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KNOWLEDGE, ATTITUDES AND PRACTICES AS A DECISION-MAKING TOOL FOR WATER CONSUMPTION RATIONALIZATION IN BALJURASHI GOVERNORATE OF SAUDI ARABIA

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ABSTRACT

This study was carried out to conduct Knowledge, Attitudes and Practices (KAP) analysis for decision making in the context of water consumption rationalization (WCR). Drawing on a sample of 383 questionnaires were completed in Baljurashi Governorate of the KSA's Al-baha Region. Results revealed that respondents had a sufficient level of knowledge about water issues and WCR. As well, the findings showed that the majority of respondents have a positive attitude toward WCR. On the other hand, the respondents had poor WCR practices. These findings suggest shaping a more sensible WCR policy. Thus, it needs strong extension support to effectively use an awareness-creation program for the implementation of a WCR instructional program that promotes effective WCR practices.

KEYWORDS: Attitude; decision making; knowledge; practice; water consumption rationalization.

1. INTRODUCTION

Water is one of the most precious resources influencing Saudi development plans. The acute scarcity of freshwater resources, combined with an increase in water consumption, poses a major challenge in Saudi Arabia. WCR has grown into well-studied and economically viable solutions and the necessity for it grows when a country like Saudi Arabia, faces water scarcity. Although numerous studies were carried out in different water sectors in Saudi Arabia, only few studies were conducted in relation to WCR with special reference to assess the level of people's awareness. Decision Support System (DSS) can be useful tools for water allocation, supply and demand analysis and WCR. The goal of DSS is to find the best decision methods that can suggest a satisfying solution to policymakers. In dry and semi-arid regions like Saudi Arabia, an information-based WCR strategy can aid in the formulation of an effective management plan to narrow the water demand-supply gap. The behavior of household water demand is inextricably linked with the general behavior of water demand. The construction of an ideal WCR plan necessitates a thorough understanding of the water demand pattern, supply system and water quantity and trend estimation. These research findings are believed to contribute significantly towards filling gaps in the KAP literature on WCR at the community level. The findings of this study could be utilized to assist the Ministry of Environment, Water and Agriculture (MEWA) to develop a WCR instructional program that promotes good attitudes and effective WCR practices, as well as to establish a baseline for measuring the effectiveness of the MEWA's efforts to raise residents' awareness of water conservation initiatives.

1.1 Water Resources

Saudi Arabia is located in an extreme desert environment and does not have any natural surface watercourses such as rivers or lakes. The annual per capita amount of water in Saudi Arabia has declined from 689 m^3 in 1965 to 411 m^3 at present, which represents only 4.7% of the world's average annual per capita amount of water. In 2005, the average annual water share per capita was 282 m^3. According to the UNESCO relative water stress index, the country is in a condition of extreme water scarcity.[1] KSA utilizes conventional and unconventional water resources to satisfy the ever-increasing water demand. The conventional water resources include surface water and groundwater, while the unconventional water includes desalination water and treated wastewater. Al-Zahrani, et al.[2] reported that surface water in Saudi Arabia is available with an estimate of about 2045 (MCM) per year that comes from the rainfall and it is found predominantly in the west and

south-west parts of the country. Groundwater is the only reliable water source. The groundwater aquifer system includes at least six non-renewable aquifers, which extend from the northern boundary southwards into the Empty Quarter and eastwards from the central area to the Arabian Gulf.[2] The groundwater aquifer systems store about 3,958,000 Mm^3.[3] According to Chandrasekharam.[4] Saudi Arabia withdraws 20 Bm^3 of groundwater per year, while the annual recharge of groundwater is only 2.4 Bm^3.

Saudi Arabia has been dependent on desalinated water for potable water since the 1950s. Today, Saudi Arabia is the world's largest producer of desalinated water (22% globally) and home to the Marafiq complex in Al-Jubail, the world's largest independent water and power project.[5] Fuel consumption in water desalination represents more than 25% of the national fuel production.[6] There are about 70 wastewater treatment plants in the kingdom. Most of the reused effluents are used for irrigation purposes, landscape irrigation, industrial use and aquifer recharge.[7] These generally indicate the country is more dependent on non-renewable water sources which require an appropriate WCR plan.

1.2 Water Consumption

Domestic water consumption in the Gulf Cooperation Council (GCC) countries ranges from 300 – 750 liters/ capita/ day, which ranks as the highest in the world. The rise in per capita water consumption in these countries is attributed to many factors including the absence of proper demand management and a price-signaling mechanism. Government policies have primarily focused on the supply side of water production, coming from aquifers or desalination plants. Water tariffs in the region are generally quite low, representing no more than 10 percent of the total cost on average, with no incentives for consumers to save water (8). According to data published by the Ministry of Water and Electricity (MWE) in 2015, the daily residential water usage per capita is reported as 286 liters. If only major cities (e.g., Riyadh, Dammam and Jeddah) are considered, the consumption rate is higher than that of Canada and is very close to that of the USA.[9] Saudi Arabia is the third biggest consumer of water per capita in the world, after the USA and Canada.

1.3 Water Consumption Rationalization

Saudi Arabia has announced a national program for WCR, setting ambitious targets that include slashing usage by nearly 24% by 2023 and some 43% by the end of the next decade. The MEWA aims to reduce daily per capita consumption from 263 liters to 200 liters by 2020 and 150 liters by 2030. Initiatives of the National Transformation Program for the sectors of

the MEWA has included in its programs, the daily water consumption rationalization program for the individual which includes raising the level of community awareness by implementing a package of activities and enacting laws to implement standard specifications for all sanitary water and water-consuming devices.[10] The National Water Company (NWC) should review its policy of fixing water tariffs. The company must modernize the devices for metering water consumption in residential units. As well, water rationalization devices shall be made available to the citizens.[11]

With this general background, the current study aimed to find out a decision support tool for WCR using analysis of knowledge, attitudes and practices.

2. MATERIALS AND METHODS

A KAP survey usually is conducted to collect information on the Knowledge (i.e., what is known), Attitudes (i.e., what is thought) and Practices (i.e., what is done) about general or specific topics of a particular population. This KAP survey provides benchmark values for indicators of water use and WCR and will be used as a decision support tool to inform future program planning.

2.1 Study Area

The study was conducted in Baljurashi Governorate which is one of the governorates of Al-Baha Region in the southern part of Saudi Arabia. It is located between 19.42° N and 20.17° N latitude and 30.00° E and 41.58° E longitude, at an altitude range of 1984 to 2224 m above sea level (Figure 1). The Governorate covers an area of approximately 1362 km^2 and it is characterized by flat valleys surrounded by high mountains.

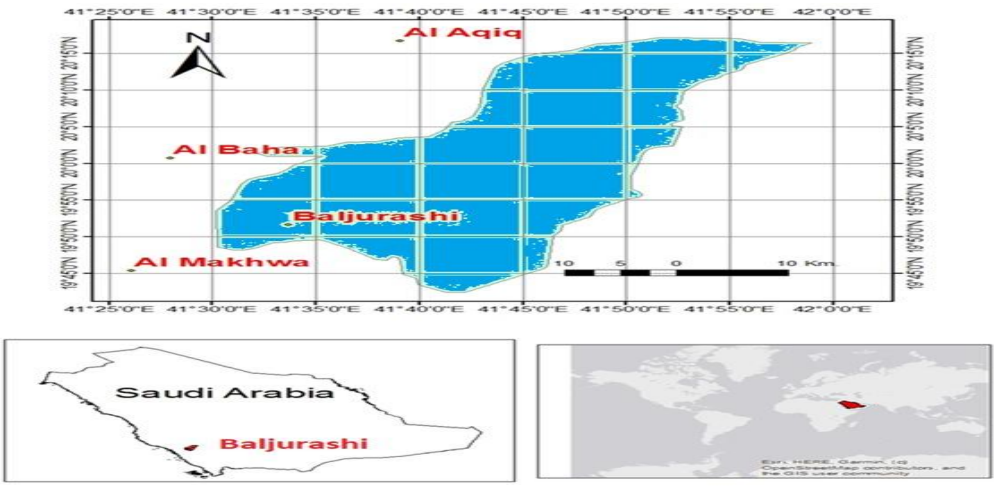

Figure (1): Baljurashi Governorate map.

Prepared by: AbdulWali Al-Khulaidi, 2021

Baljurashi is distinguished by its pleasant climate. In January, the average monthly temperature is 6.9°C and in July, it is 34.9°C. The relative humidity ranges from 24 percent in July to 54 percent in December.[21] The average precipitation is 316 mm.[13] The soils in the area vary considerably, being shallow and coarse-textured in elevated and sloping sites; it is deep of alluvial texture in protected locations.[12] According to the General Authority for Statistics,[14] Baljurashi Governorate has a human population of approximately 78,536 people.

2.2 Data Collection

A household survey with well-tailored questionnaires can provide information about how a household's water technologies are used. It is also possible to include questions regarding information about water usage habits. However, one must keep in mind that answers to such questions may be biased and unrepresentative of actual water use.[15] Out of the 420 questionnaires distributed to the sampled residents of Baljurashi Governorate, 383 were returned properly answering the questionnaires. The questionnaires were given to residents in two ways: in-person and online. The survey was created online using Google Forms platform. A digital link was made available to the public through WhatsApp and e-mail distribution. The population sample was chosen according to the formula of Krejcie and Morgan.[16] Males and females, citizens and international expatriates were chosen at random to represent residents. The questions in the questionnaire were designed in multiple-choice formats, with the respondent choosing the answer that best represents his or her point of view. To ensure diversity of respondents, the questionnaire was administered in person at various locations (e.g., malls, schools, clinics and hospitals). The survey began on March 16th, 2018 and lasted four months.

2.3 Data Analysis

The data collected in Arabic from the survey and were translated into English and entered into Microsoft Office Excel “version 2016". Data were transferred to and analyzed using the Statistical Package for Social Science (SPSS) program "version 25". Microsoft Excel program “version 2016” was used for illustrating graphs. Several preliminary operations, such as reviewing, coding and data entry, were performed before data analysis and descriptive statistics were used for data analysis.

2.3.1 Likert Scale Analysis

Measures such as Likert scales have been accepted by researchers from a variety of disciplines as appropriate tools for investigating people's attitudes.

A Likert scale was used in this study to assess respondents' Knowledge, Attitudes and Practices regarding water resources in the kingdom in general and WCR in particular. The Kingdom's scarcity of water resources and the high cost of water desalination and the high rate of water consumption is the initial stages of the decision-making process for implementing WCR policy. A scale consisting of five phrases was developed to assess respondents' knowledge regarding their familiarity with the Kingdom's water resources and respondents were given five options (1: I don't know completely, 2: I don't know, 3: I know to some extent, 4: I know, and 5: I know completely) to choose what best suited their level of knowledge and awareness. As a result, a five-point scale has been developed to determine the extent to which respondents are aware of water-related information in the Kingdom. The same can be said about respondents' Attitudes and Practices. There were five options for Attitudes (1: I totally disagree, 2: I disagree, 3: neutral, 4: I agree and 5: I totally agree). In addition, five options for Practices were provided (1: high, 2: above middle, 3: middle, 4: under middle and 5: low). Finally, descriptive statistics were used to analyze the responses to the scale items.

3. RESULTS AND DISCUSSION

KAP study identifies knowledge gaps, cultural beliefs or behavioral patterns that may facilitate understanding and action, as well as pose problems or create barriers for WCR efforts.

3.1 Demographic Details

The demographic details of the respondents are summarized in Table (1). The surveyed population was found to be homogenous in most of their characteristics. The majority of them (71.5%) were young with a high level of education. They were predominately (56.9%) males, mostly married (72.8%) and most of them were citizens (83.3%).

Table (1): Demographic characteristics of the surveyed population.

Characteristic		Freq.	%
Sex	Male	218	56.9
	female	165	43.1
Age	< 25 years	48	12.5
	(25 - 40) years	226	59
	(41 - 60) years	104	27.2
	> 60 years old	5	1.3
Residence status	Citizen	319	83.3
	Expat.	64	16.7
Marital status	Single	104	27.2
	Married	279	72.8
Family size	1 - 5	237	61.9
	6 - 10	139	36.3
	> 10	7	1.8
Scientific qualification	Primary	12	3.1
	Intermediate	27	7.0
	Secondary	87	22.7
	Diploma	48	12.5
	University	185	48.3
	Post university	23	6.0
	other	1	0.3
Housing type	Local	17	4.4
	Apartment	199	52
	Floor	103	26.9
	Villa	59	15.4
	Other	5	1.3

3.2 Public Knowledge

The general trend of respondents' knowledge level about water and WCR on a five-point cognitive level scale is shown in Table (2). “Natural water resources are scarce in Saudi Arabia’’’ had the highest level of knowledge among respondents, with an average knowledge of 4.1 degrees, while the lowest level of knowledge was related to the “national campaigns of WCR’’, which reached 3.6 degrees. By categorizing the respondents based on their overall knowledge level, the results showed that the majority of the respondents (75%) have a high knowledge level. These findings may contribute to the perception of WCR program.

Table (2): Respondents' level of knowledge about water and rationalization of water consumption.

Knowledge statement	Surveyed responses based on their knowledge of water and rationalization issues								
	Know completely n(%)	Known (%)	know to some extent n (%)	Don't know n (%)	Don't know Completely n (%)	Mean	S. D.	Cumulative percent %	Trend
Natural water resources are scarce in Saudi Arabia	140 (36.6%)	98 (25.6 %)	106 (27.9%)	27 (7%)	11 (2.9%)	4.10	1.04	82.0	know
Importance of fixing water rationalization tools	138 (36%)	114 (29.8 %)	73 (19.1%)	41 (10.7 %)	17 (4.4%)	3.82	1.16	76.4	know
Some facts about WCR	102 (26.6%)	126 (32.9 %)	92 (24%)	46 (12%)	17 (4.4%)	3.65	1.13	73.0	know
Desalination plants in KSA	172 (44.9%)	82 (28.2 %)	60 (15.7%)	29 (7.8%)	13 (3.4%)	3.56	1.16	71.2	know
National campaigns for WCR	98 (25.6%)	117 (30.5 %)	82 (21.4%)	66 (17.5 %)	20 (2.5%)	3.54	1.19	70.8	know
General Assessment						**3.75**	**1.15**	**75**	**know**

As shown in Table (2), (36.6%) and (25.6%) of the respondents know completely and know respectively about the scarcity of natural water resources in the kingdom. While (27.9%) know to some extent, (7%) and (2.9%) of them respectively don't know and don't know completely about the scarcity of the natural water resources in the kingdom. This result indicates that level of awareness of the people is sufficient compared to the level of the country's water stress and scarcity. Saudi Arabia is one of the world's most water-stressed countries. The absolute scarcity level of water is 500 m^3/c/year. Saudi Arabia only has 89.5 m^3/c/year.[17] It is necessary to start public awareness campaigns to raise awareness about the kingdom's natural water scarcity.

About (65.8%) of respondents were aware of the need of fixing water conservation tools, with (36%) expressing complete awareness. While (19.1%) of them were aware of the importance of fixing water conservation methods to some extent, (10.7%) and (4.4%) respectively don't know and don't know completely. The Austin Water Company used to give away free water conservation tools. These tools include showerheads that save 2 gallons per minute or more with a water-efficient showerhead that only uses 1.5 gallons per minute,

as well as kitchen and bathroom faucet aerators that mix air with water to minimize the amount of water used without reducing water pressure, which are among these gadgets. Aerators in bathrooms consume 0.5 gallons of water per minute, while aerators in kitchens use 1.5 gallons per minute.[18] Efforts are needed to encourage inhabitants to fix water conservation tools.

About (26.6%) and (32.9%) of the surveyed population respectively admitted that they know completely and just know about some of the WCR facts. Furthermore, (24%) know to some extent, (12%) and (4.4%) don't know and don't know completely respectively. These findings indicate that the majority of respondents know about WCR facts which may support further water conservation programs.

The majority of respondents (73.1%) know that the desalination plants are one of Saudi Arabia's water resources, whereas (44.9%) of them know completely. While (15.7%) of them know to some extent, (7.8%) don't know and (3.4%) don't know completely that desalination plants are one of the water resources in Saudi Arabia. According to the SWCC annual report,[19] the corporation produced 1.9 BCM of desalinated water in 2020.

Public awareness means the general level of understanding of a certain topic. So raising awareness for water issues is a way to build a common understanding of water issues and to create shared values on how water should be used and managed. (25.6%) of the surveyed population know completely about the national campaigns of WCR and (30.5%) of them just know. In addition, (21.4%) know to some extent, (17.2%) don't know and (5.2%) of them don't know completely. These findings indicate that much is known about the national WCR campaigns. Al-Zahrani, et al,[20] have stated that It is preferable to rely on awareness-raising and strategic campaigns to contact large numbers of people to change their behavior toward using water. They added that these campaigns have been developed by (FAO) and have been successfully applied in many countries in Africa, Asia and Latin America. The WCR campaign is an important method in raising awareness and extension activities.

3.3 Attitudes Towards Water and Water Consumption Rationalization

On a five-point attitude level scale, the respondents agreed on some measures related to water and its rationalization in the Kingdom. The highest level of respondents' attitudes was that "care must be taken to rationalize water consumption'', for which the respondents' average attitude level was 4.6 degrees. The lowest level of attitude was related to "official authorities

should take measures to rationalize water consumption if daily water consumption exceeded a certain limit'', which reached 3.5 degrees. By categorizing the respondents based on their overall attitudes level, the results show that the majority of the respondents (80.4%) have a high attitude level toward WCR. In a country like Saudi Arabia, residents' attitudes toward water consumption rationalization should be very high and sensitive, as this would be the only solution to the country's water shortage dilemma. At this level, changing behavior necessitates an ongoing effort to raise awareness toward WCR. However, it is known that attitudes do not necessarily translate into actual behavior. A large body of evidence suggests that awareness of water consumption rationalization should be promoted, similar to the successful "Water Wise" campaign in South Africa, which was visionary in changing people's attitudes and thus their behavior to use water more wisely. The campaign has been forming alliances and cultivating relationships for over a decade to bring the "Water Wise" message to Gauteng and South Africa.[21]

Figure (2) shows that (24.3%) and (30.8%) of the respondents were totally agreed and agreed respectively that official authorities should take measures to rationalize water consumption in case daily water consumption exceeds a certain limit. While (23.2%) of them were neutral in their response, (13.8%) rated disagree and (7.8%) rated completely disagree.

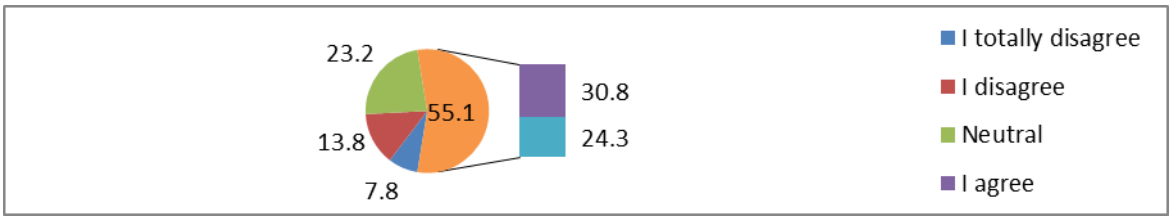

Figure (2): Status of agreement on measures taken by officials to rationalize water consumption when it exceeds a certain limit.

These results indicate that the majority agreed for taking measures by official authorities to rationalize water consumption. Official authorities should take serious measures to conserve water as this goes in line with a previous study conducted by European Union,[22] that a motivational campaign can be promotion-focused and/ or prevention-focused. The prevention-focused can include fear, punishment, worries and any other issue which brings people to act to avoid wasting water.

Approximately (17.5%) and (31.9%) of respondents agreed totally and agreed respectively that official authorities should impose a fine if daily water consumption exceeds a certain

limit as shown in Figure (3). While (21.1%) were neutral in their response, (19.6%) of them were disagree and (9.9%) were completely disagree. According to these findings, the majority of respondents agreed that authorities should levy a fine if daily water consumption exceeds a certain threshold. These findings are consistent with the procedures used in Carmichael, California, where potential fines are intended to get people to think about what they are doing to help conserve water.[23]

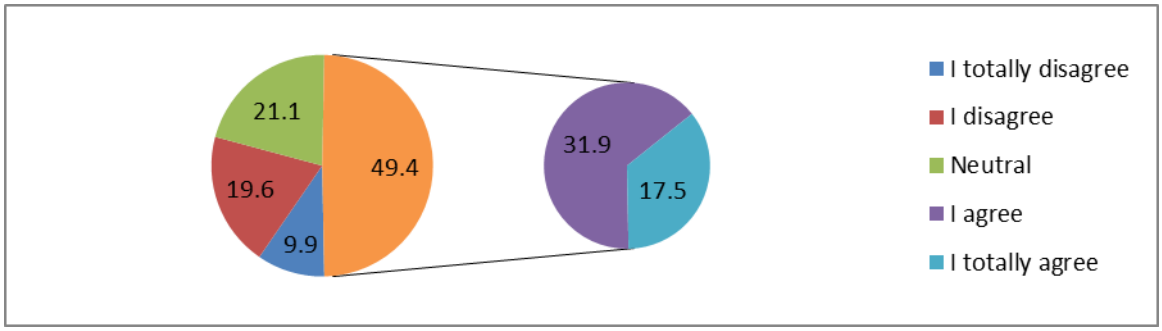

Figure (3): Distribution of surveyed response on official imposition of a fine if daily water consumption exceeds a certain limit.

Figure (4) shows that (24.3%) of the surveyed population agreed completely and (41.3%) agreed that financial fees that suit water consumption should be implemented. Furthermore, (15.7%) of respondents were neutral, (12%) disagreed and (6.8%) strongly disagreed. These findings indicate that the majority of respondents agreed that official authorities should set financial fees based on water consumption. These findings are consistent with the findings of Arbues, et al.[24] who discovered that water tariff is an important determinant factor influencing residential water demand. It is primarily concerned with valuing water as a scarce good whose consumption must be efficiently priced.

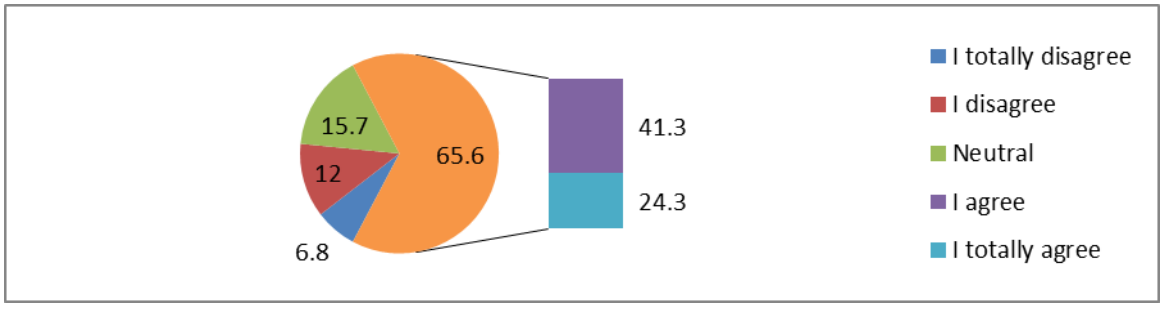

Figure (4): Distribution of surveyed response determination of financial fees to suit water consumption.

Figure (5) indicates that (49.3%) of respondents agreed completely, while (37.9%) agreed that a special water meter should be installed for each household. In contrast, (8.6%) were neutral, (2.3%) disagreed and only (1.8%) disagreed completely. These results show that the majority of respondents agreed that each house should have a special water meter. According to Gawlik et al.[25] United Kingdom experience showed that metered customers use 12% less water on average and are more proactive in removing leaks inside properties.

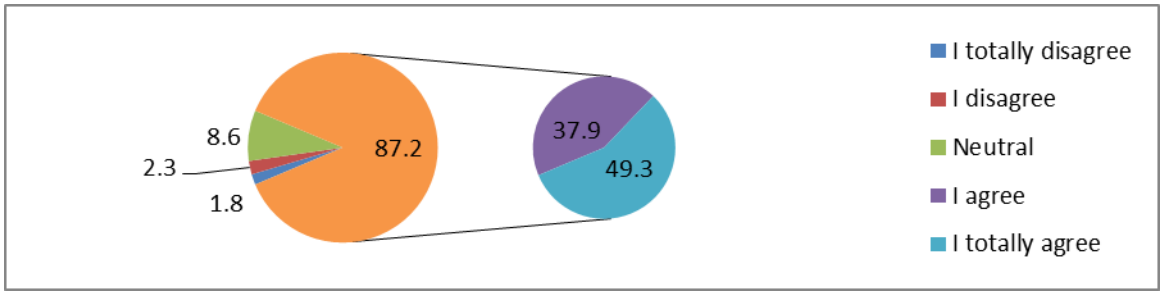

Figure (5): Distribution of surveyed response on the fixation of a special water meter.

Figure (6) shows that (68.7%) of surveyed population reported totally agreeing that family members should be directed to optimal use of water, followed by (23.6%) who reported agree. On the other hand, (3.7%) were neutral, (3%) reported disagree and (1%) reported completely disagree. The majority of respondents reported agreeing to direct family members to use water wisely. According to the WHO, a minimum of 25 liters per day is required to meet basic needs. In Saudi Arabia, the per capita use is more than ten times that, averaging 270 liters per day (8).

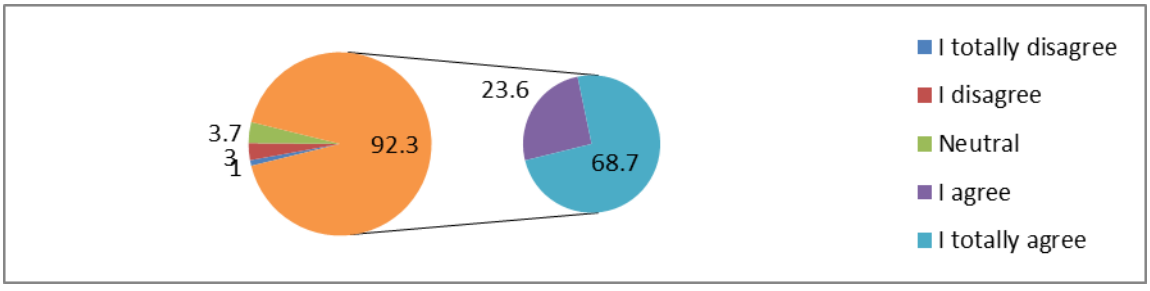

Figure (6): Distribution of surveyed response on direct taking instruction of optimal use of water.

Figure (7) illustrates that (51.7%) and (32.9%) of respondents have totally agreed and agreed respectively that obligation should be taken against consumers to use water conservation tools. (11.5%) of them were neutral, (2.3%) were disagreed and (1.6%) were totally disagreed. A ministerial decree No. (551/6) dated 11/06/2007 had stipulated a fine of 200 SR

for failing to install or tamper with rationalization tools, and if the tools are not installed, the service of supplying water will be blocked and the fine will be doubled.

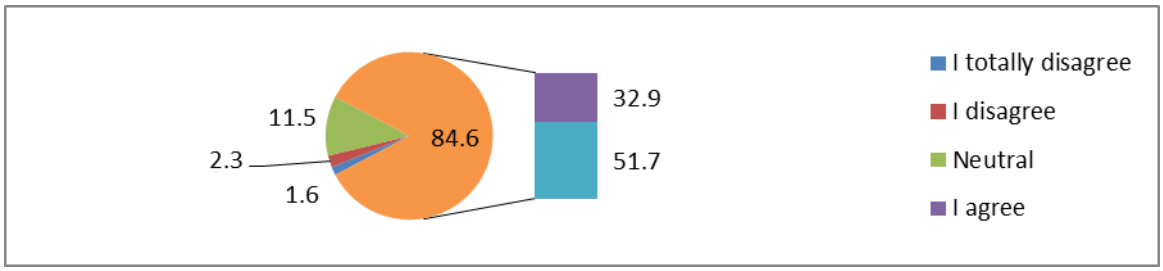

Figure (7): Distribution of surveyed response to obligating consumers to use tools for water consumption.

3.3 Practices

Table (3) depicts respondents' water-related practices and water-consumption rationalization. Practices mean values ranged from (3.24) to (4.37), with an overall mean average of (3.66) indicating above-middle practices. The highest level of practice went to taking care of not leaking water in the house (4.37 mean), followed by commitments to strict behaviors in WCR (3.96 mean) and wife/ husband commitments to WCR (3.77 mean). Workers' commitments to WCR had the lowest level of practice (3.24 mean). These findings reflect respondents' insufficient WCR practices, which influence the wise use of water.

Table (3): Surveyed respondents' water-related practices and water-consumption rationalization.

Practices statement	Surveyed responses based on their practices toward water and rationalization issues								
	High n (%)	Above middle n (%)	Middle n (%)	Under middle n (%)	Low n (%)	Mean	S. D.	%	Trend
Taking care not to leak water in house	240 (62.9 %)	80 (20.9%)	41 (10.7%)	10 (2.6%)	12 (2.9%)	4.37	0.88	87.4	Above middle
Commitments to strict behaviors in WCR	127 (33.2 %)	127 (33.2%)	119 (31.1%)	6 (1.6%)	4 (1%)	3.96	0.89	79.2	Above middle
wife/ husband commitments to WCR	107 (44.4 %)	112 (29.2%)	136 (35.5%)	24 (6.3%)	4 (1%)	3.77	0.96	75.4	Above middle
Effect of water rationalization campaign on WCR	127 (33.2 %)	86 (22.5%)	97 (25.3%)	38 (9.9%)	35 (9.1%)	3.61	0.8	72.2	Above middle

Workers' commitments to WCR	77 (20.1 %)	80 (20.9%)	126 (32.9%)	58 (15.1%)	42 (10.9%)	3.24	0.7 1	64. 8	Above middle
General Mean						**3.66**	**1.1 7**	**73. 2**	**Above middle**

In terms of taking care of non-leaking water at their home, (62.9%) and (20.9%) of respondents rated it as high and above middle level respectively as shown in Table (3). Furthermore (10.7%) have rated middle, (2.6%) were under middle and (2.9%) have rated low levels for taking care not to leak water at the house. In a similar study conducted by Ahmed and Abdulaziz,[28] in Erbil city, Iraq results indicated that more than half of the respondents do not know whether there is a leak or not in their houses. Once a reasonable level of leakage has been detected, periodic checking should be continued in all parts of the house.

About (33.2%) and (33.2%) of respondents respectively are high and above the middle in their commitment to strict behaviors in WCR, while (31.1%) of them are middle in terms of commitment. On the other hand, (1.6%) and (1%) rated as under middle and low respectively in their commitments to follow strict WCR. These findings indicate that the practice of water consumption rationalization is good and might be improved through the MEWA's *Qatrah* program (The national program for WCR) in which residents pledge to rationalize water consumption.[26]

Approximately (44.4%) of the surveyed population admitted that the practice of the wife/ husband toward WCR is high and (29.2%) rated above the middle. While (35.5%) admitted that the practice is middle, (6.3%) rated under middle and (1%) rated low. These findings suggest that more efforts should be made to promote WCR practices among family members.

Approximately (33.2%) and (22.5%) of respondents respectively rated high and above middle effect by the water consumption rationalization campaign that was organized by MWE. In addition, (25.3%) rated middle, (9.9%) rated under middle and (9.1%) rated low effect by the national water consumption rationalization campaign. In relation to this, a study conducted by Al-Kahtani,[27] resulted that 11% of the water consumers were affected by water conservation campaigns organized by the MWE, while 58% (a high percentage) were not affected, which indicates that the voluntary policy is not feasible in the short term and that the ministry

should search for a complementary policy of water demand management to be more influential on the WCR.

About (20.1%) and (20.9%) of respondents respectively rated high and above middle level of commitments to WCR by household workers. In addition, (32.9%) rated middle, (15.1%) and (10.9%) rated under middle and low level respectively to WCR commitments by household workers. The majority of expatriate workers in Saudi Arabia come from water-rich countries, particularly those in East Asia, where water is not used wisely.

Last but not least, when one of the available sources of drinking water is the costly desalinated seawater, a water conservation program is both necessary and financially justified. Water conservation measures should be tailored to Saudi Arabia's cultural, economic, religious, political and legal uniqueness in the future.

CONCLUSIONS

In conclusion, this study showed that the majority of respondents had good knowledge and attitude about water issues and WCR. These findings may contribute to the development of a more sensible water conservation policy. The findings of the practices level, on the other hand, revealed respondents' weak practices toward WCR. These results suggest that WCR knowledge was strongly associated with positive attitudes toward WCR, but not with correct practices of WCR. Organizing capacity building, campaigns, and demonstrations of effective WCR are necessary to increase public awareness, change attitudes and improve WCR practices. Further research with different designs and revered or distracted questionnaire responses, as well as the addition of regions and sample sizes, is required to comprehend the general KAP situation of WCR in the kingdom.

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