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Jyoti Rani
Department of EECM,
CCS Haryana Agricultural
University, Hisar, Haryana,
India

Preeti
Department of EECM,
CCS Haryana Agricultural
University, Hisar, Haryana,
India

Beena Yadav
Department of EECM,
CCS Haryana Agricultural
University, Hisar, Haryana,
India

Adoption status of improved mud stove by rural women

Jyoti Rani, Preeti and Beena Yadav

Abstract

The improved mud stove is a cooking stove that can save the lives of hundred thousands of women and young girls in rural areas as well as urban areas who are burning wood as cooking fuel. Demand for clean energy is directly proportional to the economic development (UNDP, 2001). In increasing awareness of the harmful effect of fossil fuels on environment and consequently quality of life of people, both Government and households are looking ensuring availability of reliable clean energy. Few studies conducted in India concerning the cook chulhas situation have highlighted the detrimental impact it has had on households, particularly women who are exposed to high level of smoke. The present study was conducted on 200 women from four villages adopted during four years under IAHS programme of College of Home Science. Dissemination of improved mud stove were organized under through Internship/Industrial Attachment of Home Science (IAHS) programme of College of Home Sciences The adoption status of improved mud stove was measured in terms of adoption ie. Knowledge, persuasion, decision, implementation, confirmation. It was found that majority of the respondents 89.0% had acquired the knowledge about the improved mud stove and its uses whereas the 80.0% respondents were persuaded regarding stove. More than half of the 67.0% respondent were mentally prepared for adoption of stove. Only more half of the 58.0% respondent adopted the stove for the first time. Only 32.0% respondents had been continuously adopted this improved mud stove. Major reason for non-adoption of this technology is unavailability of material, lack of space and higher initial cost.

Keywords: adoption stages, rural women, improved mud stove

Introduction

Nearly half the world's population burns solid fuel for cooking, heating, and lighting. The incomplete combustion of these fuels is associated with detrimental health and environmental effects. The design and distribution of improved cook stoves that increase combustion efficiency and reduce indoor air pollution are a global priority. However, promoting exclusive and sustainable use of the improved stoves has proved challenging. About 2.7 billion people cook food over stone, clay stoves, brick and fuelled by wood, leaves, dung, etc. (International Energy Agency, 2015) [2]. Wood is the most common fuel used in rural homes, because women get them from forest free of cost. Improved mud stove is an improved version of traditional chulha and has many advantages over it. Its proper use and care relieves an individual from different problems like smoke free kitchen which is safe for many health problems. Traditional cooking air pollution caused by burning unprocessed biomass is a serious and urgent health concern. The traditional chulha cooking stove is one of the major causes of pollution in both in urban and as well as rural areas. The toxins and carcinogens released from these stoves cause nearly 500,000 deaths annually in India alone (Anonymous 2007; World Bank 2002) [1, 2].

In spite of extensive efforts on the part of government to promote improved mud stove 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 the adoption status and reasons of non-adoption women regarding improved mud stove with following objectives

1. To study Adoption stages of improved mud stove among rural women
2. To find the reasons behind the non-adoption of improved mud stove
3. To assess the consequences of improved mud stove by rural women

Material and Methods

➤ **Locale of the study:** As per the objectives of study, adoption status of improved mud

Corresponding Author
Jyoti Rani
Department of EECM,
CCS Haryana Agricultural
University, Hisar, Haryana,
India

stove by rural women. Hisar district was purposively selected as the dissemination process improved mud stove is being done through Internship/Industrial Attachment of Home Science (IAHS) programme of I C College of Home Sciences, CCSHAU, Hisar. Four villages were selected purposively.

- **Research sample:** Total 200 rural women/ adolescent girls enrolled under IAHS programme who were selected proportionately for the study.
- **Instruments:** Self-developed schedule was used which contained questions regarding independent variable viz: personal, social and economic variables and dependent variable adoption status, factor for non- adoption and consequences of the improved mud stove technology. These are discuss below:
 - **Adoption in terms of IDP stages:** Rogers (2003) articulated five stages through which an individual passes during the adoption of an innovation; IDP in present study was operationalized as the process through which the selected respondents passed from first knowledge of homestead technology, to forming an attitude toward the technology, to a decision to adopt or reject, to implementation of the technology, and to confirmation of their decision. Specific questions were designed to assess whether the respondent reached a particular stage of adoption or not.
 - **Factors contributing to non-adoption of improved mud stove:** Factors that led to discontinuation of IDP during different stages i.e. knowledge, persuasion, decision, implementation and confirmation were identified. Though various factors were cited by the respondents leading to discontinuation of IDP, however most of the factors were interconnected in nature i.e. one factor led to another or the particular factor was the outcome of any other factor and some factors were mentioned by very small fraction of the respondents. Hence, only the factors leading to non-adoption of

technology that were most commonly expressed and independent in nature was/ were included in the final results.

- **Consequences of Improved mud stove technology** Rogers defined (1962) the consequences of innovation adoption as “a change that occur to an individual or to a social system as a result of the adoption or rejection of an innovation and categorized the consequences on three dimensions i.e. Desirable vs Undesirable Consequences; Direct vs Indirect Consequences;
 - **Collection of data:** The tool used for collecting data from the respondents in the present study was a structured interview schedule developed in accordance with the objective and respondents of the study and methodological procedure described above.
 - **Analysis of data:** Qualitative data obtained from the measures were quantified and analyzed using the statistical package for the social science (SPSS for windows). To calculate statistical inferences frequency, percentage, mean score, standard deviation and Z test were computed.

Statistical techniques like frequency, percentages and correlation were employed to analyze the data.

Results and Discussion

Distribution of respondents according to IDP stages of improved mud stove : Distribution of respondents according to IDP stages and with respect to adoption stages of improved mud stove as included in table 1, it was indicated that huge majority of the respondents tried to adopt the stove initially. 89.0% respondents acquired knowledge of improve mud stove. Though the percentage of the respondents who got persuaded to adopt the stove showed the decreasing trend, 80.0% of them were persuaded to adopt the improved mud stove.

Table 1: Distribution of respondents according to IDP stages of Improved Mud Stove N=200

Stages of Innovation decision process	Frequency	Percentage
Knowledge	178	89.0
Persuasion	160	80.0
Decision	134	67.0
Implementation	116	58.0
Confirmation	64	32.0

Mental readiness of the adopter is the next stage of adoption after persuasion. With respect to this stage of adoption it was revealed that the respondents who got mentally ready to adopt improved mud stove i.e. those who fall under decision stage of IDP were regarding with the maximum number of respondent i.e. 67.0% crossing the decision stage for adoption of the stove. With respect to fourth stage of IDP related to

improved mud stove (58.0%) and only (32.0%) were finally adopted the improve mud stove. Twenty six respondents were rejected the mud stove due to they were comfortable with the traditional stove over the improved mud stove. There is need of imparting more knowledge to women about improved mud stove and its usefulness like its non-hazardous effect on health of all family members.

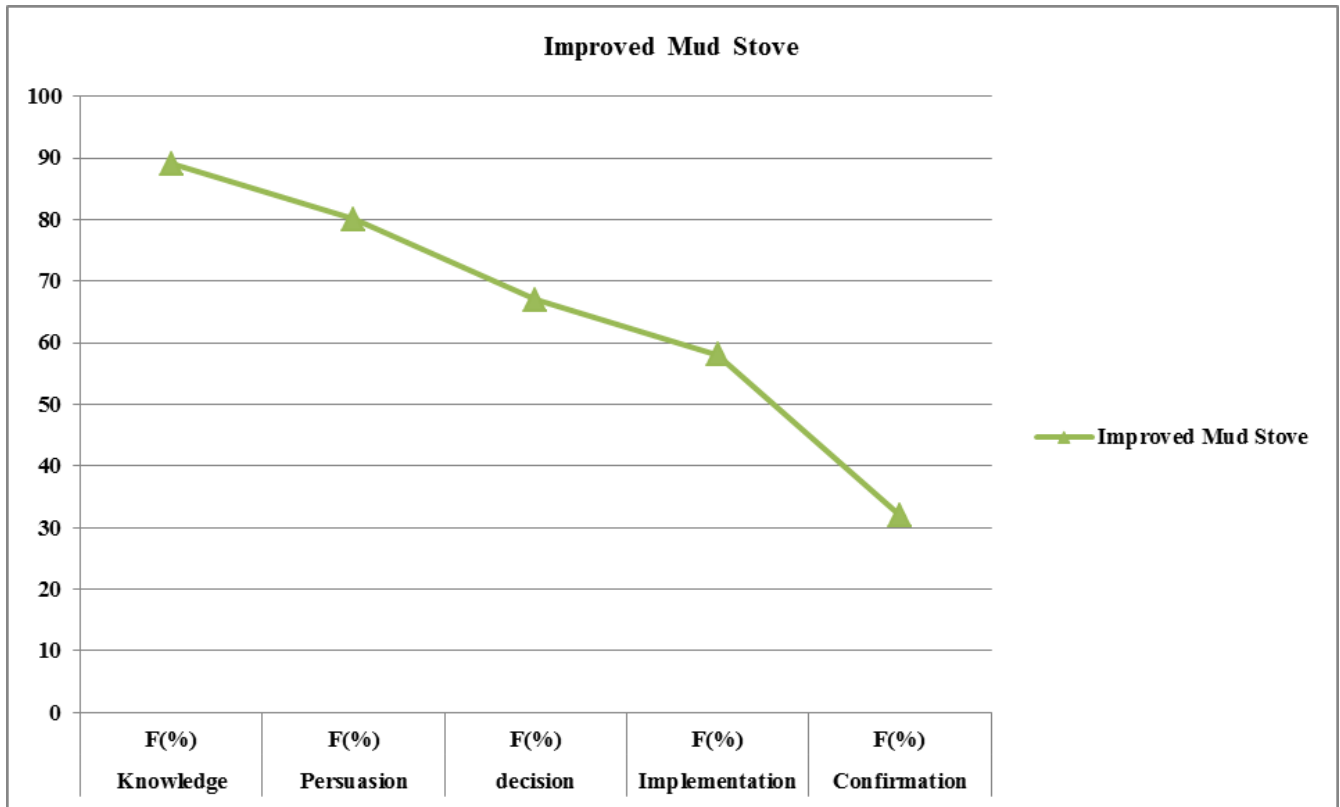


Fig 1: Distribution of respondents according to IDP stages of Improved Mud Stove related technologies

Factors for non-adoption of improved mud stove

The respondents did not acquire firsthand knowledge of improved mud stove as they were satisfied with the traditional mud stove (11.0%) in terms of shape and performance, 15.0% of them were not persuaded to adopt improved mud stove after having acquired firsthand knowledge as its initial cost of adoption was perceived the traditional mud stove (Table 2). There were two factors i.e. lack of space to install additional mud stove (7.0%) and unavailability of materials like perforated plate and wire gauze required (fig 3) for

construction of improved mud stove (6.0%) for not taking the decision to install improved mud stove by the respondents even after being convinced of its advantages. Complex procedure of construction of improved mud stove was the major reason compelling 9.0 percent respondents not to implement the decision of installing the mud stove. Because of unavailability of maintenance material (fig 2) ,14.0 percent respondents discontinued the confirmation stage of improved mud stove.



Fig 2: Unavailability of materials mud stove



Fig 3: Percent respondents discontinued

Table 2: Factors for non-adoption of improved mud stove

Factors Frequency (%)	Stages of adoption				
	Knowledge F (%)	Persuasion F (%)	Decision F (%)	Implementation F (%)	Confirmation F (%)
Satisfied with the existing mud stove	22 (11.0)	-	-	-	-
Higher initial cost	-	30 (15.0)	-	-	-
Lack of space to install additional mud stove	-	-	14 (7.0)	-	-
Unavailability of perforated plate and wire gauge	-	-	12 (6.0)	-	-
Complex procedure of construction	-	-	-	18 (9.0)	-
Unavailability of maintenance material	-	-	-	-	28 (14.0)

Consequences of adoption of Improved Mud Stove technologies: Whether a technology impacts positively or negatively, depends on the viewpoint of the stakeholders regarding its consequences. Analyzing the consequences of homestead technology adoption can potentially help in better understanding of their influence on the rural women. Due to adoption of improved mud stove, saving of fuel (28.1%), equal distribution of flame (25.0%) and smoke free kitchen (25.0%) were perceived as the direct - desirable consequences.

Table 3: Consequences of adoption of Improved Mud Stove technologies

Types of consequences	Improved Mud Stove (n=32)	F (%)
Direct -Desirable	Saving of fuel	18 (28.1)
	Equal distribution of flame	16 (25.0)
	Smoke free cooking	16 (25.0)
Direct -Undesirable--		
Indirect- Desirable	Less wavering of flame	37 (58.0)
	Feasibility of using any size cooking pot	17 (26.5)
	Cleaner kitchen	16 (25.0)
	Better quality of <i>chapattis</i>	14 (21.8)
Indirect - Undesirable	Non availability of leftover coal for <i>hukka</i>	20 (31.2)

Direct - desirable consequence of improved cot bag adoption was its suitability for grass and vegetable picking (6.5%). Indirect - desirable consequences of improved mud stove adoption as reported by the respondents were four and

maximum among the FRM related technologies. These were less wavering of flame (58.0%) that led to protection of hand from heat of flame, feasibility of using any size cooking pot (26.5%), cleaner kitchen (25.0%) and better quality *chapattis* (21.8%).

Non-availability of coal for *hukka* (31.2%) due to complete burning of fuel was the indirect-undesirable consequences of adoption of improved mud stove.

Conclusion

The percentages of the respondents falling under the initial knowledge stage of innovation decision process were more than 80% of improved mud stove. Drastic reduction in the number of respondents who reached from knowledge stage to confirmation stage was reported by the respondents. Maximum gap (26.0%) was observed in adopters between implementation to confirmation stage due to non-availability of maintenance material like perforated plate and iron gauge. Maximum desirable (direct and indirect) consequences i.e. Saving of fuel, equal distribution of flame, smoke free cooking, less wavering of flame, feasibility of using any size cooking pot, cleaner kitchen, better quality *chapattis* related to the improved mud stove were reported however, non-availability of leftover coal for *hukka* was the undesirable consequence. Panwar *et al.* 2006 [4] and Valentina (2007) [3] reported that smokeless *chullah* was perceived highly appropriate in terms of time and fuel saving, cost wise feasibility, healthy environment and keeps food hot for longer time, reduction in time spent on cooking and indoor air-pollution.

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