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Knowledge, Attitude and Practice of Women Regarding Health Hazards and Proper Methods of Storage and Use of Pesticides at Home in Abarkouh

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ABSTRACT

Introduction: A large amount of pesticides is used worldwide in different locations including homes. Considering that using pesticides in the home is mainly done by women, this study was conducted to determine the knowledge, attitudes and practices of women regarding health hazards and proper methods of storage and use of pesticides in the home in Abarkouh.

Materials and Methods: In this descriptive study, data were collected using cluster sampling and questionnaire by interviewing 210 eligible women in households. The questionnaire was included demographic information (age, education level, field of study, occupation, type of home), as well as knowledge, attitudes and practices of women. Validity and reliability of the questionnaire have been confirmed in previous studies. Data were analyzed by SPSS using nonparametric tests.

Results: According to results, the mean score of attitude among different academic disciplines was statistically significantly ($p = 0.049$). In addition, there was a significant relationship between attitude score with practice ($p = 0.003$) and knowledge ($p < 0.0001$) scores.

Conclusion: Considering the fact that people's knowledge about this subject was moderate, their knowledge should be increased to make their attitude and practice more desirable.

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Introduction

Poisoning is one of the most important health problems around the World. Exposure to industrial chemicals and pesticides and also accidental or deliberate exposure to pesticides in the home can contribute to illness and death [1]. Pesticides develop

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a series of special symptoms depending on the amount entering the body, the absorbed amount, the volume of distribution, the type of compounds, and finally the host's predisposition.

The pesticides should be used only in required doses and in appropriate ways; otherwise, they are very dangerous and can be pathogenic in humans and animals or kill them [2] as they kill insects and mice. Flies, roaches and mice are the most important disturbing insects and rodents in homes. Insecticide use is one of the methods to control the flies. Generally It has been accepted that the control of flies through insecticides should start early in the season when their population is still low, but sometimes residual spraying may be delayed to the appropriate time when their population is high [3].

The cockroach is one of the insects that can cause infectious diseases and can be found in many areas, especially in summer. The presence of cockroaches, especially when their population is high, leads to psychological reactions in many people. To combat cockroaches, a variety of pesticides are used [4]. Compounds of household insecticides cause poisoning if they are not used according to safety considerations [2]. The home is considered the most common indoor environment for exposure to pesticides.

Most people do not have scientific backgrounds on pesticides. Understanding the general risk of pesticides may affect the people's behaviors when using products [5].

The results of Samia et al. about knowledge, attitudes and practices regarding domestic poisoning in Saudi Arabia showed that the main reasons for poisoning are lack of awareness, easy access to materials and household products such as cleaners and insecure storage of these materials [1]. The researchers noted that most of the incidents occurred at home due to the use of cleaning agents, cosmetic products and pesticides [1]. Considering the studies in Iran that are limited to agricultural pesticides [6] and most epidemiological studies have been carried out on the exposure conditions and health problems of pesticides among men and in industrialized countries [7], we found it essential to investigate the reasons for the application high rate of toxic substances such as insecticides, puff sprays, insecticides, as well as ants and lizard repellent.

Housewives mainly use insecticides to deal with domestic insects such as flies, beetles, and mosquitoes; therefore, they are more exposed to the health problems caused by these pesticides. The aim of this study was to determine the knowledge, attitude and practice regarding health hazards, proper methods of storage, and use of pesticides at home among women in Abarkouh city.

Materials and Methods

In this descriptive study, cluster sampling was performed. With the probability of type one error (α) equal to 0.05 and based on similar studies [8], Standard Deviation (SD) = 0.6 and accuracy of 0.1 for simple random sampling, the sample size was calculated 139 persons. Considering the effect of plan 1.5, the size of the cluster sample was considered 210 persons.

Abarkouh city has 2 health centers, number 1 and 2 which cover four and nine neighborhoods, respectively. In the first stage, the number of neighborhoods under sampling, seven neighborhoods were estimated. According to the number of neighborhoods covered by each center, two neighborhoods from number 1 center and five neighborhoods from number 2 centers were randomly selected. According to the cluster sampling size, 30 families in each neighborhood were selected randomly.

The statistical unit of the study was determined to be the mother of the household or any of the family members over 15 years that has the most responsible for housekeeping. The required information was collected through a questionnaire and interviewing with eligible women in households. The questionnaire consists of two parts, the background information and questions of knowledge, attitude and practice.

The knowledge section consists of 15 questions (three response options: yes, no, and no idea), the attitude section contains 8 questions (five response options: completely agree, agree, have no idea, disagree, and completely disagree) and the practice

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section includes 16 questions (three response options: always, sometimes, and never). In the knowledge section, for the each correct answer was given score of one and for the wrong answer score of zero. In the attitude section, except for inverse questions, for the completely agree to completely disagree was given score of 1 to 5, respectively. The practice section was also scored 1 to 3. Data were analyzed by the SPSS-23 software using nonparametric tests (Mann-Whitney and Kruskal-Wallis).

Ethical issues

This article was confirmed by the Ethical Committee (ethical code: IR.SSU.SPH.REC.1394 .84) school of Health of Shahid Sadoughi University of Medical Sciences.

Results

According to the results, 81.90% (172 persons) of women under study were housewives. Most of the participants in this study had diploma degree or higher (56.20%). Of the 74 people, who announced their university degree, 55 (74%) people had academic degree on humanities, art and technical-professional fields, and only 8 persons (11%) had degree on medical sciences. However, only the difference in the mean score of attitude among different academic disciplines was statistically significant (p-value = 0.049). The participants with humanities and technical-engineering degrees had the lowest and highest scores mean on attitude about pesticides, respectively (Table 1).

As shown in Table 1, 91% of the residential homes of the people under study were villas. It was also observed that the job and type of home did not have a significant effect on the knowledge, practice and attitude of women (p-value > 0.05).

Table 1: The frequency distribution of demographic characteristics and comparison of the mean scores on knowledge, attitude, and practice according to these characteristics

Characteristics		Number (percent)	Mean ± SD		
			Knowledge	Attitude	Practice
Education level	Illiterate	20 (9.50)	7.85 ± 3.18	32.35 ± 4.37	35.30 ± 0.70
	Under the diploma	71 (33.80)	9.51 ± 2.08	34.60 ± 3.04	37.60 ± 4.32
	Diploma degree or higher	118 (62.50)	8. 90 ± 2.24	34.39 ± 2.78	38.28 ± 3.63
	Unanswered	1(0.50)		-	
	p-value	-	0.063	0.05	0.077
Field of study (High school diploma)	Medical science	8 (11)	1.64 ± 9.88	34.38 ± 2.32	35.50 ± 3.42
	Technical Engineering	11(15)	9.00 ± 2.00	35.18 ± 2.56	38.82 ± 3.25
	Humanities, Arts, Technical-professional	55 (74)	8.81 ± 2.12	33.98 ± 2.93	38.57 ± 2.94
	Unanswered			-	
	p-value	-	0.315	0.049	0.347
Job	Housewife	172 (81.90)	8.92 ± 2.36	34.19 ± 3.20	37.64 ± 4.38
	Employee	18 (8.60)	9.33 ± 2.19	35.39 ± 2.68	38.61 ± 3.82
	Manual worker	2 (1.00)	11.50 ± 2.12	34 ± 1.41	38 ± 1.41
	Retired	7 (3.30)	8.43 ± 1.51	34.57 ± 2.99	41.43 ± 3.95
	Free	7 (3.30)	8.86 ± 2.91	32.86 ± 3.02	35.57 ± 4.12
	Unanswered	4 (1.90)		-	
	p-value	-	0.504	0.472	0.115
Type of home	Apartment	9 (4.30)	9.11 ± 2.68	33.33 ± 2.74	39.67 ± 3.12
	Villa(Backyard)	191 (91)	8.95 ± 2.28	34.32 ± 3.13	37.65 ± 4.44
	Unanswered	10 (4.70)		-	
	p-value	-	0.98	0.17	0.17

The results showed that 66.20% (n = 139) of the women had moderate knowledge, 90% (n = 189) had good attitude and 99% (n = 208) had good practice about the correct application of pesticides.

According to the results (Table 2), the score mean of knowledge among the subjects was 8.98, the score mean of the attitude was 34.23 and the score mean of the practice was 37.88 On the other

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hand, there was a positive and significant correlation between attitude scores with the practice (p-value = 0.003) and knowledge (p-value < 0.0001) scores.

Table 2: Mean of knowledge, attitude, and practice scores and age of women in Abarkouh city and their relationship

Characteristics	p-value				Mean ± SD
	Age	Practice	Attitude	Knowledge	
Knowledge	0.259	0.096	< 0.0001		8.98 ± 2.32
Attitude	0.931	0.003			34.23 ± 3.13
Practice	0.802				37.78 ± 4.32
Age					41 ± 13.90

According to the results on the distribution frequency of training methods in the field of application, storage and health hazards of pesticides, only about 20% (n = 41) of the participants were previously trained. However, the mean of knowledge, attitude and practice scores of these individuals had not significantly different from those who did not receive training (p-value > 0.05). Of the trained people, 70.73% persons received information through television and 31.71% were informed through educational pamphlets. Companies' and pharmacies' advertising had the lowest share of education among the trained people. The average practice score of those trained by television was significantly higher than others. In addition, the average attitude score of those who received the training through leaflets was significantly higher than others.

According to the results (Table 3), 31.40% (n = 66) of Abarkouh women studied on the use, storage and health hazards of pesticides. The mean and standard deviation of attitude and practice scores in the subjects who studied, were significantly higher than others.

In addition, according to Table 3, of the 66 people who was studied, the most studied source was information on the containers or packages of pesticides (51.52%). The Internet was used only by 16.67% of the participants as a source of information for pesticides. In addition, the practice of those who studied the journals was significantly higher than others. The knowledge and attitude of those who used the information on the packaging of pesticides were significantly higher than other people.

Table 3: Frequency distribution of studied resources in the field of application, storage and health hazards of pesticides and comparison of average scores of knowledge, attitudes and practice

Characteristics		Number (percent)	p-value		
			Practice	Attitudes	Knowledge
Studied resources in the field of application, storage and health hazards of pesticides	Yes	66 (31.40)	0.006*	0.011*	0.196
	No	143 (68.10)			
	Unanswered	1 (0.50)			
Studied resources	Book	17 (25.76)	0.501	0.264	0.732
	Journal	21 (31.82)	0.026*	0.184	0.426
	Magazine	14 (21.21)	0.561	0.141	0.195
	Internet	11 (16.67)	0.183	0.553	0.110
	Information on the containers or packages of pesticides	34 (51.52)	0.642	0.555	0.022*

(p-value < 0.05 *)

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According to Table 4, 88 (41.90%) of the subjects under study received pesticides from pharmacies. The practice average of those who bought poison from a supermarket (36.48 ± 4.90) was significantly higher than others (p-value = 0.001). 28.60% of women received the information they needed from the pesticides shops. The mean and standard deviation of the attitudes of people who get your information from other times (35.18 ± 2.75) were significantly more than others (p-value = 0.009). In other words, the practice average of people who bought pesticides from different locations was significantly different.

The way of receiving information about the types of pesticides was effective on people's attitude and the score mean of attitude was significantly different with respect to the sources of information.

Table 4: Frequency distribution of the purchase place and receiving information about pesticides and comparison of scores mean of knowledge, practice and attitude

Characteristics		Number (percent)	p-value Practice	Attitudes	Knowledge
purchase place of pesticides	Health center	11 (5.20)			
	Pharmacy	88 (41.90)			
	Spraying companies	20 (9.50)			
	Sweetheart	3 (1.40)			
	Supermarket	86 (41)	0.001*	0.846	0.560
	Unanswered	2 (1)			
Receiving information about pesticides	Health experts	50 (23.80)			
	Pesticides shops	60 (28.60)			
	Those who have already Been sprayed at home	34 (16.20)			
	Pharmacy	52 (24.80)			
	Other cases	14 (6.70)	0.173	0.009*	0.121

(p-value < 0.05 *)

According to the results, 71.40% of Abarkouh women considered radio and television as the best way to inform about the correct use of pesticides.

The results of statistical analysis showed that 82.40% of respondents believed that everyone should leave the area after spraying. In addition, 27.10% of women believed presence in the place after 30 minutes spray to cause no problems. However, 20.40% of them (43 people) were unaware about the suitable time for present at the sprayed site, and 128 (60.95%) of the people did not know the amount of duration required to leave sprayed place by related companies. 13.80% of the women under study, suitable time presence in the place knew 12-24 hours after spray.

167 women in Abarkouh were maintained pesticides at home in which 29.76% used the yard and the outdoor as a place to pesticides maintenance. Afterwards, attics (13.77%) and kitchen (11.98%) were as the most frequent places to store pesticides at home.

The results showed that 77.10% people stated the most common way of contact with pesticides is breathing and 48.10% of them knew eyes are the most common place of pesticides accumulation in the body. 29.05% (n = 61) were unaware about the place of pesticides accumulation.

In the present study, most people (51.90 %) reported the most appropriate method of combating insects through environmental improvement and licensed service companies as the most suitable for spraying (53.30%).

According to the results, women in Abarkouh most frequently used pesticides in their homes during summer (78.60%) and daytime (38.60%). 131 people (62.40%) used spray poisons and only 1% used poisons in paste form and as bait.

Discussion

In this study, the knowledge, attitude and practice of women in Abarkouh in relation to health hazards and proper methods of storage and

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application of pesticides at home were investigated.

The results showed that most of the participants in this study (81.90%) were housewives. Although among the most educated people, most of them had high school diploma and higher degrees, only 19.50% (41 people) were previously trained in the subject in question. There was no significant difference between the mean scores of knowledge, attitude and practice between these people and those who did not attend the training.

Of the trained people, 70.73% (n = 29) had received training on pesticides via television. In a study by Lorenz et al. to investigate knowledge, attitude and practice of pregnant women about pesticides in northern Thailand, the results showed that the knowledge score was comparatively lower and the first trimester of pregnancy was significantly associated with unsafe behaviors at home [9].

One of the important points that should be considered before using pesticides is to read the label on pesticides cans. In the present study, 66 people who studied the health hazards and the proper methods of storing and using pesticides at home reported information on the dishes or containers of pesticides (51.52%) to be their main sources of information

Aghili Nezhad et al. conducted a study in 2007 on the health of farmers and the use of poisons.

The results of the study showed that 50% of the subjects were illiterate and did not have any training regarding the storage and health hazards of pesticides and were informed only by the available information on the packaging of poisons, in their study, only 25% of the farmers stated that they would understand the information on the packaging of poisons [6].

In Farahat et al. about knowledge, attitudes and exposure to organophosphate pesticides in women affiliated with the Family Health Center in Egypt, 62.50% of respondents believed that pesticides could cause poisoning and 72.50% believed that it is necessary to read the label on the packaging of pesticides.

Twenty five percent of the participants studied the product label, and 20% of the subjects paid attention to the expiration date of the pesticide.

In addition, according to the results of this study, most practice parameters, including the use of home poisons, the study of the instructions written on the label of the bottle of pesticides and the expiration date, were significantly improved after the implementation of the health education program [10]. The participants in this study considered the best method of information dissemination to be radio and television, and only 3% of the people considered newspapers and magazines to be appropriate information method.

Hosseini et al., in 2014, investigated the knowledge, attitude and practice of women in Yazd with respect to health hazards and proper methods of storage and application of pesticides [8].

In their study, women also reported radio and television as the best way of receiving information [8]. Another study reported that in the knowledge component prior to the implementation of the training program, 72.50% of the participants received information on organophosphate pesticides from radio and television, 25% from newspapers and 30% from other sources, such as lectures [10].

Exposure to poisons can occur accidentally or because of its residues in stuffs [11]. Until a few hours after spraying, people should not be in the house so that the vapor and poisonous particles of the poison are eliminated.

For this reason, it is recommended that at the time of spraying and up to 48 hours, people at risk, such as children under the age of 6 years, and pregnant women are not present at home.

The results of the present study showed that 60.95% of people did not know how long they should be present in the place after the spraying by the companies, 20.40% of the people did not know how long they could be in place after using Pif Paf, and 27.10% of reported 30 minutes to be a good duration to stay in place.

The research carried out by Hosseini et al. on the level of knowledge, attitude and practice of women in Yazd regarding health hazards and the

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ways of application of pesticides showed similar results [8].

Another study reported that 47.50% of participants did not close windows during the use of the pesticide before the training program, and only 20% of the subjects performed the procedure. 22.50% of them asked their children to play outdoors during the use of pesticide [10].

Pesticides enter the body in various ways, such as skin and respiratory and digestive tract. Skin is one of the most common ways to expose toxin among the users.

During the usual application of pesticides, the forearm and hands are most likely places for accumulation of poisons compared other parts of the body [8].

However, according to the results of the present study, most women (77.10%) considered the most common route of exposure to pesticides to be the respiratory tract, 48.10% of the participants in the study considered the possibility of accumulation of pesticides in the eyes greater than the possibility of their accumulation in other parts of the body.

Farahat et al. studied knowledge, attitudes and practice of women affiliated to the family health centers in Egypt regarding exposure to organophosphate pesticides.

According to the results, before the implementation of the training program, 82.50% of the respondents considered the route of exposure to the poison to be the mouth [10].

In a study by Yassin et al. regarding the knowledge, attitude, practice and toxicity associated with the use of pesticides among farm workers in the Gaza Strip, respondents reported inhalation to be the main route of exposure to pesticides [12].

There are various methods, such as physical, chemical, biological and genetic methods for combating insects and rodents.

Meanwhile, the simplest and most practical method is the physical method (environment improvement). Improvement of the environment involves measures such as proper and timely collection of waste, proper disposal of feces and excreta, and personal protection [8], 51.90% of women participating in the study expressed the best way and the best way to fight insects.

The most effective way to get rid of the proliferation of harmful animals is to spray the house.

Nevertheless, for the use of pesticides in residential environment, safety principles observance and supervision of the relevant experts are required. In the present study, 53.30% of women have enough knowledge in using pesticides. In this way the use of them in some places is necessary in warm seasons and more proliferation of insects and harmful animals.

According to the results, 78.60% of the people reported to use pesticides most frequently in the summer. Hosseini et al. obtained the same result in their research on women's knowledge about pesticides in Yazd.

In their study, 78.80% of women in Yazd had the most use of pesticides in summer [8].

Since most people are out of the house during the day, spraying will be desirable throughout the day. According to the results, 38.60% of women in Abarkouh County sprayed during the day.

It is not permissible to use insecticide pills or sprays in closed and small spaces, since daily ingestion of these pills can lead to frequent sneezes and dry coughing in human [8].

The results of the present study showed that 62.40% of women in Abarkouh used pesticides as sprays, while Hosseini et al., in their research on women's knowledge about pesticides in Yazd, found that 52.50% of people used pesticides in powder form [8]. Dehghani et al. investigated the use of poisons in Kashan's residential homes. Powder pesticides were the most used pesticides (42.70% of the participants in the study used powder pesticides) [13].

Often an amount of toxin will remain after it is used; therefore, the proper ways of storing pesticides should be learned. Inappropriate storage of pesticides will lead to certain problems.

For example, storage in a place with high temperature can cause an explosion, fire or poisoning, especially in children. In the present study, 167 women in Abarkouh, stored pesticides

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at home, 29.76% of whom selected yard and outdoors as a place to store the pesticides. After that, warehouse (13.77%) and kitchen (11.98%) had the highest frequency for keeping pesticides at home.

In the study of Samia et al. regarding the knowledge, attitude and practice of household poisoning in Saudi Arabia, the highest percentage of respondents (52.48%) stored detergents in cubicles below the sink, 25.53% in the attic and 15.37% in the bathroom, but most of these storage areas were available to children [1].

Some people, themselves, buy pesticides from groceries, and use it without taking any dose into account or following the instructions, and thereby harm the health of family.

According to the results of present study, 41.9% of the people needed to obtain their pesticides from the pharmacies, and only 3% of them received them from the groceries.

One of the limitations of this study is the use of self-report questionnaires and cross-sectional design.

Conclusion

According to the results of this study, the knowledge of most people in the field of pesticides was moderate; therefore, people's knowledge should be effectively increased.

Considering the extremely dangerous side effects of inappropriate use of pesticides, safety issues in the use of pesticides should be taught to people in various ways, such as the media, health centers, and the centers for supply and distribution of pesticides.

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Conflict of interest

We have no competing interests.

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