the study, all of them had a strong tendency to enter into the research. After that, questionnaires were distributed amongst purposed students by researcher.

According to literature study, formula

$$n = \frac{Z^2 \left(1 - \frac{\alpha}{2}\right) \times P(1-P)}{d^2}, \text{ with considering } d=0.05$$

$p=0.8$, from all schools 252 people were randomly selected and invited to the study (6). Finally, analyzing data were performed with SPSS software version 18 and analyses of both variance and correlation.

Findings:

In this study, testable group included 150 people (59.8%) female, 51 students (20.3 %) in health school, 42 students (16.7%) in paramedical science school, 43 students (17.1%) in nursery and midwifery school, 44 students (17.5 %) in medical school, 70 students (27.9%) in dentistry school. In the group, 8 people (3.2%) were students in Associate program, 115 people (45.8%) in Bachelor program, 18 people (7.2%) in Master program, 93 people (37.1%) in Professional Doctorate, and 16 people (6.4%) were as Residents. From age point of view, 241 students (96%) were within 18-30 years old, 6 students (2.4%) were 30-42 years old, and 3 students (1.2%) were within 42-54 years old. Average score of knowledge was higher than medium with $6/16 \pm 1/1$ (out of 8). Observed community enjoyed positive attitude with average score of $8/75 \pm 1/58$. Females were more Knowledgeable ($p=0/862$) than males. But males enjoyed a better attitude ($p=0/041$) than females.

University College of Takestan

Answering the question on ‘which is the best group for separating hazardous household solid waste?’, 82% of people believed family members would be the appropriate group, 12% were in favor of municipality workers, and 6% said municipality workers at disposal place. Answering the question on ‘which group is damaged most by mismanagement in separation, storing, and transportation of hazardous household solid waste?’, 24/7% of people said households as the most sensitive group, 18.3% believed

municipality workers as the vulnerable group, 55% of people were concerned about environment, and 2% named nothing. For question ‘which way is proper for spreading culture of hazardous household solid waste management?’, 73.7% answered media such as radio and television, 22.3% said schools and universities, 2.8% believed into the effectiveness of journals and books, and 1.2% thought about some other items.

Table 1: Comparing average and standard deviation of knowledge, attitude, and behavior of purposed community according to different parameters

attitude		knowledge		percent	number	category	parameters
standard deviation	average	standard deviation	average				
1.669	9.01	1.278	6.14	40	100	male	sex
1.511	8.59	1.120	6.17	60	150	female	
P=0.041		P=0.862				result	
1.578	8.79	1.193	6.16	96.4	241	18-30	Age
1.523	8.1	1.197	6.10	2.4	6	31-42	
2.516	8.33	1	6	1.2	3	43-54	
P=0.362		P=0.962				result	
1.772	9.5	1.282	6.75	3.2	8	Associate	Educational level
1.471	8.63	1.199	6.14	46	115	Bachelor	
1.455	8.66	1.294	6.56	7.2	18	Master	
1.5	8.37	0.719	6.63	6.4	16	Resident	
1.586	8.75	1.174	5.97	37.2	93	Professional Doctorate	
P=0.331		P=0.062				result	
1.316	8.29	1.046	6.51	20.4	51	Health	School
1.542	8.85	1.345	6.40	16.8	42	Paramedical Science	
1.777	8.75	1.167	6.03	28	70	Dentistry	
1.539	9.04	1.125	6.11	17.6	44	Medical Science	
1.594	8.93	1.157	5.74	17.2	43	Nursery & Midwifery	
P=0.167		P=0.014				result	
1.575	8.85	1.210	6.08	58.4	146	apartment	Accommodation type
1.598	8.61	1.151	6.27	41.6	104	villa	
P=0.245		P=0.204				Result	

Regarding data presented in table 1, statistical test ANOVA reveals that individuals' knowledge are not related to sex, age, educational level and accommodation type. But knowledge level remarkably linked to students' schools (their majors). Highest average score of knowledge was for students of health school. And lowest average score of knowledge was for students of nursery and midwifery school. There was a definite link between students' sex and their attitude. Furthermore, with aging, people attitude toward recycling and separation of hazardous household solid waste became better. There was not any correlation

between students' age, education level, school, and type of accommodation with their attitude. 62% of students believed into possibility of recyclability of hazardous household solid waste. It should be mentioned that 85.9% of students knew education level of family members as an effective factor on quality and quantity of hazardous household solid waste. Moreover, 45.8% of students did not do anything in house for separation solid wastes. The reason why they did not take any measure in favor of such a purpose was mismanagement of municipality workers in collecting separated solid wastes (45%).

Table 2: Comparing average and standard deviation of knowledge and attitude about the place of storing solid waste outside the house

Attitude		Knowledge		Percent	Number	Function
Standard deviation	Average	Standard deviation	Average			
1.54664	8.7	1.178	6.46	75.5	189	Container lid
1.56347	9.11	1.037	6.38	14.8	37	By main gate
1.90347	8.66	1.414	6.38	9.6	24	By curbs and drainage

62.4% of people considered it necessary to remove solid wastes outside the houses every day. While, 13.1% of people suggested once within 2 days for this job. People, who thought that whenever solid waste accumulated, it would be the appropriate time to remove outside the houses, were 24.4%. It should be noted that 75.6% of people have been using container lids, 14.8% of them set their containers next to gates, and only 9.6% of people put them by curbs and drainages. Regarding findings, knowledge level about the place of storing solid wastes outside the houses was

high. To such an extent that average score of knowledge about keeping solid wastes in container lids (the best way) was in highest level (+7.65) (table 2).

Answering the question on ‘which way is preferable for getting informed about proper management of hazardous household solid wastes?’, 16.3% people selected educational classes, 69.7% said radio and television, 14% were in favor of books, educational brochures, pamphlets (char 1).

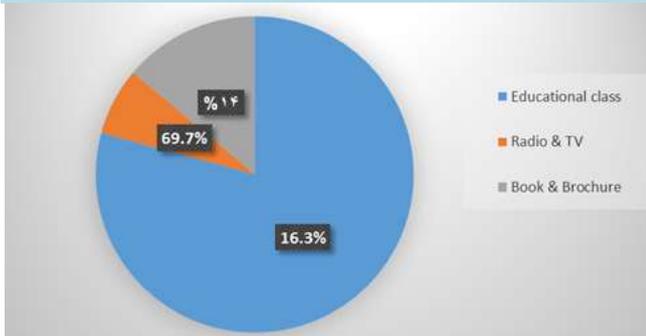


Chart 1: Informative resources of students on managing hazardous household solid wastes

Discussion and Conclusion:

Findings were from studying knowledge level, attitude, and behavior of students of Qazvin University of Medical Sciences (Qazvin, Iran) whose results showed most of observed students enjoyed relatively healthy knowledge, attitude, and behavior. Since students' knowledge about studied subject was reasonable, a link between knowledge level and school was noticed. Remarkable knowledge of students of health school revealed that they were more knowledgeable than other students owing to the type of their educational subjects on environmental health.

In a research by Dehghani (22), males were more knowledgeable than females. But females' attitude was better than males. Regarding the result, that was not corresponded with present study. In a study by Ardabilian (23), males and females were informed in the same level. Thus, it was not paralleled with current study. In a research work by Tehrani (24), medicine students were more knowledgeable than students of other majors. According to, it was not corresponded with the present study. It is well worth highlighting that the study of Ardabilian (23) was paralleled with the present research because students of health majors were reasonably knowledgeable.

In a study by Ebrahimi (25), no meaningful difference was noticed between the average scores of knowledge and sex. Thus, it was corresponded with the present study. Furthermore, such condition was likewise between attitude and sex in Ebrahimi's work (25). So it was against the present study. In this study, more than half of students were in a reasonable level in terms of function. Such a result was paralleled with a study by Pazira (26). In the current study, the main source of information on hazardous household solid wastes for students was mass media such as radio and television. Such a result was so similar with findings by Amouyi (20).

In order to reaching success in the field of hazardous household solid waste management, an educational program via mass media can increase society's knowledge effectively. Since students can be considered one of the most important purposed groups for spreading information in families and societies, it is necessary to teach them educational courses related to hazardous household solid wastes management. Therefore, it is suggested to determine educational strategies for it. To reach such a goal, several organizations such as municipalities, science ministry, and health ministry should work together. For example, followed suggestions are expressed to improve people's

culture in favor of hazardous household solid waste management:

- Extending educational subjects related to solid wastes in books and also offering some courses
- Adding voluntary courses related to teaching environment in all universities' majors
- Improving quality and quantity of educational programs related to solid waste on television and radio
- Stimulating individuals with holding conferences on environmental health and solid waste
- Distributing brochures on this in universities simultaneously with teaching can bring about educational subjects to households. It can influence on increasing knowledge level and proper function of students and families.
- Arranging programs specialized to hazardous household solid waste management with municipalities, related organizations, and universities
- Performing studies in large scale in order to calculating financial worth of hazardous solid wastes separation and recycling of these materials in houses

Gratitude:

This article was extracted from a research project, with number 14002294, approved by research committee of Qazvin University of Medical Sciences (Qazvin, Iran). Authors of the article wholeheartedly express their gratitude to the officials and students participating in the research.

References:

1. Hashemi M, Khanjani N, Saber M, Fard NK. Evaluating health literacy of Kerman Medical University, School of Public Health students about recycling solid waste. *Journal of education and health promotion*. 2012;1.
2. Lund HF. The McGraw-hill recycling handbook. *Mechanical Engineering-CIME*. 2001;123(3):76-.
3. Mazaheri Tehrani A, Hosseindoost GH. Knowledge and Attitude Level of Students about Solid Waste Recycling; *Kashan University of Medical Sciences. International Archives of Health Sciences*. 2016;3(1):7-13.
4. Salvato JA, Nemerow NL, Agardy FJ. *Environmental engineering*; John Wiley & Sons; 2003.
5. Alavi M, Ghasemi A. The role and importance of education in the comprehensive management of solid waste in Iran. *Eighth National Conference of Environmental Health, Tehran University of Medical Sciences and Health Services, Tehran*. 2005.
6. Dehghani MH, Dehghanifard E, Azam K, Asgari A, Baneshi MM. A quantitative and qualitative investigation of Tehran solid waste recycling potential. *Journal of Knowledge & Health*. 2009;4(1):40-4.
7. Shabiri M, M S. Citizen Participation is the only way to solve the problem of waste (with approach to environmental education). *Fourth Conference of Environmental Engineering*. 2010.

University College of Takestan

8. Abdoli MA, R SF. Household hazardous solid wastes management. *Solid wastes Management Bulletin* 2006;8:261-7.
9. Cabaniss AD. Handbook on household hazardous waste: Government Institutes; 2008.
10. Amouei AI, Mohammadi AA, H. F, al e, editors. Qualitative and quantitative characterization of household hazardous solid waste in Amirkola city in 2013. 6th National Conference on Environmental Health; 2013: Tabriz university of medical sciences.
11. Desa A, Kadir NByA, Yusooff F. A study on the knowledge, attitudes, awareness status and behaviour concerning solid waste management. *Procedia-Social and Behavioral Sciences*. 2011;18:643-8.
12. Malakootian M, Yaghmaean K. Evaluation of the knowledge, attitude and paractice of residents of the city of Kerman to the municipal solid wastes management. *Journal of School of Public Health and Institute of Public Health Research*. 2004;2(4):27-38.
13. Rezaei Moghaddam M, L RK. . Role of women in the municipal solid waste management. 3rd National Congress on waste management. 2007:187-95.
14. Yousofi Z, M B. Study on Household Hazardous Waste in Sari city. 14th Conference on Environmental Health: Yazd University of Medical Sciences; 2012.
15. Ghafouri Y, Y T. Knowledge and attitude Qom citizen people in order to increasing of municipal solid waste recovery coordination in model recovery project. 8th National Congress on Environmental Health. 2005:198-206.
16. Rezaei Mofrad M, Miranzadeh M, H A. Knowledge of Kashan house wives in field of solid wastes management in 2003. 8th National Congress on Environmental Health. 2005:221-28.
17. Abdoli MA, A DZ. Household used Batteris management in Iran. First Special Congress on Environmental Engineering, Environment Faculty. 2005:105-12.
18. Mir Mokhtar H, Sobhani A, F KF. Culture methods in field of solid waste management in Arumia in 2006. 9th Iranian National Congress on Environmental Health. 2005:212-20.
19. Ghanbari Q, Arshi S, Kamri M, Soroush-Zadeh M. Strategic Factors of Household Solid Waste Segregation at Source Program, Awareness and Participation of Citizens of the 3 Municipality District of Tehran. *Community Health*. 2016;2(3):149-56.
20. Amouei A, Hosseini SR, Khafri S, Tirgar A, Aghalari Z, Faraji H, et al. Knowledge, Attitude and Practice of Iranian Urban Residents Regarding the Management of Household Hazardous Solid Wastes in 2014. *Archives of Hygiene Sciences*. 2016;5(1):8-1.
21. Mehdinejad M-H, Rajaei G, Aryaie M, Ahmadi M, Saeedinia R-M. Awareness and performance of people of the cities of Gorgan, Gonbad, and Aliabad Katool (Iran) regarding management of municipal solid waste materials. *Journal of Mazandaran University of Medical Sciences*. 2013;23(106):148-53.
22. Deghani M, Hashemi H, Abedi T, Shamsedini N, Khodabakhshi A, Ghasemi R. The survey of knowledge, attitude, and Behavior of students in Shiraz University of Medical Sciences about the recycling of solid wastein 2012. *J Health Syst Res*. 2014;10(4):821-29.
23. Bagheri Ardabilian M, Nabiee A, Eslami A, editors. The survey of knowledge and attitude of students of Zanjan University of Medical Sciences about separation and recycling of solid waste in 2007. Proceeding of the 10th National Conference on Environmental Health.
24. Mazaheri Tehrani A, Hosseindoost G, Miranzadeh M. Knowledge and Attitude Level of Students about Solid Waste Recycling; Kashan University of Medical Sciences. *International Archives of Health Sciences*. 2016;3.
25. Ebrahimi A, Smay M, Karimi B, Rahimibeistun S, Bakhshi T. The survey of knowledge, attitude and performance the city of Tabas about solid waste management. 12 the national conference on environmental health of Iran Shahid Beheshti University of Medical Sciences; Tehran-Iran2009. p. 1951-56.
26. Pazira M, Mirgoli Afshar A. Sutvey Knowledge, attitude and performance of dormitory students in Tehran University about waste and recycle. 8 the National Conference on Environmental Health; Tehran2005.