

Factors Affecting the Knowledge and Adoption Behaviour of Urban Women Regarding Solar Cooker

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ABSTRACT

Knowledge and adoption are critical and important component of human actions. The knowledge and adoption of any technology is largely governed by the number of personality of the beneficiaries. Cooking is the daily activity performed in every house hold requiring various types of fuels. Solar cookers are safe around children and provide a great way to learn about and use of solar energy. Hence, to study factors affecting to knowledge and adoption behaviour of urban women regarding solar cooker, data were collected from randomly selected 140 women having their own solar cooker from eight different areas of Anand city of Gujarat state. The study revealed that more than half 57.14 per cent of the women had high to very high level of knowledge regarding solar cooker. Knowledge and adoption behaviour of women regarding solar cooker was found positive and significant relationship with their education, income, knowledge of more number of languages and economic motivation, while age of the urban women had negative and significant relationship with their knowledge and adoption behaviour regarding solar cooker.

Key words: Knowledge, Adoption, Solar cooker and Women;

The population of the world continues to grow, so does the average standard of living, increasing demand for food, water and energy and placing increasing pressure on the environment. The population of the world doubled from 3.2 billion in 1962 to 6.4 billion in 2005 and is forecasted to grow to 9.2 billion in 2050. Supplies of oil, gas, coal and uranium are forecast to peak as reserves are depleting. At the same time, fear of climate change is putting pressure on the energy sector to move away from carbon burning to nuclear, solar and other environmentally friendly options (Chakranarayan 2013). India is endowed with abundant of solar radiation. Solar thermal technologies have already found ready acceptance for a variety of decentralized applications in domestic, industrial and commercial sectors of the country. Among solar photovoltaic technologies, there are some devices/ systems such as solar lanterns, solar home systems, solar street lights, solar pumps, solar power packs, roof top SPV systems and solar cooker etc which could be useful both in rural and urban areas

for the purpose of reducing burden on conventional fuels (www.mnre.gov.in). According to the world Health Organization comparative risk study, exposure to smoke from household use of solid fuels is responsible for the premature deaths of approximate 4,00,000 women and in India every year, 28 per cent of all deaths caused by indoor air pollution (IAP) in developing countries (Smith, 2000). The increasing demand for energy, unchecked deforestation and drudgery in fuel wood collection and exponential population growth have aggravated the deficiency of cooking energy (Desai and Palled 2012). With the depletion of the fossil fuels resources there is growing need for non-conventional sources of energy like solar energy, wind energy etc, out of these solar energy forms the promising future energy source. Solar energy has the greatest potential of all available energy sources. Solar energy will be one of the important alternate energy sources if a portion of it is effectively harnessed, especially for the day to day life (Suple and Thembre 2013).

Solar heat is utilized in residential sector for heating water for bathing, cleaning and washing throughout the world. Its utilization is very much less in commercial, industrial and agricultural sectors. Solar thermal applications are economical and efficient for our daily life. India has a high solar resource; therefore, need to develop solar thermal applications in residential, commercial, industrial and agricultural sectors. Cooking food by solar cooker is clean and free from smoke, thus it can provide quality way of life to the millions of people using chulhas and kerosene for cooking. Need innovation, technological development, implementation, awareness and encouragement to increase use of solar heat in all walks of life, under the guidelines Jawaharlal Nehru National Solar Mission (*Arora and Arora 2013*).

Food is easily and conveniently cooked with solar energy as the fuel in devices called solar cookers. A solar oven or solar cooker is a device which uses sunlight as its energy source. Moderate cooking temperatures in simple solar cookers help preserve nutrients. Smoky cooking fires irritate lungs and eyes and can cause diseases. Solar cookers are clean, convenient, non-polluting and easy on the environment. Solar cookers are, when used in large numbers, may help curb global warming. Kitchens remain cool while solar cooker cooks food outdoors. A solar cooker should provide necessary heat and its supply rate equivalent to that commonly used heating methods. In most parts of India, solar energy is available almost throughout the year and can be used as alternate energy to meet out energy needs. Solar energy is the cheapest, in-exhaustible and can be used for various domestic and agricultural requirements including cooking, drying, dehydration, heating, cooling and solar power generation (*Kalbande et al.2007*).

In spite of extensive efforts on the part of government to promote solar cookers among women the response is not that much encouraging. It is common notion that human beings tend to expose themselves to adoptions that suits their needs, knowledge, positive belief and their personality. Hence the study was conducted to know factors affecting to knowledge and adoption behaviour of urban women regarding solar cooker with following objectives-

- i. To assess extent of knowledge and adoption of women regarding solar cooker
- ii. To find out relationship between profile of the

women and their knowledge and adoption behaviour about solar cooker.

METHODOLOGY

The study was conducted at Anand city of middle Gujarat on urban women who were having their own solar cooker during 2013. Total 140 urban women were selected randomly from eight different areas of Anand city. Data were collected by personal interview schedule. Ex-post-facto research design was used. Structured schedule with sixteen items reflected to knowledge of solar cooker was developed with the help of teacher made test based on scale developed by Jha and Singh (1970) with appropriate modification and the response was collected in correct and incorrect answers at the time of interview to measure knowledge of urban women regarding solar cooker. The scores of 1 and 0 were assigned for correct and incorrect responses, respectively. Adoption behaviour of solar cooker was measured with the help of model developed by *Patel and Chauhan (2010)* with slight modification. Response was obtained in four indicators viz; experience, frequency, purpose and way of solar cooker use. To find out total score, scores of all the indicators received by the respondents were summed up. Statistical tools used to draw the result was frequency, mean, percentage, standard deviation and coefficient of correlation.

RESULTS AND DISCUSSION

Knowledge is pre-requisite to the adoption of an innovation. In the present study, knowledge refers to know-how about cooking practices in solar cooker possessed by the urban women. Based on their correct answers of knowledge regarding solar cooker respondents were grouped in five categories.

Table 1. Extent of knowledge of urban women regarding solar cooker (N=140)

Extent of knowledge	No.	%
Very Low	00	0.00
Low	09	06.43
Medium	51	36.43
High	42	30.00
Very High	38	27.14
Total	140	100.00

The results in Table 1 indicated that more than one third (36.43 per cent) of the solar cooker adopted

women had medium level of knowledge regarding various uses of solar cooker, followed by 30.00 per cent, 27.14 per cent and 6.43 per cent of them had high, very high and low level of knowledge of regarding solar cooker. *Yadav et al. (2009)* revealed that more than half (56.00 percent) of the women had neutral attitude towards solar cooker. She further studied that relative advantage and labour saving were perceived to be the best attributes of solar cooker by the respondents. *Ternier (2010)* revealed that active experiences during cooking classes increased knowledge and preference of vegetables and fruits in both young and older children, increased behavioural intentions to consume healthy foods in younger children, and increased cooking self-efficacy in older children. He further reported that the importance of home economics or culinary classes within the educational system as a mean of providing the nutritional knowledge and cooking competence needed for everyday life.

Adoption behaviour of solar cooker adopter urban women regarding solar cooker: The introduction of new fuel/devices is a dynamic process with strong interactions with users and the larger socioeconomic and ecological context. The adoption process is characterized by: the initial acceptance level, time to reach sustained use, level of sustained use and magnitude of seasonal fluctuations (*Marcado et al., 2011*). To measure the level of Adoption behavior of urban women regarding solar cooker, total 4 indicators were used; data was collected and analyzed as under.

Experience of solar cooker use of the respondents was measured in total number of years of their association with solar cooker and its applications. Based on frequency and percentage the respondents were categorized arbitrary into four groups. The data in Table 2 indicate that less than one third (31.43 per cent) of solar cooker adopter urban had above three years of experience of solar cooker followed by 27.15 per cent with up to three years, 22.85 per cent with up to two years and 18.57 per cent with up to one year of experience of solar cooker. As stated earlier the study was conducted on 140 solar cooker adopter urban women who were having their own solar cooker.

The result in Table 3 indicated that less than half (44.30 per cent) of the solar cooker adopter urban women had used solar cooker every day, out of which 37.14 per cent, and 07.14 per cent of them used it for

above 3 hours and 2 to 3 hours, respectively. It can also be seen that 27.14 per cent of the solar cooker adopter urban women had used solar cooker twice in a week, 17.14 per cent once in a week; where as 11.42 per cent of them used once in a month.

Table 2 Solar cooker adopter urban women according to their experience (N=140)

Detail	No.	%
Up to one year	26	18.57
Up to two year	38	22.85
Up to three year	32	27.15
Above three year	44	31.43
Total	140	100.00

Table 3. Frequency of solar cooker used in summer (Delete-except rainy and cloudy days) (N=140)

Solar Cooker use	2 to 3 hrs		Above 3 hrs		Total	
	No.	%	No.	%	No.	%
Everyday	10	07.14	52	37.14	62	44.30
Twice in a week	02	01.42	36	25.72	38	27.14
Once in a week	-	-	14	10.00	24	17.14
Once in a month	04	02.85	12	12.86	16	11.42
Total					140	100.

Table 4. Purpose of solar cooker use:

Purpose	Mean	Rank
To save the fuel	1.53	I
Physical presence is not needed while cooking	1.53	I
To prepare food more tasty	0.99	VI
To keep the food hot	1.10	V
To avoid smoke problem	1.10	V
To prepare hygienically food	0.87	VII
To follow the cooking tradition	0.87	VII
To avoid the cleaning of the kitchen utensils at the time of cooking	1.20	III
To do another household work side by side	1.39	II
To save the natural resources	0.59	IX
To manage kitchen budget	1.39	II
To avoid burning and over flowing of food	0.87	IV

The data presented in Table 4 revealed that the best five uses of solar cooker made by solar cooker adopter urban women were to save the fuel, to save the physical presence, , to manage kitchen budget, to avoid burning and over flowing of food and to avoid the cleaning of the kitchen utensils at the time of cooking.

Of the households that purchased solar cookers, 85 per cent reported using solar Cookits very often or often, while 11 per cent used them rarely and 2 per cent

never. A majority of those households, 53 per cent, used solar CookKits for pasteurizing water, while cakes, vegetables, and meats were commonly prepared with solar cookers in 79 per cent, 42 per cent and 34 per cent of households, respectively. Solar cookers were rarely used to cook Ugali, a local staple made from corn meal (Anonymous 2009).

Table 5 Way of using solar cooker:

Way of using solar cooker	No.	%
Own	122	84.15
With the help of other	18	15.85
Total	140	100.00

The data presented in Table 5 indicate that majority (84.15 per cent) of the solar cooker adopter urban women used solar cooker by their own while, 15.85 per cent of them used it with the help of others.

Table 6. Relationship between profile of the solar cooker adopter urban women and their extent of knowledge and adoption behavior of solar cooker (N=140)

Variables	Knowledge (r)	Adoption (r)
Age	-0.249*	-0.235*
Education	0.629**	0.268**
Occupation	0.026 ^{NS}	0.068 ^{NS}
Income	0.240*	0.242*
Social Participation	0.178 ^{NS}	0.223*
Type of Family	0.139 ^{NS}	0.079 ^{NS}
Size of family	0.198 ^{NS}	-0.295**
No. of languages known	0.492**	0.335**
Economic motivation	0.364**	0.255*
Innovation proneness	0.194 ^{NS}	0.193 ^{NS}

NS = Non-significant, * = Significant at 0.05 level,

** = Significant at 0.01 level

The data in table-6 concluded that those women who were younger in age, well educated, having added family income, better knowledge of languages, and economically motivated were more enthusiastic and paying attention to know ecofriendly usages of solar cooker and at the same time had increasing tendency to adopt this knowledge in practice. Women with irrespective type of occupation, family and inclination to add novelties in cooking had almost similar level of knowledge and adoption behaviour regarding solar cooker. Women having contacts with other social members of society and small size of family were not paying attention to know eco-friendly usages of solar cooker but were more concerned in adopting solar cooking practices.

CONCLUSION

The result concluded that more than half 57.14 per cent of the women had high to very high level of knowledge regarding solar cooker. The overall adoption behaviour indicates that less than half solar cooker adopter women had elevated level of experience, and majority of them had own awareness of using solar cooker. Definable purposes of using solar cooker were to save the fuel, to save the physical presence and to manage kitchen budget

Knowledge and adoption behaviour of women regarding solar cooker was found positive and significant relationship with their education, income, knowledge of more number of languages and economic motivation, while age of the urban women had negative and significant relationship with their knowledge and adoption behaviour regarding solar cooker.

REFERENCES

- Anonymous (2009). Solar cooker review. 15 (3) (online) Available www.solarcooking.org/newsletters
- Arora J. and Arora P.R.(2013). Use solar heat for prosperity, healthy and pollution. *Int. J. of Scientific and Res. Pub.* (online), 3(10). Available www.ijsrp.org
- Chakranarayan V. (2013). Study of adoption and diffusion of new and renewable energy technology products for domestic use. A Research Proposal (Ph.D.) in Management, Lovely Professional University, Punjab, (online). Available shodh.inflibnet.ac.in:8080/jspui/bitstream/123456789
- Desai S.R. and Palled V. (2012). Performance evaluation of improved solar cookers. *Karnataka J. Agric. Sci.*, 25 (2): (287-288)
- Jha, P.N. and Singh, K.N. (1970). A test to measures farmer's Knowledge about high yielding variety programme, *Interdiscipline*, 7(1): 65-67.
- Kalbande S. R., Mathur A. N., Kothari S. and Pawar S. N. (2007). Design, Development and Testing of Paraboloidal Solar Cooker. *Karnataka J. Agric. Sci.*, 20(3):571-574

- Marcado I.R., Smith K.R., Zamora H. and Masera O. (2011). Adoption and sustained use of improved cook stoves. *Energy policy*, 39 (12) (online) Elsevier
- Patel Meena and Chauhan N.B. (2010). Model to measure Internet Exposure, *Agric.Sci. Digest*, 30 (2):110-114
- Smith, K.R. (2000) Inaugural article on National burden of diseases in India from indoor air pollution. *Proc. Natl. Acad. Sci., USA*, 97: 13286-13293
- Suple Y.R. and Thombre S.B.(2013)Performance Evaluation of Parabolic Solar Disc for Indoor Cooking, *IOSR Journal of Mechanical and Civil Engineering*, 4 :42 – 47
- Ternier S (2010). Understanding and measuring cooking skills and knowledge as factors influencing convenience food purchases and consumption, University of Guelph, Vol 3, No 2, (online) [www.criticalimprov.com /index.php/surg/article/view/1122/1668](http://www.criticalimprov.com/index.php/surg/article/view/1122/1668)
- Yadav B., Yadav P. and Yadav L. (2009). Perception and attitude of rural women towards solar cooker. *Indian Res. J. of Ext. Edu.*, 9(1):22-24.
- www.mnre.gov.in

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