

## Effect of Education on Tendency to Water Use Efficiency in Housewives of Zarrin Dasht

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### ABSTRACT

**Introduction:** Zarrin Dasht is one of the low rainy areas of Fars province, which has faced repeated droughts in recent years. The aim of this study was to investigate the effect of education on the tendency towards water use efficiency in housewives of Zarrin Dasht.

**Materials and Methods:** In this semi-experimental study, 130 patients (65 cases and 65 controls) were selected from housewives of Zarrin Dasht by cluster random sampling from four health centers. Data collection instrument was a standard, two-part questionnaire (demographic data and water saving tendency) that was a water saving standard. Data were analyzed by SPSS version 24 software.

**Results:** The results of this study showed that the intervention was effective on the tendency of housewives to water use efficiency. There was a significant difference between the above variables before and after the intervention in the intervention group, and the relationship between age and occupation, and tendency to water use efficiency was statistically significant.

**Conclusion:** Considering that education has a positive effect on women's tendency to water use efficiency, so providing water management education to housewives can lead to modification of consumption pattern.

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### Introduction

Water crises are one of the most severe environmental crises in the world<sup>1</sup>. Water is one of the most valuable environmental factors that contribute significantly to human life and health<sup>2</sup>. According to estimates, at least 50 countries will

face fresh water scarcity by 2050, including Iran, although the average rainfall in Iran is one third of the global average<sup>3</sup>. But the per capita consumption of all household, agricultural and industrial sectors is higher than global standards. For example, per capita domestic water consumption in Iran is 220

liters per day, while its standard in the world is only 75 liters<sup>4</sup>. Household water is a basic requirement for human well-being and economic activity. Water supply and treatment for domestic consumption and drinking are long processes, and sometimes the cost of this operation is 10 times as much as that of agricultural water due to restrictions on domestic water<sup>5</sup>. There are many factors for the positive attitude toward water use, including environmental awareness, information, the presence of women at home, the existence of drought and perceptions of cost-effectiveness<sup>5</sup>. Water use efficiency also reduces stupendous costs of water and wastewater treatment and adverse environmental effects of sewage disposal as well as energy saving<sup>6</sup>. Among the methods of water use efficiency, public education and the use of low-consumption equipment and components are the most welcome. Therefore, promotional and educational programs should provide extensive education to increase citizens' awareness of the state of the water in the country and their pattern of use, so that in addition to raising awareness, it increases the sensitivity of people to the problem<sup>5</sup>. Women have played a more responsible role in preserving the environment as a major and determinant subpopulation throughout history. Therefore, many scholars believe that the promotion of environmental culture in any society, is mainly possible through well-informed and empowered women. The important role of women in environmental management activities has led to a further emphasis, in global agendas such as Agenda 21, on educational planning aimed at raising women's ability and knowledge to participate in development affairs, as one of the responsibilities of governments. The reason for emphasizing these educations is that the role of women in environmental education is not an individual role and, if women are trained, their environmental knowledge is several times higher than that of men<sup>7</sup>. In the study of Bazdar, to investigate the effect of education on water use efficiency, the results indicated that education had a positive effect on water efficiency use<sup>5</sup>. In a study by Willis *et al.* to investigate the impact of environmental attitudes and water use efficiency on domestic water

consumption, the results showed that households with a positive attitude towards environmental concerns and water use efficiency had lower overall water consumption and this attitude affected all their behaviors in the bathroom, clothing, washing, irrigation, and leaving tap water faucet turned<sup>8</sup>. Zarrin Dasht is located in the dry region of Iran and there were continuous years of drought in this area. Furthermore, women have a prominent role in promoting the culture of efficient use and saving in their families. They also can transfer this culture to their children and future generations. Moreover, to the best of our knowledge, no study has ever been conducted on this subject. Considering all the above-mentioned ideas, this study was conducted to investigate the effect of education on the tendency towards water use efficiency in housewives of Zarrin Dasht.

### Materials and Methods

This semi-experimental study of pretest-posttest type was carried out from December to March 2013. A sample consisting of 130 housewives in Zarrin Dasht were selected by random cluster sampling from four urban and rural health centers of Hajiabad, Khasviah, Dabiran, and Shahrpir. The samples were selected based on the population covered by each center and using lottery of the household health records number, and then were divided into two groups of 65 person. To prevent contamination of samples, after lottery, samples in neighborhoods or kinship with the control group were removed and replaced. Then, by calling the individuals by telephone and obtaining their consent to participate in the study, necessary coordination were made to participate in the ongoing research process. The data collection instrument was a two-part water use efficiency questionnaire, which was used in a similar study<sup>3</sup>. Validity of the questionnaire was confirmed by experts on health education, environmental health engineering, human ecology and geography, and its reliability obtained 0.87 using the Cronbach's alpha coefficient. The questionnaire consisted of demographic variables (age, occupation, educational level, economic status, number of family members, and housing situation)

and 12 items rated on a 5-point Likert scale (I absolutely agree, I agree, No idea, I disagree, I absolutely disagree). Five choices for each item were scored from one to five, so each person attained a total score of 12-60 points on the 12 items. The inclusion criteria were housewives living in Zarrin Dasht and attending the program until the end of the study. Exclusion criteria were lack of participation in the educational program or lack of completely filling out the questionnaire. At baseline of the study, the conditions were explained for the women, and finally, those who were willing to participate in the study were included. In pre-test, the questionnaire was administered as self-report in both groups and filled out by two trained investigators in the above-mentioned health centers. The completion time of each questionnaire lasted 10-15 minutes. Then, based on the obtained information, two hours education sessions were provided for the housewives by the environmental health expert in the health center of the city. Two months after the

last session, post-test was performed. Prior to the study, explanations were given about the research objectives and the voluntary participation as well as the confidentiality of the information obtained from the individuals. Data were entered into the SPSS version 24, and due to the normal distribution of data on water use efficiency, analyzed using descriptive statistics (mean, standard deviation and percentage), paired *t*-test, independent *t*-test, and chi-square. The significance level in this research was considered 0.05.

### Results

The mean age of women was  $36.42 \pm 15.53$  and 44.61% were in the range of 15-30 years old. Among women, 50.76% were housewives. The majority were tenants (47.69%) and had secondary education certificate (27.69%). 56.15% of the people lived in a 3-5 individual family. There was no significant difference in demographic variables between two groups (Table 1).

**Table 1:** Frequency distribution of demographic variables in total and their comparison between case and control groups

Variable	Status	Total		Case		Control		P-value
		Number	Percentage	Number	Percentage	Number	Percentage	
Age	15-30	58	44.61	29	44.6	29	44.6	0.07
	31-45	31	23.84	10	15.4	21	32.3	
	46-60	24	18.46	15	23.1	9	13.8	
	> 60	17	13.07	11	16.9	6	9.2	
Occupation	Housewife	66	50.76	35	53.8	31	47.7	0.82
	Clerk	24	18.46	10	15.4	14	21.5	
	Self-employed	14	10.76	7	10.8	7	10.8	
	Retired	26	20	13	20	13	20	
Education level	Elementary school	20	15.38	11	16.9	9	13.8	0.86
	Guidance school	36	27.69	20	30.8	16	24.6	
	High school	25	19.23	12	18.5	13	20	
	High school diploma	28	21.53	13	20	15	23.1	
Economic status	Academic	21	64.61	9	13.8	12	18.5	0.75
	Good	28	13.84	13	12.3	15	23.1	
	Average	84	64.61	44	67.7	40	61.5	
Number of family members	Poor	18	13.84	8	12.3	10	15.4	0.46
	< 3	23	17.69	13	20	10	15.4	
	4-5	73	56.15	36	55.4	37	56.9	
	6-7	15	11.53	5	7.7	10	15.4	
Housing status	> 7	19	14.61	11	16.9	8	12.3	0.87
	Owner	48	36.92	24	16.9	24	36.9	
	Rental	62	47.69	30	46.2	32	49.2	
	Living with family (parents, etc.)	20	15.38	11	16.9	9	13.8	

As Table 2 shows, the intervention is effective on the tendency of housewives to water use efficiency. Paired t-test showed a significant difference in the above variables before and after the intervention in

the case group, while in the control group, there was no significant difference between the case and control groups before and after the intervention.

**Table 2:** Comparison of mean and standard deviation of the studied variables in case and control groups before and after intervention

Time of test administration	Variable	Group	Pre-test		Post-test		p-value
			Mean	SD	Mean	SD	
	Tendency to water use efficiency	Case	36	4.93	48.86	4.20	P = 0.000
		Control	35.69	5.01	36.01	4.50	P = 0.907

There was no statistically significant difference between the mean and standard deviation of the tendency to water use efficiency in housewives in

two groups of case and control with respect to demographic variables before intervention (Table 3).

**Table 3:** Comparison of mean and standard deviation of tendency to water use efficiency in housewives in case and control groups based on demographic variables before intervention

Variable	Status	Case		Control	
		Mean	SD	Mean	SD
Age	15-30	36	4.93	35.86	4.20
	31-45	35.54	5.21	36.01	4.50
	46-60	36	4.93	35.86	4.20
	> 60	35.54	5.21	36.01	4.50
p-value		0.12		0.11	
Occupation	Housewife	37.30	4.37	35.56	4.20
	Clerk	35.47	4.07	35.01	4.21
	Self-employed	36.903	5.63	35.86	5.20
	Retired	6.50	4.11	36.21	4.87
p-value		0.09		0.81	
Education level	Elementary school	34.01	4.21	35.65	5.20
	Guidance school	36.86	6.20	35.01	4.41
	High school	35.14	5.24	36.84	4.93
	High school diploma	35.07	4.07	35.54	5.21
p-value		0.86		0.13	
Economic status	Good	38.21	5.21	32.84	6.21
	Average	38.86	5.28	32.14	5.90
	Poor	38.21	4.04	32.36	4.87
p-value		0.75		0.65	
Number of family members	> 3	35.74	4.32	36.94	4.12
	4-5	35.01	5.50	35.51	4.70
	6-7	35.86	4.96	34.86	4.25
	> 7	35.62	5.50	35.12	5.11
p-value		0.69		0.46	
Housing status	Owner	34.01	6.50	37.51	4.70
	Rental	34.76	4.91	34.86	4.25
	Living with family (parents, etc.)	34.62	4.40	32.16	4.96
p-value		0.87		0.07	

There was a statistically significant difference between the mean and standard deviation of the tendency to water use efficiency in housewives

in case group with respect to age ( $P = 0.03$ ) and occupation ( $P = 0.03$ ) after intervention (Table 4).

**Table 4:** Comparison of mean and standard deviation of tendency to water use efficiency in housewives in case and control groups based on demographic variables after intervention.

Variable	Status	Case		Control	
		Mean	SD	Mean	SD
Age	15-30	48.86	4.20	36	4.93
	31-45	59.51	5.51	35.87	5.07
	46-60	47.32	6.61	55.36	4.67
	> 60	39.39	4.48	35.54	5.21
p-value		0.02		0.20	
Occupation	Housewife	60.30	10.37	35.74	4.32
	Clerk	53.47	9.07	36.01	5.50
	Self-employed	51.90	10.63	35.86	5.96
	Retired	57.50	10.11	34.62	5.17
p-value		0.04		0.09	
Education level	Elementary school	48.86	4.20	35.74	4.32
	Guidance school	44.51	5.01	35.64	4.84
	High school	47.32	6.61	37.01	5.50
	High school diploma	45.18	84.48	35.86	4.96
p-value		0.69		0.11	
Economic status	Good	50.86	4.20	38.64	4.84
	Average	46.51	5.18	37.47	5.08
	Poor	47.32	6.01	35.86	4.91
p-value		0.54		0.14	
Number of family members	< 3	48.86	6.20	35.65	4.32
	4-5	46.51	5.11	35.71	5.17
	6-7	47.32	6.61	35.86	4.87
	> 7	48.39	4.88	36.62	5.50
p-value		0.87		0.15	
Housing status	Owner	46.51	4.11	34.24	6.18
	Rental	49.32	6.61	34.86	4.41
	Living with family (parents, etc.)	45.39	4.19	34.62	4.40
p-value		0.27		0.21	

## Discussion

Water, God's unique blessing, is a representation of beauty and refreshing, a manifestation of purity and clarity, and in fact, the main reason for universe to continue to exist. The water crisis in Iran is one of the challenges and problems caused by water scarcity and misuse of water resources. Water use efficiency is the best solution to deal with this crisis. The purpose of this study was to investigate the effect of education on the tendency towards water use efficiency in housewives of Zarrin Dasht.

The results of this study showed that education had a significant effect on the tendency of the case

group to water use efficiency, which is consistent with the results of the studies of Bazdar<sup>5</sup>, Ahmadi<sup>9</sup>, Kalantari<sup>10</sup>, Ifegbesan<sup>11</sup>, De Young<sup>12</sup>, Schultz<sup>13</sup>, but inconsistent with the results of the peasant<sup>14</sup>, Mini<sup>15</sup>, Katircioğlu<sup>16</sup>, Abrahamese<sup>17</sup>. Maintaining and preserving existing water resources and learning the efficient use culture is one of the important and essential issues for any society, because first, demand for water resources is increasing day by day, and secondly, due to lack of full knowledge about the way in which it is used correctly, valuable water resources are wasted and polluted. Education is one way to raise awareness

of people. Informing women as water use managers at home can help create an efficient use culture and transfer this skill and culture to their children as future generations to alleviate the water crisis. Certain measures such as consumption management education, informing housewives about the process of exploitation to treatment and distribution of water, and providing information on the per capita consumption of our nation compared to other countries, even those countries with a population far more than ours can be helpful in making women more sensitive to the water crisis and creating a more sophisticated attitude toward this vital resource. The results of this study showed that there was a significant difference between age and tendency to water use efficiency after intervention, which is consistent with the studies of Aghili<sup>18</sup>, Kalantari<sup>10</sup>, and Ramsey<sup>19</sup>, were consistent with these results, but inconsistent with the study of Ahmadi<sup>4</sup>. The average tendency of women in the study to water use efficiency in the age range of 30-45 years old was higher than that in other age groups, which may be due to the fact that this age range is the era of human sophistication as he also has physical and mental capacity, therefore the best performance and lifestyle is also expected of people in this age. The results of this study showed a significant relationship between individual occupation and the tendency toward water use efficiency after the intervention, which was consistent with the results of Kalantari<sup>10</sup>, but inconsistent with Ahmadi's study<sup>20</sup>. In this study, housewives tended to use water more efficiently. Because housewives had enough time to do home routines, including washing and drinking water, patiently and more opportunities to attend social events and education sessions held by various institutions, they appear to be more sensitive to the efficient use of water. In addition, more attention by housewives may also be due to the economical aspect of water use efficiency. The limitations of the present study include financial resources and the difficulty of coordinating the presence of housewives in educational sessions. It is suggested that a similar study be conducted on the education of the

efficient water use pattern in the age group of students who are most capable population to learn and change their habits and behaviors.

### Conclusion

Considering that awareness, general knowledge, perception of the problem and attitude about water have a significant relationship with efficient water use and housewives, as water use managers at home and educators of future generations of community members, play an important role in promoting the development of efficient water consumption patterns in the studied community, the primary objective of the authorities should be perform awareness-raising campaigns about the water resource crisis and its various consequences in this group. Holding lecture sessions, workshops and meetings in respective departments, such as the Water and Wastewater Office, the Municipality, the Governor's Office, the cultural centers, the Environment Office, etc., can increase housewives' information about water scarcity and reduce water waste in urban and residential areas.

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### Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this article.

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