

Research Article

CONSUMERS FACED PROBLEMS WITH SOLAR WATER HEATER

*Bhavya Padmini, C.H., Vijaya Lakshmi, V. and Radha Rani, P.

Department of Resource Management and Consumer Sciences, College of Home Science, Professor Jayashankar Telangana State Agricultural University, Hyderabad – 500004

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ABSTRACT

Solar energy is renewable free source of energy. Solar energy is certainly not a new concept. It has been long realized that, despite the low energy density of the incoming insolation, solar radiation has a large potential as an energy source. Solar power is one of the alternatives to the electricity. Solar power is clean green electricity that is created from sunlight, or heat from the sun. One of the popular devices that harness the solar energy is Solar Hot Water System (SHWS). The objective of the study is to find out what are the problems faced by the consumer while using solar water heater. A standard questionnaire was framed which was used for data collection. One hundred samples were taken in Hyderabad city for this study. The data subjected to analysis and the findings of the study reveals that solar water heater not working properly in rainy and winter season problem was faced by the maximum of the respondents. Chi-square analysis showed that there was no significant association between age and level of consumer satisfaction. However, there was a significant association between education, income, type of family and type of building and level of consumer satisfaction.

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INTRODUCTION

India is a sunny country with a solar energy potential of 20 mw every square km. At present, only a tiny fraction was being tapped. Solar energy can be used directly in two forms – producing heat or light. Production of light and electric current from the sun's rays users' photovoltaic technology', which involves direct conversion of sunlight into electricity. The thermal form of solar energy is used for cooking, water heating or purification, drying and fruit ripening, lighting, distillation or producing steam for power generation. Apart from cooking, heating water dominates the energy needs of households. For households in developing nations, heating water was often the most energy intensive process, and therefore the most expensive or time-intensive. In communities throughout the developing world, poor households struggle to meet their hot water needs. Solar water heating technology was used in many parts of the world including the U.S., China, India, and the Middle East. Systems have been adopted for a wide range of use patterns and climate conditions (Praveena and Kumaresh, 2011).

MATERIALS AND METHODS

Research design

Ex-post facto research design was adopted to conduct the study. Ex-post facto research is a systematic empirical inquiry in which the scientist does not have direct control of independent variables because their manifestation has already occurred or because they are inherently not manipulatable. This research design was adopted to explore the reasons and factors for purchase of solar water heaters (Saravanavel, 2004).

Location of the study

The Hyderabad city was purposively selected for the study as the investigator is familiar with the local language, which would help to build quick rapport and also to enable in depth study combined with personal observation. The total five zones in Hyderabad were purposively selected for the study. East, West, North, South and Central are the five zones located in Hyderabad city.

Selection of the sample

Sampling is the process of selecting number of respondents for a study in such a way that they represent the larger group of population.

*Corresponding author: Bhavya Padmini, C.H.,
Department of Resource Management and Consumer Sciences,
College of Home Science, Professor Jayashankar Telangana State
Agricultural University, Hyderabad – 500004.

Purposive sampling method was adopted to select the sample. Purposive sample is a kind of non-probability sample, based on the typicality of the cases to be included for the study (Singh, 1993). Users of solar water heater were purposively chosen as they could only express their reasons and factors for purchase of solar water heaters. The list of SWH users in Hyderabad city was collected through NEDCAP (New & Renewable Energy Development Corporation for Andhra Pradesh).

Selection of tool

Interview schedule come likert scale was adopted for data collection. Interview schedule is a data collection technique in which the interviewer physically meets the interviewee and asks the questions related to the research topic.

Method of Data Collection

The data was collected by administering the structured interview schedule to the respondents. The statements were asked in Telugu and English. The respondents were personally interviewed by the investigator, which enabled her to get first hand information and provided her an opportunity to observe their reactions. It was made sure that the statements mentioned in the schedule were correctly understood by the respondents by repeating and clarifying them where ever necessary. The data was collected with regarding to the objectives i.e. profile and house related information of the respondents, general and cost related information about SWH, , reasons and factors for purchase of SWH.

Data analysis

Analysis means a critical examination of the assembled and grouped data for studying the characteristics of the object under study and for determining the patterns of relationships among the variables related to it (Swami, 1997). The data was coded, tabulated and analyzed through percentages and chi-square test. The relationship between different independent variables and dependent variables was interpreted through the data that was collected through the interview schedule.

RESULTS AND DISCUSSION

Percentage analysis

This section deals with the findings and discussion regarding the profile characteristics of the respondents from the five zones in Hyderabad city. Profile of the respondents included age, education, occupation, income and family type. Distribution of the respondents under different categories based on their profile characteristics was presented. The age of the head of the family showed that 47 per cent of the respondents belonged to young age group. More or less an equal proportion of the respondents belonged to middle age group (29%) and above middle age group (24%). Education of head of the family showed that 47 per cent of the respondents were post graduates i.e. M.Sc, M.tech& M.B.A followed by professional degree holders (32%). Nearly one-fifth (19%) of the respondents were graduates i.e. B.Sc, B.Com & polytechnic and negligible proportion of the respondents were doctorates (2%).

Table 1. Distribution of respondents according to the problems faced with SWH (N=100)

Problems	4(F)	3(S)	2(R)	1(N)	Total Score	Rank	Mean	S.D
Solar water heater is not working properly in rainy and winter season	20	39	30	11	268	1	2.68	0.91
Not getting hot water	1	2	9	88	116	10	1.16	0.14
Scale deposition of water is high	2	8	24	66	146	6	1.46	0.72
Maintenance cost is very high	1	30	22	47	155	5	1.55	0.93
Coils need to be repaired	3	49	41	7	248	2	2.48	0.66
Water leakage problem	0	23	24	53	170	3	1.70	0.81
Inadequate service	0	10	41	49	161	4	1.61	0.65
Long payback period	0	9	20	71	138	7	1.38	0.64
Glass breakage on the panels	1	11	8	80	133	9	1.33	0.7
High initial in repair cost	0	15	7	78	137	8	1.37	0.72
Inadequate installation space	0	1	3	96	105	11	1.05	0.26
Infrastructure	0	1	3	96	105	11	1.05	0.26
Lack of stakeholders/community Participation	0	1	2	97	104	12	1.04	0.02
Legal and regulation constraints	0	1	2	97	104	12	1.04	0.02
Not guided properly about the sizes of SWH	0	0	2	98	102	13	1.02	0.1

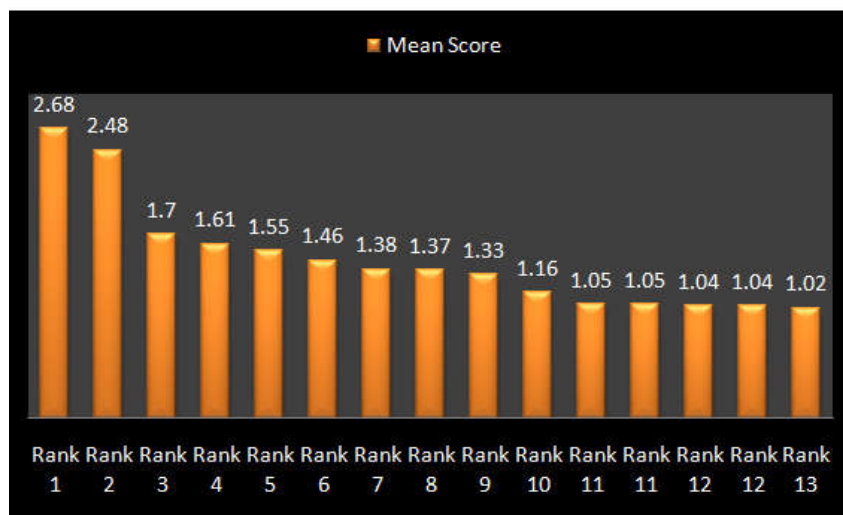


Figure 1. Distribution of respondents according to the problems faced with SWH by mean score

A negligible percentage (3%) of the respondents had chosen semi-professional occupation. Income of head of the family found that sixty per cent of the families were earning Rs.50,000-1,00,000 and 30 per cent of the families were earning Rs.1,00,000-1,50,000 while negligible proportion of the families were earning Rs.1,50,000-2,00,000 (7%), Rs.≤ 50,000(2%), and Rs.≤ 2,00,000(1%). Majority (85%) of the respondents belonged to nuclear families followed by 15 per cent respondents belonging to joint families. Type of building showed that 81 per cent of the respondents were living in independent buildings out of which half (50%) of the respondents were living in duplex building followed by single storeyed building (29%), while 19 per cent of the respondents were living in apartments. A negligible proportion of the respondents were living in triplex building (2%).

Chi-square analysis

- There is no significant association relationship between the age of the head of the family and level of consumer satisfaction.
- There is a significant relationship association between the education of the head of the family and level of consumer satisfaction.
- There is a significant relationship association between the income of the family and level of consumer satisfaction.
- There is a significant relationship association between the type of family and level of consumer satisfaction.
- There is a significant relationship association between the type of building and level of consumer satisfaction.

Respondents were asked to report on a 4 point scale as frequently (4), sometimes (3), rarely (2) and never (1). Each point on the scale carried a score. These score values were not printed on the instrument but are shown here just to indicate the scoring pattern. Each statement was scored by 100 respondents on a 4 point scale.

The maximum score earned on that statement was $100 \times 4 = 400$ i.e. frequently respondents had faced problems with SWH and minimum score earned on each statement was $1 \times 100 = 100$ i.e. never respondents had faced problems with SWH. Hence, each statement would fall between 100 and 400. Ranking was given to each statement based on the total score of that statement. The total score was calculated on each statement separately by multiplying the score with the number of responses on all 4 categories and adding up. If the score happens to be 400, it shows that frequently respondents had faced problems with SWH. Score of 100 would mean respondents had not faced problems with SWH. All the respondents' answers were scored, totaled and ranking was given based on the total score earned on each statement. The results revealed that major problem faced was that solar water heater not working properly in rainy and winter season, coils need to be repaired (2nd rank) and water leakage problem (3rd rank). The least problem faced was they were not guided properly about the sizes of SWH by the respondents with SWH. Similar results were found by Praveena and Kumaresh (2011) who said that majority of the respondents stated that during rainy season, they couldn't get hot water followed by scale deposition problem, there is no after sales service and coil problem etc. Each statement's mean and S.D score also was calculated by dividing the total score with 100 respondents. Same method was followed for each statement. For all 15 statements mean and S.D was calculated. Based on the mean score also the most important problems faced by the respondents with SWH were solar water heater not working properly in rainy and winter season (mean score 2.48) and coils need to be repaired (mean score 1.70). The least problem that was faced by the respondents with SWH was they were not guided properly about the sizes of SWH (mean score 0.98).

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