

Knowledge, Attitude and Practice of Iranian Urban Residents Regarding the Management of Household Hazardous Solid Wastes in 2014

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Background & Aims of the Study: Household hazardous waste is an important part of municipal solid waste in any community and if it is not managed properly, it can significantly damage the health of family, community and environment. The present study aimed at evaluating the knowledge, attitude and practices of households regarding the management of household hazardous wastes in Amirkola, Mazandaran, Iran.

Materials and Methods: This cross-sectional study was conducted on 330 households of Amirkola, Mazandaran, Iran in the summer of 2014. A researcher-made data collection form in accordance with the objectives of the study was used to assess the knowledge, attitude and practices of Iranian urban residents regarding the management of household hazardous wastes through observation of researchers and interview. The validity of the data collection form was confirmed by five faculty members of the Departments of Environmental Health and Community Medicine. Data were analyzed using SPSS version 19, descriptive statistical indexes, T-test and Chi-square tests, and $p < 0.05$ was considered as significant level.

Results: The mean age of studied people was 39.1 ± 10 years and 51.5% had high school and diploma degrees. In this study, 75%, 36.7% and 6.3% of households were good in the knowledge, attitude and practices, respectively. A major part of household hazardous wastes (78%) was the containers of disinfectants and detergents. 43.6% and 10.3% of households separated the household wastes and household hazardous wastes, respectively and no one recycled these wastes at home. 30% of households expressed that the lack of proper management of municipal on collecting the separated wastes as a major factor in the reluctance of them in waste separation. 86.7% of people need to get information about it.

Conclusion: Despite appropriate knowledge of surveyed households on different kinds of household hazardous wastes, most of them had no good attitude and practices and most of them did not separate and recycle the wastes. It is necessary to train the households because of the central role of families in improving the public and environmental health and their tendency to get information on the management of household hazardous wastes.

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Background

Solid waste is referred to the materials discarded by consumers and resulted from the activities of humans and animals (1). Increasing population growth, urban development and expanding the metropolises have been caused to increase the amount of wastes (2). It is the human problem and both human and environmental health are at risk (3,4,5). In addition, the risk of non-sanitary waste disposals, which is one of the major problems in the country in turn, can threaten the health of human communities (6,7,8,9). One of the main sources of waste production is homes and residential areas (2,3). The major part of household wastes is animal and vegetable wastes such as vegetables, fruit and animal skin, bones and wastes of meat, poultry and fish which are called putrescible wastes (10,11). Paper and cardboard including newspapers, books, notebooks and packed papers are another important part of wastes, which are called trash (4,12). The percentage of waste produced in homes contains hazardous materials that require special management to eliminate the potential contamination (6,13). According to United States Environmental Protection Agency, Hazardous wastes refer to substances that can destroy or harm the human and environmental health (4,14). An important part of hazardous wastes in any community is generated in residential areas and houses (7,15). Some examples of household hazardous wastes include disinfectants, waxes, detergents, cosmetics, medications, solvents, colors, pesticides, oils and lubricants, batteries, light bulbs and fluorescent tubes (1,16,17). Household hazardous wastes are almost produced anywhere at home such as kitchen, bathroom, garden, backyard and parking of vehicles. Store of chemicals in below the stairs of houses can potentially lead to fire (2,18,19). Children and pets are exposed to these hazardous wastes by storing them in warehouse

(1,3,20). When these chemicals are released into the environment, they are considered as serious threat to humans and other organism (6,21). They can adversely affect the health of households and their environment such as ignition, explosion, corrosion, reactivity, toxicity, their accumulation in human body and finally cause of all kinds of gene mutation, birth defects and cancer in the absence of proper management, unsuitable disposal and their potential ability (3,22,23). The family can play an important role to protect and promote the health of community and environment to manage the hazardous wastes properly by proper planning (21). They can prevent from producing a considerable amount of leachate by separating the household hazardous wastes in the site of production and collecting them separately.

The aim of this study was to assess the knowledge, attitude and practices of family in Amirkola City of Babol and the study was conducted on the management of hazardous wastes because the family has an important role to maintain the health of environment and consequently the health of family and community.

Materials & Methods

This descriptive and cross-sectional study was done in Amirkola because of the homogeneity of cultural, social and economical aspects of this city. In the present study, 330 households were selected by using random cluster sampling method based on the population of Amirkola, Mazandaran, Iran (6200 households), on sample size formula and on the selection of 5% of the total households in 33 neighborhoods of Amirkola. The data were collected using researcher – made data collection form containing 6, 7, 9, 7 and 8 questions related to personal, demographic, knowledge, attitude and practices questions, respectively about the management of household hazardous wastes and their adverse consequences. The validity of the data collection form was confirmed by five

faculty members of the Departments of Environmental Health and Community Medicine. After two weeks, the same families again completed the forms. The collection sheets were completed by households at the presence of researcher through an interview. The forms were coded in order to enter the data into the Excel and one point was given to each correct answer of three parts of knowledge, attitude and practices. There was no point for the "false" and "I do not know". In order to assess the knowledge, attitude and practices of households and rank the results, the answers of them were considered as weak, medium and good if the correctness percentage of their answers was 50, 50-75 and more than 75, respectively. The data were analyzed using the statistical software SPSS version 19, descriptive statistics including measures of central tendency such as mean, standard deviation, inferential statistics such as chi-square test and t-test. The level of significant was considered $P < 0.05$.

Results

The results showed that the mean age of the studied population was 39.1 ± 10 years with a minimum age of 18 and maximum of 71 years. Most of the subjects (48%) were in the range of 30 to 40 years and 59.4% and 40.6% of them were women and men, respectively. Among them 8.5%, 27.6%, 51.5% and 12.4% were uneducated and illiterate, elementary and guidance school, high school and diploma and Bachelors or higher, respectively. As shown in Table 1, the largest and lowest numbers of people were 139 (42.1%) housewives and 11 (3.3%) workers. In this study, there was no significant relationship among the knowledge, attitude and practices of people with the age, sex, family size and source of information. However, according to the Pearson correlation coefficient there was significant relationship between age and knowledge (-0.64), attitude (-0.19) and performance (-0.22) of participants.

This means that the knowledge, attitude and performance of them declined with increasing the age. There was a significant relationship between educational level and the knowledge and practices of people ($P < 0.05$), but there was no significant relationship between their attitudes and the level of education. The relationship between knowledge, attitude and practices and job variable was not statistically significant.

Table 1) The frequency distribution of studied demography characteristics in Amirkola's families

Variables	Level	Numbe	Percentage
Age	18-30	70	21.3
	31-50	208	63
	51-71	52	15.7
Gender	Man	134	40.6
	Women	196	59.4
Education level	Elementary and guidance	91	27.6
	High school and diploma	170	51.5
	Bachelors or higher	41	12.4
	Elementary and guidance school	91	27.6
	Self-employment	129	39.1
	Employee	38	11.5
Jobs	Housewife	139	42.1
	Workers	11	3.3
	Other	13	3.9

Although the highest knowledge score was belonged to the staff and students and lowest one was related to the workers and self-employment, no significant relationship was observed between knowledge and job. There was no significant relationship between waste separation and the variables such as gender, occupation and type of building, but the separation of waste among females was more than that of males ($P < 0.05$). Those who were under 30 years had better practices for the separation of waste compared to those who were older than 30 years.

Based on the results of T-test, the significant relationship was observed between age and the

separation of waste (P= 0.002).

Table 2) Frequency of some questions and their positive and negative answers about the knowledge of households in Amirkola *

Questions	Agree		Disagree	
	number	percent	number	percent
Chemical waste is considered as household hazardous waste.	281	85.2	37	11.2
Electronic and electrical wastes are considered as household hazardous waste.	288	87.3	31	9.4
Sharp waste is considered as household hazardous waste.	319	69.7	4	1.2
Education of family members is effective on the quality and quantity of household hazardous waste.	238	72.1	77	23.3
The type and area of residential buildings are effective on the quality and quantity of household hazardous waste.	249	75.5	67	20.3

* Lack of equal frequency to total in samples (n=330) is due to no answer of some questions on the behalf of households.

The separation of waste was greater with the increase of educational level. There was a significant relationship between the level of education and waste separation on the basis of Chi-square test (p=0.006). Based on the results of this study, the knowledge of 0.9%, 24.1% and 75% households was "weak", "medium" and "good", respectively in the household hazardous waste management. 80.7% of families were aware of the types of household hazardous waste and 19.3% of them were not aware. In addition, 22.4% of households had lack of knowledge about the adverse effects of household hazardous wastes. More information about knowledge questions are listed in Table 2.

14.5%, 48.8% and 36.7% of households had weak, medium and good attitude, respectively (Table 3). In terms of practices, 86.7%, 7% and 6.3% of households were weak, medium and good, respectively (Table 3).

Table 3) Frequency of the knowledge, attitude and practices of families on household hazardous waste management

The parameters	Weak (%)	Medium (%)	Good (%)
Knowledge	0.9	24.1	75
Attitude	14.5	48.8	36.7
Practices	86.7	7	6.3

In relation to the storage of waste at home, 74.2%, 12.4% and 6.4% of wastes were in trashcan along with disposal bag, only in trashcan and only in disposal bag, respectively.

The wastes were daily transported out of the house by 58.8% of households. 70.6% and 16.7% of the wastes were poured into the containers with lids and put the next door, respectively. Respectively, 43.6% and 10.3% of households separate household waste and household hazardous waste that only 6.4 percent of households used the especial bins for household hazardous waste collection, but no one recycled these wastes.

41% and 30% of participants believed that the municipal workers in disposal place and family members in house respectively could easily separate the hazardous waste. 72% of participants said that the decrease of household hazardous waste was impossible, while 50 (15.2 percent) of them stated that recycling the household hazardous waste was necessary. 24 (7.3 percent) of them mentioned that the effective methods of recycling are the construction of waste recycling factories, collection and recharging the batteries, making laws for recycling household hazardous waste, reuse of plastic bottles of detergents and cleaners. The highest number of households (30 percent) expressed that the lack of proper management of municipal in collecting the separated waste and also the lack of cooperation among the family members were the main causes of reluctance in waste separation.

The majority (78%) of household hazardous waste included the containers of disinfectants and detergents that the highest amount (58.7%) of these containers were thrown away in the

kitchen and toilet. More information is listed in Table 4 on this issue.

Table 4) Frequency distribution of answers to some common questions on household hazardous waste by households

in Amirkola			
Common questions on household hazardous waste	Answer	Number	percentage
	Trashcan along with dispo sal bag	245	74.2
How to store the waste at home	Only trashcan	41	12.4
	Only disposal bag	21	6.4
	Daily	194	58.8
The duration of waste transporting into outdoors	Once every few days	136	41.2
	Separation of household wastes	144	34.6
	Separation of household hazardous wastes	34	10.3
Waste separation	lack of proper management of municipal in collecting the separated waste	99	30
	lack of cooperation among the family members	45	13.6
	Containers of disinfectants and detergents	257	78
Home reluctance of households to separate waste	Cosmetics	8	2.4
	Pesticides	2	0.6
	Kitchen and toilet	194	58.7
Most types of household hazardous waste	Backyard	24	7.2

56.4% of participants said that the mass media especially radio and televisions are the best option to aware people of the hazardous waste management. Only 16.4 percent of the households said that they got information through the media and books on household hazardous waste management, and 86.7% of them believed that they needed to get the information in this regard. More information is listed in Table 5 on this issue.

Table 5) Frequency of information resources of households on household hazardous waste management*

Sources of information	Number	Percent
Media (Radio and TV)	186	56.4
Training Course	16	4.8
Books and Magazines	17	5.2
Other	21	6.4
Total	240	72.8

* Lack of equal frequency to total in samples (n=330) is due to no answer of some questions on the behalf of households.

Discussion

The analysis of the data revealed that 0.9%, 14.5% and 86.7% of households had weak knowledge, attitude and practices of household hazardous waste management, respectively. Therefore, it is necessary to implement the training programs, enhance the knowledge of households on the management of such wastes, change their attitudes and increase their practices. 48% of households aged from 30 to 40 years and the women had the highest number (59.4%). The finding of the study was consistent with Johari (15) and Samadi (16)

studies. In this study, the largest number of subjects (51.5%) had diploma and under diploma in terms of education level which was the same as the study of Johari (15) and Ebrahimi (17). In terms of job, 42% of them were housewives which accorded to Johari (15) and Samadi (16) studies. In relation to the information resources of the household, 63.6% of them declared the media as a viable option for awareness of household hazardous waste management that was in accordance with the study of Johari (15) and Samadi (16). Household hazardous waste management training can increase the knowledge, attitude, practices and ultimately public health through the mass media, especially radio and television. In the present study, there was significant relationship between the level of knowledge and education so that people with higher than diploma had higher level of knowledge than those below diploma. It shows that the school and pre-college training is very important. The results of this study were consistent with those of Ghafuri (18), Mofrad (19) and Kashi (20) studies. It seems that the workshops or training classes about the environment and training through the mass media increase the knowledge level of people under diploma. In this study, there was no significant relationship between the knowledge and job. Training the housewives through the mass media was very important based on the current study because the number of housewives was greater than others and they could manage these wastes better than others. The relationship between gender and the knowledge, attitude and practices of households was not statistically significant and this suggests that the gender is not important to increase the knowledge, attitude, practices and cooperation of households in health planning. These results corresponded to the results of Ghafuri (18) study. In this study, 43.6% and 10.3% of households separated the household waste and the household hazardous waste, respectively. Only 6.4% of these people had the especial

container of hazardous waste collection at their home, but no one recycled such wastes. In a research conducted in Uremia city, 77.5% people of that city agreed with the separation of waste at home (21). In the study performed in Khorram Abad, the separation of waste was not done at home in this city (22). The main reason of reluctance to the separation and recycle of waste, especially household hazardous waste can be attributed to the weakness of urban solid waste management systems. Although the garbage bins for wet and dry wastes were placed in the neighborhood of Amirkola, unfortunately, it was not continuous basis and not covered all areas in Amirkola. 78% of households stated that the maximum amount of household hazardous waste produced in homes included the containers of disinfectants and detergents that the largest amount (58.7%) of them was in the kitchen and toilet and this was consistent with the study of Amouei and *et al.* (24) and Yousefi and *et al.* (23). If the household hazardous waste, particularly household detergents and disinfectants, along with other wastes are discarded in waste collection containers and delivered to the municipal staff, it can be led to dangerous incidents for municipal workers and environment in addition to the serious damage to the health of households.

The strengths of this study are to address the issue, which has been paid less attention despite the adverse health and environmental effects on individuals and families. The weaknesses of this study are the limit number of questions to assess the knowledge, attitude and practices of the households, lack of repeating the study after the oral education and lack of the distribution of educational pamphlets among the studied families in the field of household hazardous waste.

Conclusion

Household hazardous wastes are such threatening resources that can cause serious

risks for the health of family, society and environment if they are not managed properly. This study showed that a high percentage of the amount of household hazardous waste was belonged to the cleaners and detergents and after them to the pharmaceutical wastes. It is recommended to train the households to separate, recycle, collect, transport and dispose the household hazardous wastes in accordance health standards in order to provide, maintain and improve the health of family, society and the environment because the prevention of adverse environmental effects of hazardous wastes is a priority and this can be achieved by applying proper management methods.

Footnotes

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Conflict of Interest:

The authors declared no conflict of interest.

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