ADOPTION OF ENVIRONMENTAL AND HEALTH CARE PRACTICES AT HOUSEHOLD LEVEL

BY

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DISSERTATION

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DECLARATION OF CANDIDATE

I hereby declare that the dissertation
or part thereof has not been
submitted by me to any
other university or
institution for a
degree or diploma

Parbhani

PARBHANI **(ARCHANA BHALERAO)**

DATE: 30th June, **1998**

CERTIFICATE - I

Miss. Archana Rustumrao Bhalerao has satisfactorily prosecuted her course of research for a period of not less than two semester and that the dissertation entitle **"ADOPTION OF ENVIRONMENTAL AND HEALTH CARE PRACTICES AT HOUSEHOLD LEVEL"** submitted by her is the result of original research work and is of sufficiently high standard to warrant its presentation to the examinatin. I also certify that the dissertation or part thereof has not been previously submitted by her for a degree of any University.

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This is to certify that the dissertation entitled **"ADOPTION OF ENVIRONMENTAL AND HEALTH CARE PRACTICES AT HOUSEHOLD LEVEL"** submitted by **Miss. Archana Rustumrao Bhalerao** to the Marathwada Agricultural University, Parbhani in partial fulfilment of the requirements for the degree of **MASTER OF SCIENCE (Home Science)** in the subject of **HOME MANAGEMENT** has been approved by the student's advisory committee after oral examination in collaboration with the External Examiner.

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Introduction

Chapter 1

INTRODUCTION

The quality of our environment is determined by the intricate processes of Mankind's making a living and enjoying life. The world's population is multiplying fast. The rapid increase in population on one side and the cry for improving the standard of living on the other side, necessitate a proportionate increase in the production of goods required for the well-being of mankind.

These modern demands have resulted in the accelarted production of waste materials at unusually high rate. But their disposal has been more or less left to the nature to be taken care of. Today the natural speed of recycling has been found to be very inadequate to take care of the waste created so fast in an unnatural way.

Preservation of ecological balance is a crucial need and an important national goal. Efficient waste management can lead us to a long way in not only achieving this goal but also in improving the national economy. Importance to this aspects should be given by all concerned. Preservation of environment is the main responsibility of each and every citizen, communities, enterprises and institutions at every stage. Degradation of environment and depletion of resources are caused among

other factors by improper disposal of domestic waste. But there is a big hue and cry about industrial effluents and emissions and comparatively less concern about other sources of pollution.

Decentralised ON-SITE systems for waste recycling have great future potential for developing countries. These would be effective steps towards self-reliance through saving valuable resources, improvement of the environment through effective waste disposal resulting in better public health and consequently greater productivity.

The need for environmental consciousness in day to day life is becoming increasingly important these days. Environmental protection should start from home, every household has to be sensitive to the problems that emerge with his/her immediate surroundings. Most of the health hazzards are due to improper care towards environment. Some may be in ignorant in their respects, but ignorance is no excuse. Epidemics like the `Surat' type plague would become imminent in other cities, if immediate action is not taken in time. Therefore, it is the responsibility of each and every citizen to allocate a minimum portion of income towards environmental care. The cost incurred would be vary low when compared to the benefits thereof from clean environment through improved health.

Many version exists about the inadequacy of environmental awareness in general and women in particular and the way in which people manage environmental problems. Therefore, a study will be undertaken with the following objectives.

1. To study adoption and awareness by housewives regarding environmental and health care practices.
2. To associate personal and family characteristics with adoption and awareness of housewives' regarding environmental and health care practices
3. To analyse expenditure incurred on health and environmental care at household level.
4. To study the waste management practices followed at household level.

Review of Literature

Chapter II

REVIEW OF LITERATURE

The investigation is mainly dealt with important health determinants such as environmental care, waste management and hygienic practices followed at household level. As knowledge from more studies accumulates, our understanding of the interlinkages of socio-economic and environmental factors with health is depended. Hence the resume of literature for the purpose of this study has been reviewed and is reported in brief as below.

2.1 Composition and amount of the refuse from different areas

2.2 Waste recycling/disposal methods and environmental care practices adopted at household level.

2.3 Family expenditure on environmental and health care practices.

2.1 Composition and amount of the refuse from different areas

National Environmental Engineering Research Institute (Anonymous, 1975), found that the composition of town refuse in different cities (Madras, Calcutta and Poona) in India was garbage (45 to 67 %) followed by paper (4 to 8 %) glass (0.38 to 0.58 %), rags (1.63 to 3.84 %

and plastics (0.56 to 0.72 %). Locality wise characteristic of refuse indicated that as the income of the family increased the percentage of moisture and compostible material in refuse was found to be increased. Further, the refuse was analysed for its Calorific value which was ranged between 1500 to 1700 calories/kg.

Berk (1979) had reported that for every kilogram of edible plant product, 5 to 10 kg, of residues are produced as waste in majority of urban areas. The per capita waste output ranged from 0.3 to 0.5 kg per day. According to this estimate the solid waste production per person per year was one tonne.

Patel (1979) presented the major organic waste available per year (in crores) in villages in India such as wet cattle dung (117.0), Night soil (7.0), fermentable agricultural and vegetable wastes (117.0), fermentable woody agricultural waste (2.8) and water weed (1.5).

In a report given by free press journals (Anonymous, 1985), it has been stated that Mumbai and its municipal corporation are critically dependent on its vast army of garbage collectors. Their absence even for a day could reduce Mumbai to stinking hell-hole Choking in 3200 tonnes of solid waste that the city spews every day. A Network of 19,000 sweepers and garbage collectors caters to Mumbai's 8.5 million population spread over an area of 437 sq/kms. On an average every person in the city contributes

425 grams of garbage every day. An increase in population by 0.3 million every year increases the solid waste generation by 100 tonnes.

In 1981, Lakshmi Santa studied the possibility of reuse of waste and quantity of the different types of waste available in selected urban households, farm households, residential institution and an educational institution of Coimbutore city. The household waste had highest percentage of the paper and packings (50 %) and lowest percentage of plastics waste (11 %). The farm households had agricultural wastes available depended on the farm size and crop grown. The residential institution of 600 women produced on average of 3.5 kg of each garbage and plate waste per day. The average quantity of paper waste per day from the educational institution with 1500 members was 5.5 kg.

Ventkateswaran *et al.* (1994) reported that for the country as a whole per capita waste generation varies between 0.1 kg and 0.6 kg per day with an average of 0.33 kg. According to this study Bangalore was estimated to generate about 0.5 kg per capita. Per day or 2000 tonnes of waste per day. Although for Delhi and Mumbai precise data for waste generated are not available. As a rough estimate based on a daily per capita generation norm of 0.5 kg, it worked out to about 4800 tonnes for Delhi and 6285 tonnes for Mumabi. In Delhi, the daily waste generated has been increasing by about 200 tonnes every year.

Further they stated that compared with other developing countries in the south-east Asian region the per capita waste generation in India was on the higher side for the larger cities, but well below the others for the small cities. It waste generated in India reflected a much higher proportion of compostable matter and fine earth where as the former has a higher paper content.

Aggarwal (1997) analysed more than 500 sample of wastes collected from different parts of India and reported that the plastic, paper and metallic contents are taken away by the ragpickers and are used by the recycling industries to make new products. Most of the waste left for disposal was organic matter and the combustible matter was low in Indian garbage.

2.2 Waste recycling/disposal methods and environmental care practices adopted at household level

Defence and improvement of the human environment between natural and man made had become an imperative goal for peace and for worldwide economic and social development. The achievement of this goal is the main responsibility of each and every citizen.

The waste generated by household and industrial activity can be turned to useful products through judicious handling and technological processing. Apart from saving the environment from the onslaught of these toxic

byproducts, we also save on the valuable material resources.

Regarding role of agriculture in the management of urban waste. Harry *et al.* (1972) suggested gainfully utilize of all waste as a conservation measure giving particular attention to utilizing bio-degradable solid wastes in the soil. They pointed out that no one method or technique of waste utilization is the answer to waste management for all wastes in every location. As a conservation measure the nutrients in urban solid waste should be returned to agriculture. This can be accomplished by means of a recycling method referred to as the land utilization of waste.

Researches conducted at shri Avinashilingun Home Science College were reported by Lakshmi Santa (1981) which indicated that Biogas compares well with LPG in keeping the kitchen smokfree and neat. When compared with kerosene, biogas took less time in cooking. For cooking a selected menu for the day, biogas took 164 minutes, kerosene 217 minutes and LPG 139 minutes. Through these studies biogas was found least costly effecting a saving of 37.1 per cent in fuel cost over LPG and 59.4 per cent over kerosene.

Department of science and technology (Anonymous, 1981) had reported that 575 million tonnes of wet dung would be available per annum at a collection rate of 66 per cent. This dung can produce about 22.4 billion cubicmeters

of gas in biogas plants and can potentially replace about 14 million kilolitres of kerosene per year. The potentially available organic manure is around 206 million tonnes which can replace 104 million tonnes of nitrogen, 13 million tonnes of phosphate and 0.9 millions tonnes of potash.

A community biogas project had shown a profit and are excellent source of waste recycling. A report published in Indian express (Anonymous, 1983) projected the following information regarding profitability of the biogas plant. The community biogas project at Masudpur, near Delhi, inaugurated in August 1982, has a cow-dung plant a night soil plant and three small units in which rubbish and agricultural waste is used. Piped gas is supplied to more than 50 families in the village whose inhabitants use the 20 lavatories built as a part of the project. After a years operation, the Department of Non-conventional Energy Sources (DNES) which manages the experimental plant finds that there was a surplus of Rs. 11,000 after meeting expenditure of Rs. 88,000. The operational profit next year is expected to be about Rs. 80,000. There was extremely good response to the dried slurry which was solid in 5 kg packs at Rs, 5 a pack through the khadi and village industries commission. Gas was solid at a flat rate of Rs. 25 per month per burner cow dung is purchased from a dairy and costs the project Rs. 36,000 a year while the costs of water deliverd by tankers comes to Rs. 12000 per year.

According to a world watch Institute study (Anonymous, 1984), almost 75 per cent of the world's paper demand can be met by recycling half of that used. This would free eight million hectares of forest land from paper production. Only 25 per cent of the world's paper is now recycled though no technical or economic reasons prevent the doubling of this share by the end of the century. The best progress in recycling has been made by Japan, the Netherlands, Mexico, South Korea and Portugal. South Korea and Mexico now produce half of their paper from waste paper. In south Korea imported waste paper provides 40 per cent of the fibre used in paper production.

A large demonstration plant of IIT Delhi's Biochemical Engineering Research Centre (Anonymous, 1984) has been producing 45 litres of biogas from each litre of distillery waste fed in. This indicates that million of litres of noxious distillery waste presently thrown into rivers can become a source of biogas fuel.

Trivedi (1984) stated that smokeless chulhas (stoves) developed by Indian scientists are popular every where in the country except in the north-east. The reasons seems to be the liking of the northeastern tribals for `Smoked' meat. As the smokeless chulas are not capable of smoking meat while cooking, the tribals do not want them. However a scientist in the Meghalaya state council of science and technology, has succeeded in modifying the

chulha so that meat could still be smoked, while the kitchen remained free of smoke.

Jain (1994) reported that the Indiscriminate dumping of waste around waste bins on the streets and in water bodies give rise to air and water pollution unlifted waste from storage points causes health risks.

Air pollution can result from spontaneous combustion of waste at disposal sites. Based on an estimate of two cubic meters of methane gas generation from one tonne of garbage calculates the total methane released into the air every day in Delhi at 7000 cubic meters.

Workers handling waste come in constant direct contact with waste and remain exposed to the impact of wastes. Studies have shown that such workers suffer from skin diseases due to contact with waste from respiratory and opthalmic diseases due to inhalation or contact with infected dust from ulcers and infected wounds. Studies carried out by the National Environmental Engineering Research Institute on waste workers found them to suffer from skin and eye infections, respiratory diseases, jaundice etc.

Mukhopadhyay *et al.* (1993) conducted the study in urban slum of Calcutta and urban health centre chetla and a field practice area of All India Institute of Hygienic and public Health Calcutta which was responsible for health services to this slum community. For this study

environmental sanitation services and health care services were considered the most important determinants of health and impact of these determinants were studied in isolution and combination.

The study was based on [illegible] experimental design though it was naturally available. Each of the 4 groups consisted of 80 families and was studied in depth and details in relation to their health status in the form of morbidity like incidence and prevention of diseases and utilisation of preventive and promotive service.

The cost effective exercise revealed that both health care services and environmental services were cost effective but when the effects were compared, it showed that environmental services have twice the favourable impact on health than that of health service.

Ravichardran *et al.* (1997) conducted a case study in Tamilnadu regarding the household waste disposal. In study area, composition of waste showed that it largely consists of kitchen waste and other items like waste paper, glass pieces metal or plastic which can be recycled. It was observed that 60 per cent of the respondents maintain a dustbin inside the house. They then throw it into the common dustbin kept in their locality when it gets filled up. Thirty per cent of the respondents throw waste directly into the common dustbin. About 3.3 per cent of the households throw the waste into the drainage which creats

problems. Further they stated that dumped solid waste on the drainage beds rot in due course and animals feed on them spreading diseases in the surrounding areas, people who come into contact with this rotten solid waste also get infected. Only 6.7 per cent of the household dispose of the waste by digging the pit.

Sinha (1996) carried out a 10 months experiment with vermicomposting of biodegradable waste at household level in Delhi. She found that the average 250 gm daily feed into pot that is about 7 kg of waste material can be collected in one month for vermicomposting, with this, the actual production of vermicompost was around 2 kg/month.

2.3 Family expenditure on environmental and health care practices

Household expenditure on health and environmental care is an important indicator of consciousness on the part of the citizens and assumes great significance to nations to secure good health.

Purohit (1994) coated a study conducted by Foundation for Research in Community Health (FRCH) regarding household expenditure on health care by the families hailing from rural and urban areas of two district of Madhya Pradesh. According to this study, households in rural and urban areas spend as much as 8.95 per cent and 7.7 per cent respectively of their monthly expenditure on

health care. Further study analysed the pattern of morbidity among the respondents. The figures of overall prevalence rate for urban and rural areas were 310.78 and 308.24 per thousand respectively.

Ravichandran *et al.* (1997) conducted a case study in Tamilnadu to analyse family expenditure on environmental care. Regarding allocation of income for environmental care, it was observed that the low income group (Rs. 3000 per month) spent about 4.8 per cent of their total income while the high income group allocated around 5.8 per cent of the total. Interestingly, it was noted that the lower income group incurred more expenditure on garbage disposal, than the high income group correlation coefficient computed for variables such as income and expenditure and with regard to family size and expenditure showed no significant relationship between the two.

Sundar (1994) had reported the results of the surveys conducted by National council of Applied Economic Research Since 1986. The household survey of Health care utilization and expenditure was carried out in the summer months of may-June 1993 and covered almost all the states and union territories of India. The sample consisted of 18,693 household spread over the rural and urban area of the country. The study was based on household interview carried out with the help of a detailed questionnaire and the reference period was one month preceding the data of interview.

Based on the expenditure incurred by the households during the one month reference period for the treatment of illnesses the per capita annual household expenditure on curative health care has been estimated for the country as a whole, the per capita annual household expenditure on curative health care worked out to be Rs. 204. The urban dwellers were spending more on curative health care when compared to their rural counterparts.

The per capita household expenditure on curative health care worked out to be Rs. 184 and Rs. 258 for the rural and urban households respectively.

The results of the survey indicated that on an average the households spend nearly 5 per cent of their income on curative health care. The household expenditure on curative health care comes down with an increase in the income status of the households. The poor households with annual income of less than Rs. 18,000 spend more than 7 per cent of their income on the treatment of oilments while the rich households (with annual income exceeding Rs. 54,000) spend much less (about 3 per cent).

Kunhikannan & Aravindan (1996) examined, the rate of rise of family expenditure on health in the context of total household expenditures during the period 1991-94. In a semi-urban locality in kozhikode district of Kerala 52 households with 310 persons were prospectively surveyed for the month of Nov. 1991.

The data presented in this study is a comparison between the expenditure in 1991 and 1994 of the same families living in these 31 households.

All the items of medical expenditure showed marked increase. Though the cost of drugs as a proportion of total medical expenditure felt from 79.8 per cent to 64.8 per cent in absolute terms the expenditure on drugs than the increase in general consumer expenditure. In addition others items of medical expenditure like doctors fees, lab expenditure and other items showed much greater rate of increase.

Methodology

Chapter III

METHODOLOGY

The present study was planned to investigate the housewives' adoption and awareness level regarding health and environmental care in urban, rural and slum areas of Parbahani district. The materials and method used in conducting this study are presented under the following headings.

3.1 Locale of the study:

This investigation was conducted in the Parbhani district of Marathwada region, Maharashtra. The households were selected from six residential areas of Parbhani city namely Ekta coloney, Sneh Nagar, Jagruti coloney, Gauali Galli, Sarojani Naidu road and Subhash road. Two slum areas

for the study were selected from Parbhani city namely Ashok Nagar and Rahul Nagar. Two villages from Parbhani district such as Aral and Darephal were also selected for the survey, selection of the study area was done purposively considering good raport of investigator with these areas.

3.2 Sampling procedure:

A total of 250 households were surveyed during the study. The households were stratified according to the living area such as urban, rural and slum to represent sample from all walks of life. Random sampling technique was applied for selecting 100 households from urban and rural area respectively and 50 from slum area.

3.3 Developing interview schedule:

The structured interview schedule was formulated to elicit general and specific information related to the investigation. The interview schedule mainly focused on types of methods adopted for the disposal and recycling of household waste, amount of money recovered by making sale of household waste, pollution control measures use in the house, problems in waste management or recycling of waste, amount of money spend on environmental and health care activities and housewives' awareness regarding health and environmental care practices. Before finalization, the interview schedule was pretested for its clarity, validity

and adequacy on 5 homemakers a exclusive of final sample. Necessary modifications and additions were made to finalise the survey schedule (Appendix -I). Before implementing survey, schedule was approved by the advisory committee.

3.4 Collection of data:

The data were collected from the selected households by conducting a survey through personal interview of housewives' by the investigator. The approximate time required for conducting interview was one to two hours in each family.

3.5 Analysis and tabulation of data:

The collected information was then carefully edited, processed and tabulated. The tabulated data were subjected to statistical analysis.

3.6 Measurement techniques and variables used in the study

Methods used for the measurement of adoption and awareness level and classification of independent and dependent variables are given below.

3.6.1 Dependent variable:

3.6.1.1 Adoption level of the respondent regarding environmental and health care practices:

Adoption level of pollution control measures used in the house by the selected housewives was decided by calculating adoption index. List of the pollution control measures recommended by the scientists was made by refering all the types of literature available. The list comprised of 12 different measures such as smokless chulha, biogas plant, vermiculture, compost pit, drainage facility, use of solar cooker, night soil composting, algal production in stabilization ponds, agricultural application of waste water, aquatic weed production in ponds, soil fertilization with untreated stored night soil and latrines with septic tank. The adoption of pollution control measures by the respondents was measured on two point response category viz; yes and No. For each of the measures adopted by the respondent a score of one was given, whereas zero score was given for non adoption. Thus, the total score was computed for each respondent by summing up the scores recorded. The raw score thus obtained was converted into adoption index by using following formula.

$$\text{Adoption Index} = \frac{\text{Sum of adoption score obtained by a respondent}}{\text{Sum of the obtainable adoption score}} \times 100$$

3.6.1.2 Awareness level of the respondents regarding environmental and health care practices:

Awareness has been used in the investigation to indicate the condition of being conscious of environmental and health care practices. Awareness level of the respondents regarding environmental and health care practices was decided by calculating awareness index. A exhaustive list of the environmental and health care practices comprising 22 aspects was made by refering literature and consulting experts in this field. Awareness level of the environmental and health care practices of the respondents was elicited on three point response category viz. "Aware", "Partially aware", and "Unware" for each of the response categories consulted by a respondent a respective score of 2, 1 and 0 was assigned. The total score was computed for each respondent by summing up the scores recorded. The formula used to calculate awareness index was as follows.

$$\text{Knowledge index} = \frac{\text{Sum of knowledge score obtained by a respondent}}{\text{Sum of the obtainable knowledge score}} \times 100$$

The respondents were categorised into 3 categories depending upon the level of awareness regarding environmental and health care practices.

Level of awareness	Index
Low	0 - 33
Medium	34 - 67
High	68 - 100

3.6.1.3 Family expenditure on environmental and health care practices:

An amount of money spent per year by the selected families on care of environment and health as given by the respondents was recorded. Per capita health expenditure was calculated by dividing total amount of money spent by family on health care by total number of family members.

3.6.2.1 Independent variables:

3.6.2.2 Age:

Age was measured on the basis of the actual chronological age as reported by the respondents. The respondents were grouped into following four categories.

1. 15 - 25 Years
2. 26 - 35 Years
3. 36 - 45 Years
4. 45 - Years and above

3.6.2.3 Education:

For measurement and categorisation of this variable, the education level as given by the respondents was taken as the basis and they were classified into.

1. Illiterate
2. Primary school
3. Secondary school
4. High school
5. Graduate
6. Post-graduate and above

3.6.2.4 Family income:

The family income level as given by the respondents was taken as the basis and they were classified statistically by using standard deviation and mean into following groups.

1.	Mean - SD	Less than Rs. 1855
2.	Mean + SD	Rs. 1855 to Rs. 6024
3.	More than Mean + SD	Rs. 6025 to Rs. 10192 More than Rs. 10192 to Rs. 20,000

3.6.2.5 Size of the family:

On the basis of the number of members in the families surveyed the following groups were made.

	Number of family member		Category
1.	1 - 4	-	Small
2.	5 - 8	-	Medium
3.	9 - 12	-	High

3.7 Statistical analysis:

The data were tabulated after calculating simple arithmetic means, percentages and standard deviations. Data from different areas were subjected to statistical analysis.

The data were analysed to find out the correlation of co-efficient between selected personal, social and economical variables with awareness and adoption behaviour of the respondents.

Completely Randomized Design (CRD) was worked out to know the significant difference between the adoption and awareness level of the housewives belonging to different occupation group.

Z test was applied for comparing two proportions of the subjects falling into different categories.

Results and Discussion

Chapter IV

RESULTS AND DISCUSSION

The study to investigate "Adoption of environmental and health care practices at household level" was carried out by selecting 250 families at random from six residential areas and two slum ares of Parbhani city and two villages from Parbhani district of Marathwada region. The collected data were pooled analysed, tabulated and discussed under following heads.

4.1 Personal and family characteristics of the selected housewives .

4.2 Adoption of the environmental and health care practices by the selected families.

4.3 Awareness level of the selected housewives regarding environmental and health care practices.

4.4 Areawise comparison of the awareness and adoption status of the subjects regarding environmental and health care practices.

4.5 Factors correlated with awareness and adoption of the environmental and health care practices in the selected families.

4.6 Family expenditure on environmental and health care practices and factors associated with it.

4.7 Methods of disposal/recycling/utilization of household waste adopted by the selected families and money recovered by making sale of household waste.

4.8 Constraints in management of household waste.

4.1 Personal and family characteristics of the selected housewives

4.1.1 Age

Table 1 indicates that the majority i.e. 44 per cent of the respondents were young belonging to the age group i.e. of 26-35 years. Whereas 27.6 per cent housewives' were elder i.e. in the age group of 36-45 years and 18 per cent housewives were belonging to the age group of 15-25 years. An average age of the respondents was 31 years. The lowest value of the standard deviation calculated for the age of the housewives i.e. 7.54 denotes the homogeneity in the age of the selected sample

4.1.2 Education

In this study, maximum respondents 38.8 per cent were found to be illiterate, whereas 17.2 per cent were primary school educated and 16 and 14.4 per cent were high school and graduate level educated respectively. Least percentage of the housewives were educated upto secondary school (12.4 %) and post graduate (1.2 %). Majority of the

respondents selected from rural and slum areas were illiterate and all high school educated, graduate, post graduate housewives were from urban area.

4.1.3 Occupation

In the present study majority of the housewives 58.8 per cent were involved only in household work than in service (3.2 %) and business (2.8 %), twenty five per cent of the selected housewives from rural area were farmers and 9.6 per cent housewives from slum area were labourer. In this study majority of the housewives (2.4 %) involved in business were from slum area and all the employed housewives (3.2 %) were from urban area.

4.1.4 Type of family

Table 1 indicates that majority of the housewives (70 %) belonged to nuclear type family. However, joint family system was in existant in 23.2 per cent families. Only 6.8 per cent families were categorised under extended type. Majority of the joint and extended type families studied were from rural area.

4.1.5 Size of the family

Majority of the respondents (49.6 %) were belonging to small family i.e. having only four members in families whereas 42 per cent families had more than five

members and 8.4 per cent families had more than 8 members in the house. Majority of the large size families were observed in rural (5.2 %) and slum (3.2 %) areas.

4.1.6 Monthly income

Monthly income of the maximum respondents (38 %) in the present study was in the range of Rs. 1855 to 6024. Thirty per cent respondents belonged to the income range of Rs. 6025 to 10192 per cent/month and 16.8 per cent families were having income less than Rs. 1885 and 15.2 per cent families were in higher income group earning more than Rs. 10192 per month. Majority of the families surveyed from slum area were belonging to the lowest income group. Whereas, majority of the families from urban area were belonging to the income range of 6024 to 10192. Number of families belonging to the highest income group i.e. Rs. 10192 to 20000 were observed maximum in rural area (14 %) than urban (1.2 %).

On an average income of the selected families was Rs. 6024.4 per month. The higher value of the standard deviation (4168.5) showed the fluctuation in the family income of the selected respondents. The selected sample was highly heterogeneous with respect to the family income.

Table 1: Personal and family characteristics of the selected housewives

Particulars	Frequency and percentage				Mean	SD
	Urban (N=100)	Rural (N=100)	Slum (N=50)	Overall (N=250)		
A) Age (years)						
1. 15 - 25	21 (8.40)	13 (5.20)	12 (4.80)	46 (18.4)	31.99	7.540
2. 26 - 35	49 (19.6)	47 (18.8)	14 (5.60)	110 (44.0)		
3. 36 - 45	30 (12.0)	40 (16.0)	24 (9.60)	94 (27.6)		
B) Education						
1.Illiterate	--	68 (27.2)	29 (11.6)	97 (38.8)	5.052	4.912
2.Primary school	7 (2.80)	22 (8.80)	14 (5.60)	43 (17.2)		
3.Secondary school	14 (5.60)	10 (4.00)	7 (2.80)	31 (12.4)		
4.High school	40 (10.0)	--	--	40 (16.0)		
5.Graduate	36 (14.4)	--	--	36 (14.4)		
6.Post-gradutae	3 (1.20)	--	--	3 (1.20)		
C) Occupation						
1. Non emplyed	91 (36.4)	36 (14.4)	20 (8.00)	147 (58.8)	--	--
2. Employed	8 (3.20)	--	--	8 (3.20)		
3. Business	1 (0.40)	--	6 (2.40)	7 (2.80)		
4. Farmer	--	64 (25.6)	--	64 (25.6)		
5. Labourer	--	--	24 (9.60)	24 (9.60)		
D) Type of the family						
1. Nuclear	86 (34.4)	43 (17.2)	46 (18.4)	175 (70.0)	--	--
2. Joint	10 (4.0)	45 (18.0)	3 (1.20)	58 (23.2)	--	--
3. Extended	4 (1.6)	12 (4.80)	1 (0.40)	17 (6.80)	--	--
E) Size of family						
1. 1-4 members	75 (30.0)	41 (16.4)	8 (3.20)	124 (49.6)	5.028	2.044
2. 5-8 members	25 (10.0)	46 (18.4)	34 (13.6)	105 (42.0)		
3. 9-12 membrs	--	13 (5.20)	8 (3.20)	21 (8.40)		
F) Monthly income (Rs.)						
1. Less than 1855	1 (0.40)	3 (1.20)	38 (15.2)	42 (16.8)	6024.4	4168.5
2. 1855 to 6024	45 (18.0)	38 (15.2)	12 (4.80)	95 (38.0)		
3. 6025 to 10192	51 (20.4)	24 (9.60)	--	75 (30.0)		
4. More than 10192 to 20000	3 (1.20)	35 (14.0)	--	38 (15.2)		
G) Tenure of the house						
1. Own	60 (24)	99 (39.6)	48 (19.2)	207 (82.8)	--	--
2. Rented	40 (16)	1 (0.40)	2 (0.80)	43 (17.2)		

* Figures in parenthesis indicate percentages

4.1.7 Tenure of house

In this study majority of the respondents had own house (82.8 %) and 17.2 per cent were staying in the rented house. The percentage of families staying in own house was maximum in rural area (39.6 %) than urban area (24.1 %).

4.2 Adoption of the environmental and health care practices by the selected families

Distribution of the respondents according to their extent of adoption of the environmental and health care practices is presented areawise in Table 2 and Fig. 1.

It is clear from the Table that majority of the recommended environmental and health care practices were not adopted by the selected families such as biogas plant, vermiculture, use of solar cooker, night soil composting, algal production in stabilization ponds, agricultural application of waste water, aquatic weed production in ponds and soil fertilization with untreated stored night soil. Reasons for non-adoption of these practices were lack of space and need as expressed in all the selected urban families. Whereas, in rural families, these measures were not accepted because for them these were difficult techniques to adopt and also lack of knowledge and awareness were two major constraints faced by them.

Very few pollution control measures were found to be adopted by the selected families which are discussed below along with reasons expressed for non adoption.

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Table 2: Areawise adoption of the environmental and health care practices at household level

Measures	Urban (N=100)	Rural (N=100)	Slum (N=50)
1. Smokless chulha	---	27 (10.8)	2 (0.4)
2. Biogas plant	---	---	---
3. Vermiculture	---	---	---
4. Compost pit	---	100 (40)	---
5. Drainage facility	60 (24)	6 (2.4)	---
6. Use of solar cooker	---	---	---
7. Night soil composting	---	---	---
8. Algal production in stabilization ponds	---	---	---
9. Agriculture application of waste water	---	---	---
10. Aquatic weed production in ponds	---	---	---
11. Soil fertilization with untreated stored night soil	---	---	---
12. Latrines with septic tank	100 (40)	---	---
Adoption index	12.61	11.00	8.60
SD	4.16	4.88	1.64

* Figures in parenthesis indicate percentages

4.2.1 Smokeless chulha

Smokeless chulha was found to be used in rural area by very few per cent of families (10.8 %), whereas in slum area it was used by only 0.4 per cent families. The reasons for its less use were lack of knowledge, awareness and money as expressed by the respondents from slum and rural area. Majority of the respondents from rural area (34 %) felt that construction of chulha is a difficult technique which need a training. As no families were using fire wood chulha in urban area non-adoption of smokeless chulha was observed in all the selected families.

4.2.2 Compost pit

In all the selected rural families, compost pit was found to be existed since long time. Whereas, in urban and slum families, compost pits were not constructed because of lack of space and time.

4.2.3 Drainage facility

This important facility was available in majority of the urban families (24 %) but very less in rural (2.4 %) and nil in slum. The reason for not having drainage facility in their house was financial constraint in a rural and slum families. Thirty five per cent rural housewives' expressed that they never felt a need of drainage in their houses.

4.2.4 Latrines with septic tank

All the families surveyed in urban area were using latrines with septic tank but in rural and slum area such type of latrines were not in existant in the selected families financial constraints and lack of space were the two major reasons expressed by these housewives for its non-adoption.

Table 2 also indicates that an average adoption index of respective selected urban, rural and slum families regarding environmental and health care practices were 12.4, 11 and 8.6, whereas 4.1, 4.8 and 1.6 where the respective values of standard deviation. The figures of the adoption index for all the three selected areas indicated that the adoption level of environmental and health care practices at household level was very poor. Adoption of these pollution control measures was found almost nil in slum area.

The values of standard deviation calculated for adoption are low which indicate that sample was homogeneous with regard to the adoption of environmental and health care practices in rural as well as urban areas. However, `Z' value indicated that there was significant difference in the values of adoption index of rural and urban families as adoption level was higher in urban than in rural area.

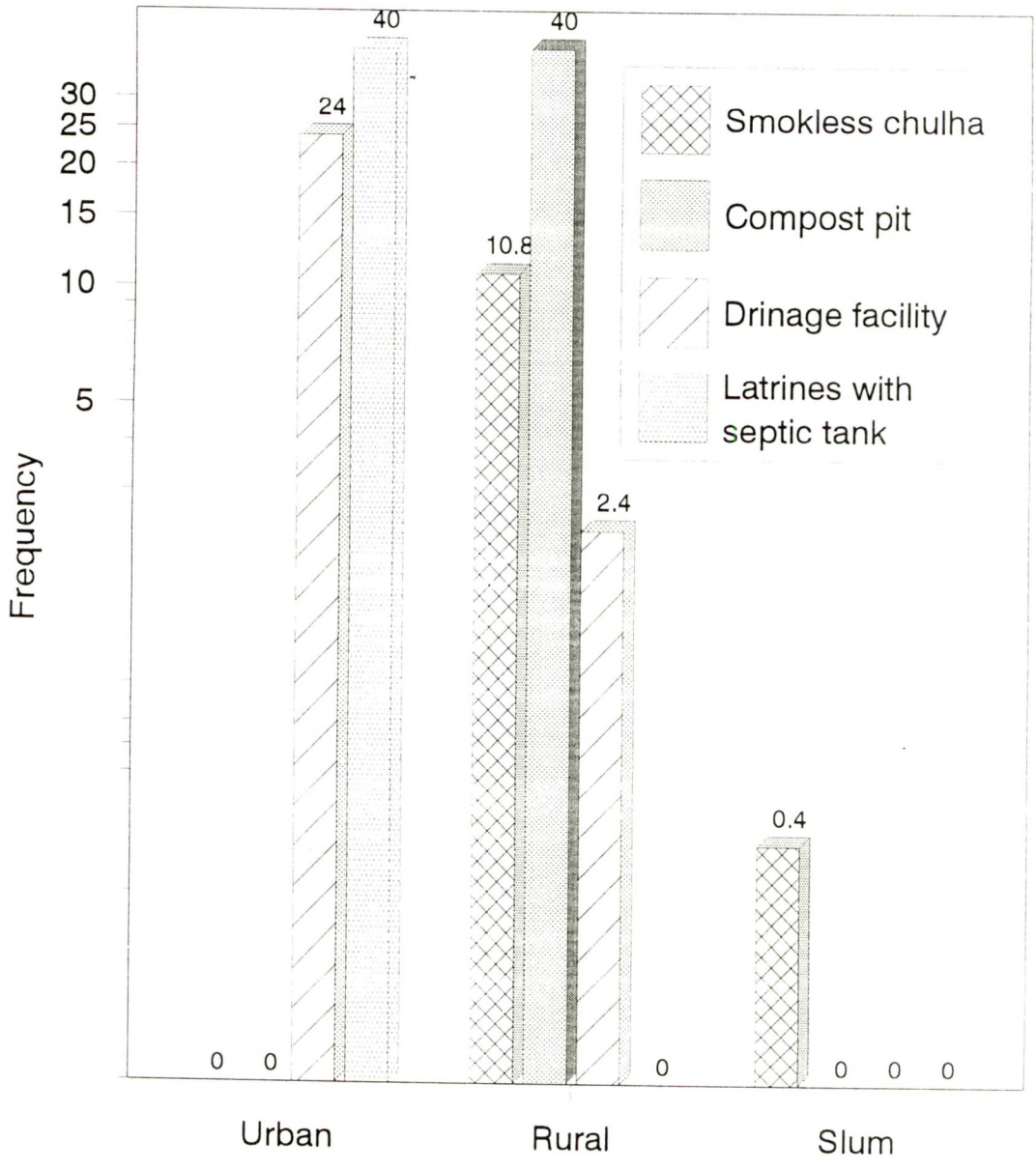

Fig. 1. Adoption of pollution control measures at household level

Graphical representation of normalcy distribution (Fig. 2) based on observed frequency with respect to adoption index indicated that the distribution of sample was not normal.

From the above discussion, it can be concluded that adoption of the recommended pollution control measures at household level was poor. In urban area particularly many measures were not adopted because of lack of space and time. These measures have more potentiality in rural area but lack of knowledge was a main constraint for them. For the slum families financial problem was greater along with lack of knowledge to adopt. Hence, it is felt that there is urgent need to educate the people about environmental and health care practices. For urban families specially considering their different life style from rural area, it is required to investigate and suggest some suitable measures to care environment and health, with regard to the adoption of the latrines with septic tank, sincere efforts are required including some financial help for increasing latrine consciousness in rural and slum area.

4.3 Awareness level of the selected housewives regarding environmental and health care practices

Awareness of the housewives regarding environmental and health care practices was measured on 3 point response, categories such as `aware', `partially

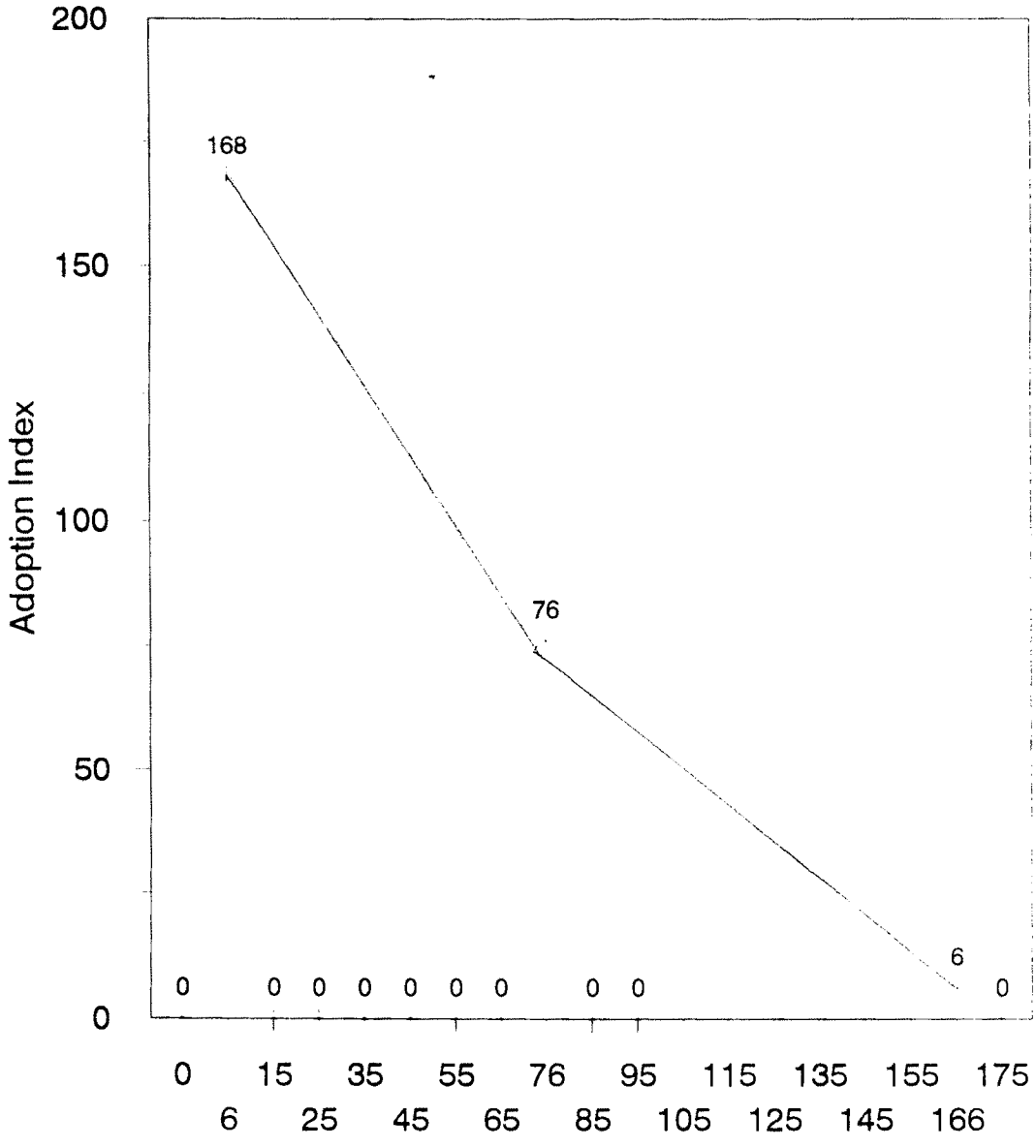

Fig. 2. Frequency distribution curve of adoption of environmental care practices

aware' and `unaware'. Frequency distribution according to these response categories obtained for different 22 environmental and health care practices has been presented areawise in Appendix 2. Based on the values obtained for the awareness index, the level of awareness was decided as low, medium and high. Areawise awareness level of the housewives regarding environmental and health care practices along with mean awareness index is presented in Table 3 and illustrated in Figure 3. It showed that value of the awareness index was highest i.e. 62.25 for urban area followed by 55.2 and 51.4 in rural and slum area, respectively. Further, table indicates that all the families surveyed from slum and rural areas had shown medium level awareness, whereas in 84 per cent urban families medium level awareness was noted only 16 per cent housewives' had shown high level awareness in urban area.

There was a significant difference found between awareness level of the housewives from urban and rural areas when `Z' test was applied.

Graphical representation of normalcy distribution (Fig. 3) based on observed frequencies indicated that direction and symmetry of the curve was rejected. It showed that distribution of sample with respect to awareness level was not normal.

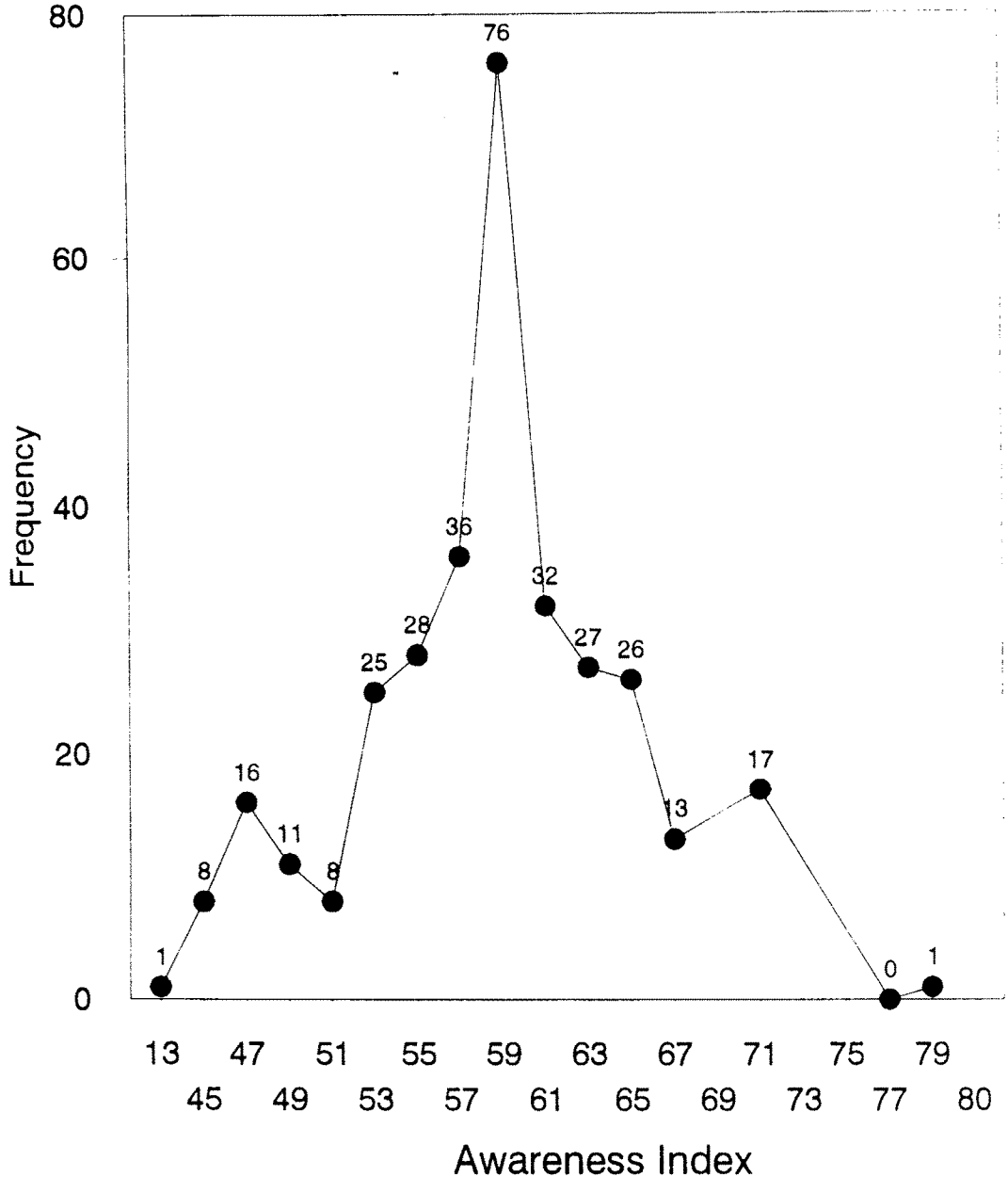

Fig. 3. Frequency distribution curve of awareness of environmental and health care practices

It can be concluded from the above results that on an average awareness level of the selected housewives regarding environmental and health care practices was moderate. Hence, there is a need to educate the people in order to increase the awareness knowledge regarding environmental and health care practices.

Table 3: Areawise awareness level of the selected housewives regarding environmental and health care

Level of awareness	Urban (N=100)	Rural (N=100)	Slum (N=50)
Low	---	---	---
Medium	84 (84)	100 (100)	50 (100)
High	16 (16)	---	---
MEAN	62.25	55.23	51.42
SD	4.42	4.67	4.50

`Z' Value (Urban vs Rural) = 10.96**

* Figures in parenthesis indicate percentages

4.4 Areawise comparison of the adoption and awareness status of the subjects regarding environmental and health care practices

Adoption and awareness of the selected housewives regarding environmental and health care practices in urban, rural and slum areas has been shown in Table 4 and illustrated in Figure 4.

Table 4: Areawise comparison of the awareness and adoption status of the subjects regarding environmental health and environmental care practices

Areas	Awareness index		Adoption index		'Z' Value
	Mean	SD	Mean	SD	
Urban (N=100)	62.2	4.4	12.6	4.1	82.73**
Rural (N=100)	55.2	4.6	11.0	4.8	67.01**
Slum (N=50)	51.4	4.5	8.6	1.6	62.92**
MEAN	57.2	6.2	11.1	4.3	96.02**

* Significant at 5 % level
** Significant at 1 % level

Table delineates that the values of awareness index were 62.2, 54.4 and 51.4 in urban, rural and slum areas respectively, whereas 12.6, 11.0 and 8.63 were the values obtained for adoption index in respective areas. Thus, it can be concluded that in all the selected areas, awareness was higher than adoption regarding environmental and health care practices.

Significant difference was found between adoption and awareness behaviour of the subjects in all the selected areas when Z test was applied.

The present study concluded that awareness knowledge of the subjects was significantly higher than the adoption. The probable reason for non-adoption that could be attributed to many constraints encountered in adoption

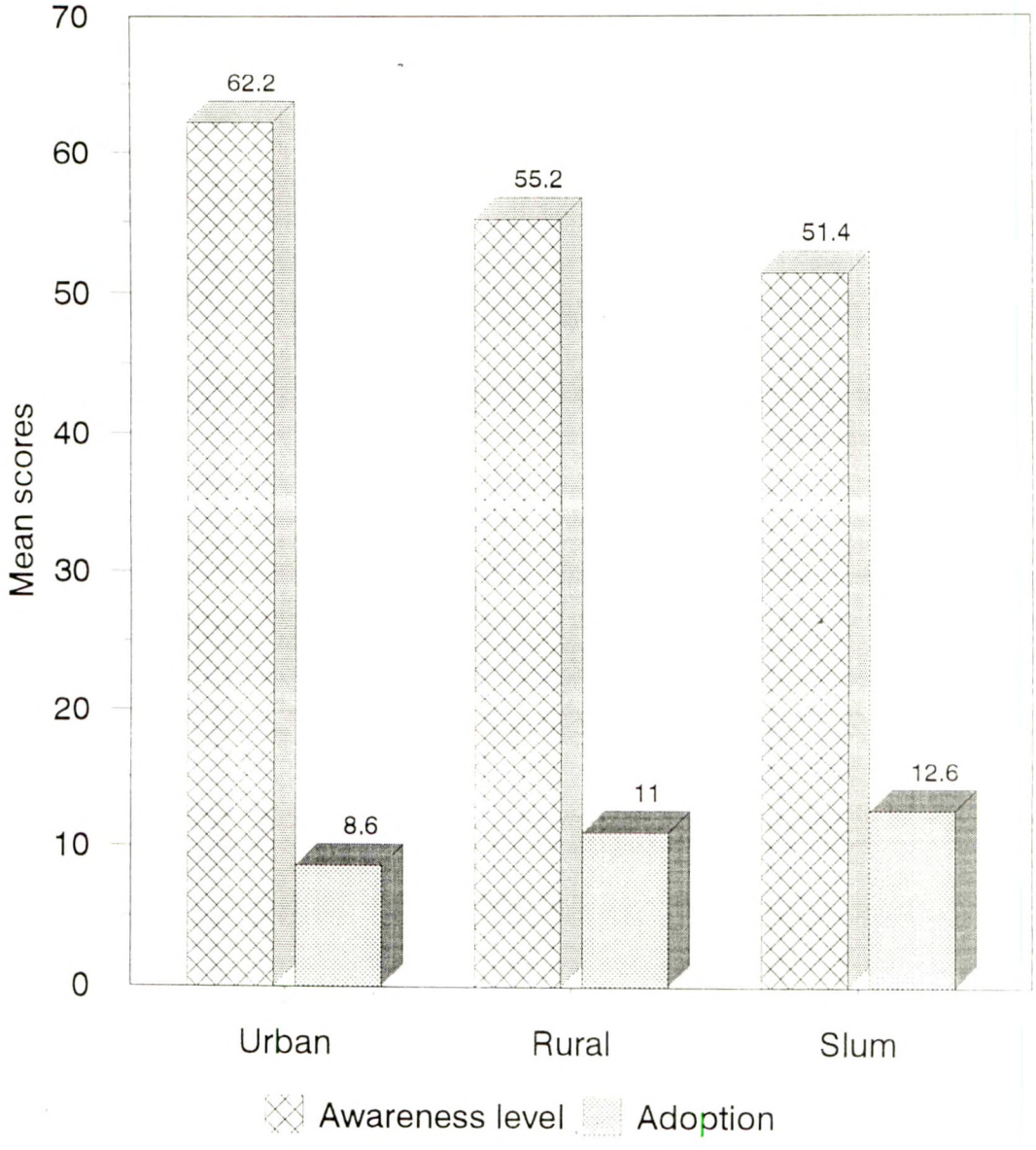

Fig. 4. Areawise adoption and awareness level of the houswives regarding envrionmental and health care practices

of environmental and health care practices. Thus, study emphasizes the need to study problems indepth in order to incalculate values of environmental and health care practices amongst the families.

4.5 Factors correlated with awareness and adoption of the environmental and health care practices in the selected families

Data regarding correlation coefficients indicating the relationship between the selected characteristics and adoption and awareness level of the respondents have been furnished in Table 5.

Table 5. Factors correlated with awareness and adoption of the housewives regarding environmental and health care practices

Factors	Adoption		Awareness	
	`r'value	`b'value	`r'value	`b'value
1. Age	-0.059	-0.034	-0.015	-0.0124
2. Education	0.162*	0.144	0.575**	0.7320
3. Size of the family	0.047	0.1009	-0.257**	-0.7860
4. Income	0.229**	0.00024	0.153*	0.0002

* Significant at 5 % level
** Significant at 1 % level

r = Correlation co-efficient
b = Regression co-efficient

It is observed from table that the two characteristics of the respondents viz., education and monthly income of the family had positive and significant correlation with the adoption and awareness of the housewives regarding environmental and health care practices. It clearly indicate that the housewives with high education level from higher income family found to be involved more in environmental and health care practices.

The data were further subjected to multiple regression analysis for ascertaining the relative contribution of variables to the variation in the awareness and adoption level of the housewives . The regression analysis showed that education emerged as crucial variable in influencing the awareness and adoption of respondents regarding environmental and health care practices.

Further, table indicates that size of the family was the only variable which had negatively significant correlation with awareness level of the respondents. It indicates that as the size of the family increased the awareness level of the respondents found to be decreased and vice-versa. In this analysis age of the respondent was found to be a non-significant variable.

As regards to the association of occupation of the housewives and data presented in Table 6 and 7 revealed that occupation did not influenced awareness and adoption regarding environmental and health care practices.

Based on the above findings, it can be concluded that education of the housewives and family income had shown significant influence on adoption of environmental and health care practices at household level. Size of the family had negatively significant correlation with awareness level of the selected housewives indicating low awareness in large families and vice-versa.

Table 6: Areawise adoption index of the selected subjects belonging to different occupation categories

	Adoption Index			
Occupation	Urban (N=100)	Rural (N=100)	Slum (N=50)	Overall (N=250)
Non employed	12.5	12.0	9.0	11.9
Employed	13.4	---	---	13.4
Business	12.4	---	8.3	9.2
Labourer	---	---	8.30	8.3
Farmer	---	10.5	---	10.5
`F'value = 0.52 (N.S.)				

Table 7: Areawise awareness index of the selected housewives belonging to the different occupation categories

Occupation	Urban (N=100)	Rural (N=100)	Slum (N=50)	Overall (N=250)
Non employed	61.8	54.2	50.8	58.4
Employed	66.5	---	---	66.5
Business	64.7	---	53.6	56.7
Labourer	---	---	51.4	51.4
Farmer	---	55.7	---	55.7

`F'value = 0.47 (N.S.)

4.5.1 Factors correlated with areawise awareness and adoption of the housewives regarding environmental and health care practices

Perusal of the data in Table 8 reveals factors correlated with awareness and adoption of the housewives regarding environmental and health are practices.

Awareness

In urban area education of the housewives' was found to be only significantly correlated variable with the awareness regarding environmental and health care practices. As per the increase in education level of the housewives awareness level was found to be increased. But education was a non-significant variable in a rural and slum area.

Adoption

In slum area, age of the respondent was found to be negatively significantly correlated with adoption level regarding environmental and health care practices. This part of the analysis revealed that young housewives from slum area had shown high level of adoption. In rural and urban area, age of the respondent was a non-significant variable.

In urban area, size of the family and adoption of the housewives regarding environmental and health care practices showed significant relationship. It indicates that the adoption of environmental and health care practices was increased as per the increase in the family size.

Monthly income of the families did not show any significant correlation with awareness and adoption level of the housewives regarding environmental and health care practices.

The above findings indicated that in urban area, educated housewives belonging to small families showed significantly higher level of awareness regarding environmental and health care practices. Whereas, in slum areas age of the housewives was found to be only factor influencing adoption level of housewives. In rural area, selected personal and family characteristics were not significantly correlated with adoption and awareness of environmental and health care practices.

Table 8. Areawise factors correlated with adoption and awareness of the selected housewives regarding environmental and health care

Factors	Environmental care						Health care					
	Urban		Rural		Slum		Urban		Rural		Slum	
	`r'value	`b'value	`r'value	`b'value	`r'value	`b'value	`r'value	`b'value	`r'value	`b'value	`r'value	`b'value
Age	-0.139	-0.092	-0.057	-0.034	0.154	0.079	-0.052	-0.030	-0.059	-0.038	-0.334**	-0.061
Education	0.335**	0.388	0.020	0.035	0.160	0.233	-0.053	-0.057	-0.106	-0.194	0.149	0.077
Size of the family	0.073	0.194	-0.121	-0.245	0.098	0.445	0.229*	0.571	0.142	0.301	-0.258	-0.420
Income	0.086	0.0001	-0.148	-0.0014	0.225	0.001	0.034	0.00005	0.172	0.0018	-0.219	-0.0003

* Significant at 5 % level
** Significant at 1 % level

r = Correlation co-efficient
b = Regression co-efficient

4.6 Family expenditure on environmental and health care practices and factors associated with it

4.6.1 Areawise annual household expenditure on environmental care practices

Table 9 and Fig. 5 reveals amount of money spent by the selected families on environmental care practices such as control of household pest, mopping and dust cleaning, garden maintenance, disposal of waste water, night soil and garbage and colouring of the house.

4.6.1.1 Control of the household pest

This item of expenditure included cost of pesticides and equipments used to control household pest. It has been shown in the Table 9 that amount of money spent by the urban families for control of the household pest per year was Rs. 230, whereas in rural families, this expenditure was only Rs. 90/- and in slum area there was no expenditure incurred on control of the household pest by the families.

4.6.1.2 Mopping of the floor

An average annual expenditure by urban families for cleansing agents used and money paid to servants for mopping of the floor was Rs. 60. There was no expenditure incurred in slum and rural area for mopping of the floor.

Table 9. Areawise annual household expenditure on environmental care

Environmental care practices	Amount of money (Rs.) spent in Urban Mean	Urban SD	Rural Mean	Rural SD	Slum Mean	Slum SD
1. Control of the household pest (Masquito repellents, use of pestisides)	230	25.85	90.3	18.31	--	---
	N=78		N=84			
2. Mopping of the floor (disinfectant, cleansing agent money paid to servants	60	9.35	----	----	----	----
	N=82					
3. Dust cleaning (Cost of equipment and money paid to servants)	64	9.97	38.7	9.50	36.8	8.81
	N=100		N=100		N=50	
4. Garden maintenance (cost of equipments, money paid to servants)	31.4	2.10	----	----	----	----
	N=4					
5. Waste water disposal (Cost of equipments, money paid to servants	11.3	2.05	----	----	----	----
	N=3					
6. Night soil disposal (cost of cleansing agent, brush, brooms, money paid to servants	160	24.93	----	----	----	----
	N=100					
7. Garbage disposal (money paid to servants, cost of equipments)	127	19.79	----	----	----	----
	N=89					
8. Colouring of the house (money paid to servants cost of colour)	484.6	55.80	194.3	38.0	168.2	30.2
	N=60		N=96		N=32	
Total expenditure	1132.4	176.5	322.3	79.8	205.0	49.9

'Z' value (Urban vs Rural) = 41.90**

Figures in parenthesis indicate percentages

4.6.1.3 Garden maintenance

Expenses on equipments used and money paid to servants for maintenance of garden were calculated. An average annual expenditure by urban families on garden maintenance was worked out to be Rs. 31.6. In rural and slum area, garden maintenance expenses were nil.

4.6.1.4 Waste water disposal

An average annual expenditure in urban families on waste water disposal was worked out to be Rs. 11.3 It comprised of money paid to servants and cost of equipments used for cleaning drainage. There was no expenditure in the selected families from rural and slum areas for disposal of waste water.

4.6.1.5 Night soil disposal

Total amount of money spent on brushes, brooims and cleansing agents and money paid to servants for cleaning latrines were the items considered for calculating total cost of night soil disposal. It was found than an average annual expenditure incurred by urban families was Rs. 160. In rural and slum areas, there was no expenditure for night soil disposal.

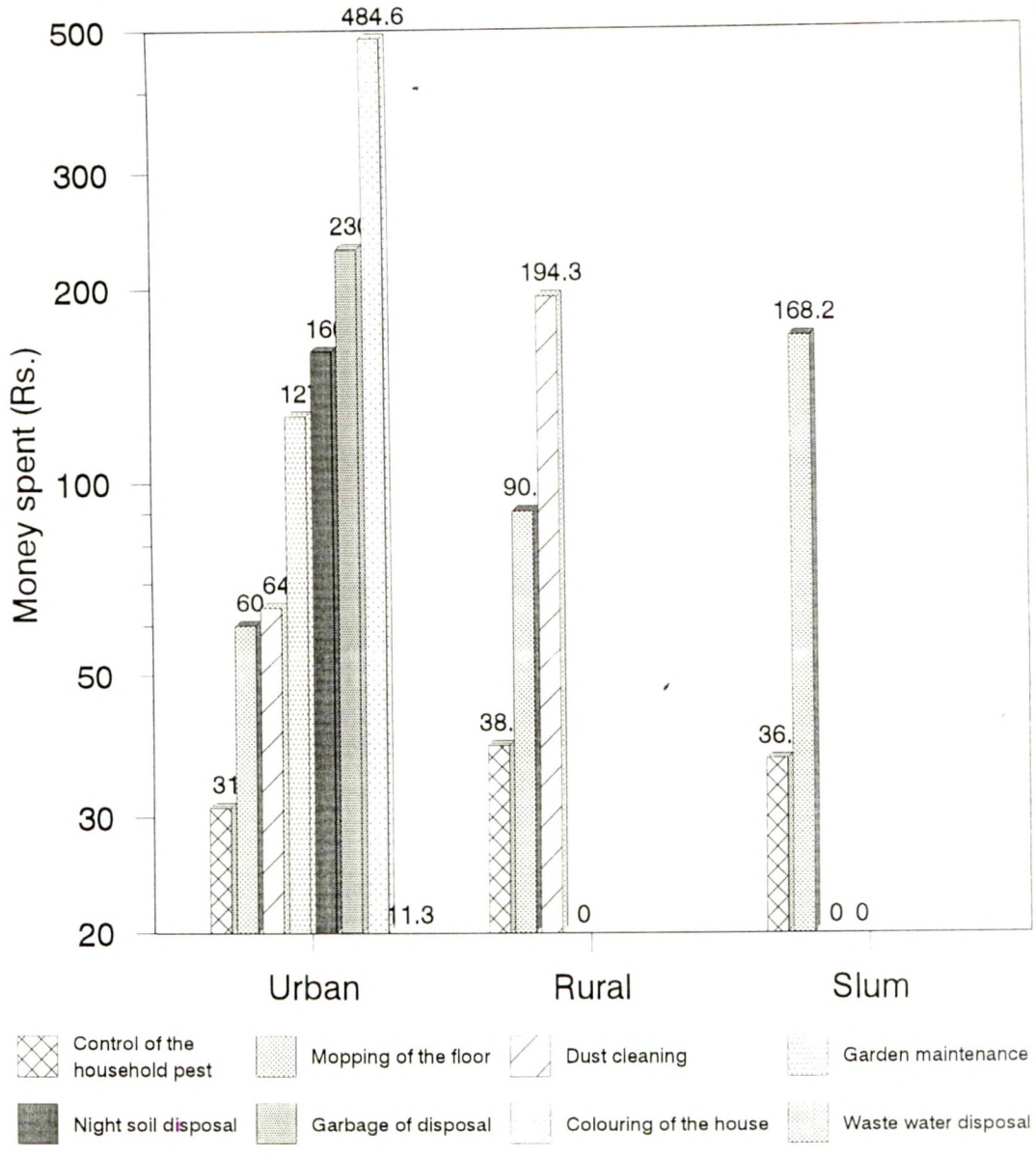

Fig. 5. Areawise annual family expenditure on environmental care by the selected families

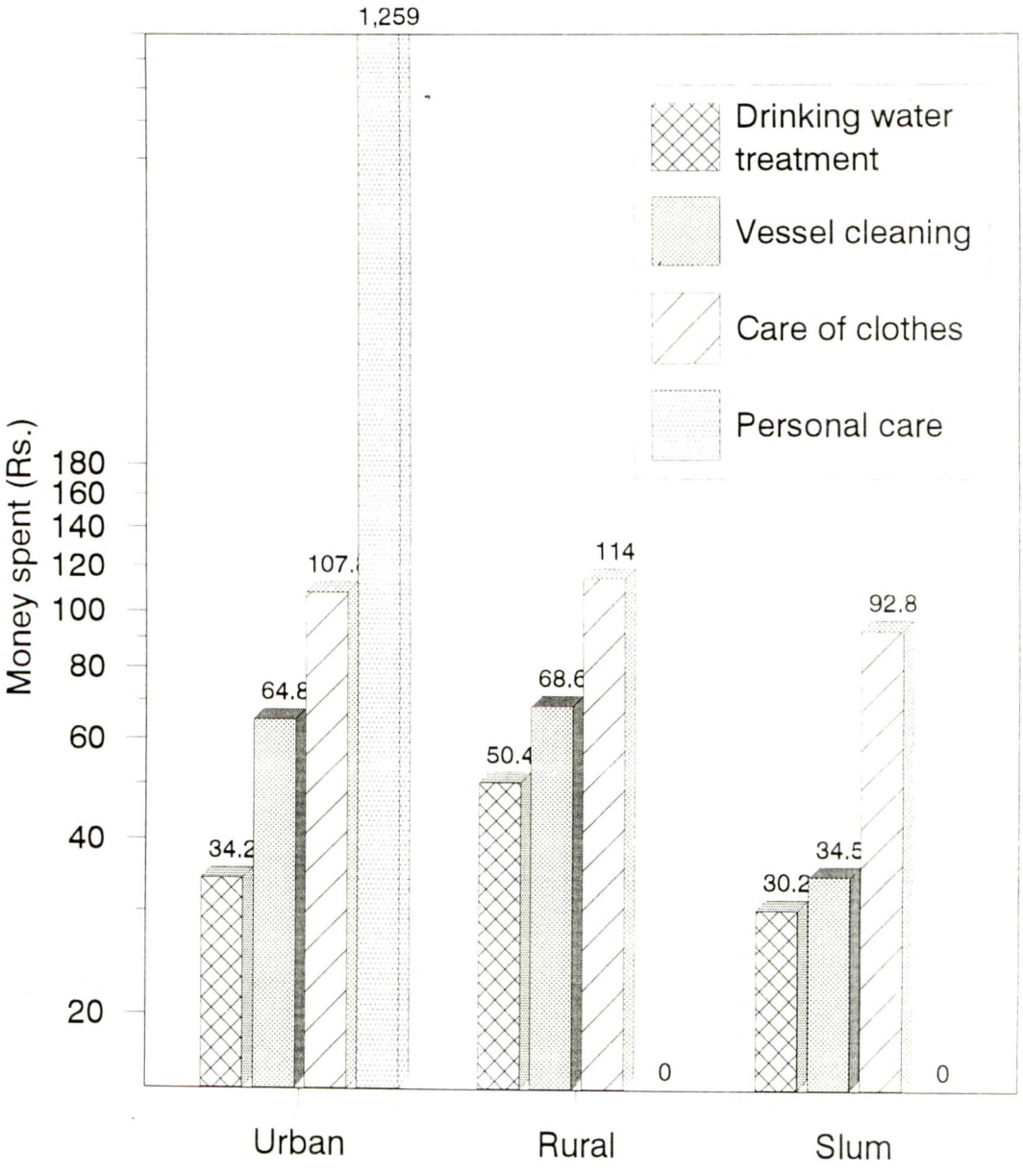

Fig. 6. Areawise per capita annual expenditure on health care by the selected families

4.6.1.6 Garbage disposal

An average cost of equipments used for collecting garbage in the house was worked out to be Rs. 127 per annum, for urban area. No money was spent by rural and slum families for garbage disposal.

4.6.1.7 Colouring of the house

This item of the expenditure included cost of colour etc. and money paid to servants for applying colour to the house. Colouring of the house required an average annual expenditure of Rs. 484.6 in 60 per cent urban families, whereas, an average expenditure incurred in rural families (96 %) was Rs. 194.3 and it was 108.2 per year in slum families (32 %).

Table 9 reveals that in rural and slum areas there was no expenditure incurred on some of the environmental care practices such as mopping of the floor, garden maintenance and disposal of waste water, night soil and garbage. An average amount of money spent by urban families on evnrionmental care was calculated to be Rs. 1132.4 per year. An average amount of Rs. 323.3 was spent by rural families and Rs. 108.2 was spent in slum families for environmental care. There was a significant difference found between an amount of money spent on environmental care by urban and rural families, when `Z' test was calculated (59.10^{**}). Significantly more amount was spent on environmental care by urban families than rural families.

4.6.2 Areawise annual household expenditure on health care practices

Areawise per capita expenditure on health care by the selected families is presented in Table 10 and illustrated in Figure 6. Various determinants of health care such as drinking water treatment, care of clothes and vessel cleaning and personal care aspects were considered for calculating expenditure on health which are discussed here briefly.

4.6.2.1 Drinking water treatment

An average cost of equipments and purifying agents required for purification of drinking water in the selected households of urban area was worked out to be Rs. 34.2 per year/person. There was no expenditure incurred on drinking water treatment in slum and rural area.

4.6.2.2 Cleaning of the vessels

Cost of cleansing agents used and money paid to servants for cleaning of the vessels were included in total expenditure on vessel cleaning. Thus areawise per capita annual household expenditure on cleaning vessels was worked out to be Rs. 64.8 for urban and Rs. 54.7 and Rs. 30.3 for rural and slum areas, respectively. An amount of money spent on vessel cleaning in urban families was deviating greatly from family to family (SD = 50 %) as compared to rural (SD = 22.3) and slum families (SD = 8.94).

Table 10. Areawise per capita annual household expenditure on health care

Health care practices	Amount of money (Rs.) spent per year in Urban Mean	Urban SD	Rural Mean	Rural SD	Slum Mean	Slum SD
1. Drinking water treatment (cost of equipment, water purification agent)	34.2	28.8	----	-----	--	---
	N=93					
2. Vessel cleaning (cost of cleansing, money paid to servant	64.8	54.7	50.4	22.3	30.27	8.94
	N=82		N=100		N=50	
3. Care of clothes (cost of equipment, soap, money paid to servants)	117.8	81.7	68.6	20.6	34.51	10.21
	N=100		N=100		N=50	
4. Personal care (cost of toilet soap,shampoo, tooth paste, hair oil including medical care	1259.9	963.7	114.0	30.6	92.78	17.41
	N=100		N=100		N=50	
Total expenditure	1466.2	1238.8	232.4	102.9	157.3	46.49

'Z' value (Urban vs Rural) = 0.99 (NS)

(Figures in parenthesis indicate percentages)

4.6.2.3 Care of clothes

Average per capita annual expenditure on care of clothes was maximum i.e. 107.8 which was varying more from family to family in urban area. In rural area, this expenditure was worked out to be Rs. 68.6 whereas in slum area least amount of money was spent on care of clothes i.e. Rs. 37.6 per head/per annum which was not varying much from family to family (SD = 10.21).

4.6.2.4 Personal care

Expenditure incurred on toilet soap, shampoo, tooth paste, hair oil including medical care comprised of total expenditure for personal care. Results obtained were very much obvious that the family expenditure on personal care items deviates a lot from family to family. It was noted that the personal care was a major item of expenditure in all the selected families. An average annual personal care expenditure in urban area was calculated to be Rs. 1259.9 whereas it was Rs. 232.4 in rural and Rs. 92.3 in slum area.

Table 10 also indicates overall annual health care expenditure estimated for urban rural and slum areas. It was observed that on an average urban families spent about Rs. 1466.2/yr/capita for health care, whereas rural families spent about Rs. 232.4/yr/capita. In slum area, least amount i.e. Rs. 157.3/yr/capita was spent by the families for health care.

On the basis of results obtained regarding areawise per capita annual health care expenditure, it can be concluded that expenditure incurred by urban families was maximum i.e. Rs. 1466.2 which was 6 to 8 times higher than that of the rural and slum families i.e. Rs. 232.4 and Rs. 157.3, respectively.

4.6.3 Areawise comparison of annual household expenditure on environmental and health care

An average amount of money spent on environmental and health care by the selected families from urban, rural and slum areas is depicted in Table 11. It is observed from the table that an amount of money spent in urban families was significantly more on health care (Rs. 1466.2) than environmental care (Rs. 1132.4). Whereas in rural and slum areas, exactly opposite results were obtained an amount of money spent on environmental care was more than health care.

Based on the total expenditure incurred on environmental and health care practices by the families. Percentages of annual expenditure on health (per capita) and environmental care has been estimated and are presented in Table 11. On an average allocation of income per annum on environmental care was worked out to be 10 per cent of montly income and expenses on health care were 11 per cent of monthly income.

From the table, it can be seen that an average expenditure in all the selected families was more on health care than environmental care. The difference in the expenditure incurred on health and environmental care was found to be significant when `Z' test was applied `Z' values showed that, on an average amount of money spent on health care was significantly more than that of the environmental care.

Table 11: Areawise comparison of annual household expenditure on environmental and health care

Areas	Amount of money (Rs.) spent on				`Z' Value
	Environmental care		Health care/head		
	Mean	SD	Mean	SD	
Urban (N=100)	1132.4	176.5	1466.2	1238.8	2.66**
Rural (N=100)	323.3	79.8	232.4	102.9	6.98**
Slum (N=50)	205.0	49.9	157.3	46.4	4.94**
MEAN	623.2	436.7	710.9	998.1	1.27
Percentage of expenditure	10 %	--	11 %	--	--

* Significant at 5 % level
** Significant at 1 % level

4.6.4 Factors correlated with household expenditure on environmental and health care practices

Factors correlated with annual household expenditure on environmental and health care has been shown in Table 12.

Table 12. Factors correlated with household expenditure on environmental and health care

Factors	Environmental care		Health care	
	`r'value	`b'value	`r'value	`b'value
1. Age	-0.000	-0.0023	0.092	12.150
2. Education	0.742**	65.990	0.394**	80.020
3. Size of the family	-0.323**	-68.940	-0.313**	-153.10
4. Income	0.247**	0.025	0.014	0.0033

* Significant at 5 % level, r = Correlation co-efficient
** Significant at 1 % level, b = Regression co-efficient

Environmental care

Data reveal that education of the subjects and family income had shown positive correlation and statistically highly significant relationship with the expenses incurred by the respondents for environmental care. A significant negative relationship between size of the family and expenditure on environmental care was established. It indicates that expenditure on environmental care comes down with an increase in the size of family. Age of the housewives did not show any significant correlation.

Health care

It can be inferred from the table that level of formal education attained by the subjects tends to influence the expenditure to be done on health care. Statistically highly significantly correlation was found between education and expenses on health care.

The size of the family was found to be a major constraint in spending money on health care. As significant negative relationship was established between size of the family and expenditure incurred on health care. Age of the housewives did not exert any influence on expenditure to be done on health care.

It can be concluded that the education of the housewives and family income were the two major factors influencing environmental and health care expenses to be done. It was observed that economically better families incurred more amount of money on environmental care than poor families.

4.6.5 Areawise analysis of factors correlated with household expenditure on environmental and health care

Data was further analysed to correlate factors with the areawise expenditure on environmental and health care. Table 13 indicates coefficients of correlation between the selected socio-economic characteristics of the families and expenditure incurred on environmental and health care.

Table 13. Factors correlated with areawise household expenditure on environmental and health care

Factors	Environmental care						Health care					
	Urban		Rural		Slum		Urban		Rural		Slum	
	`r'value	`b'value	`r'value	`b'value	`r'value	`b'value	`r'value	`b'value	`r'value	`b'value	`r'value	`b'value
Age	-0.075	-1.97	0.215*	2.254	-0.058	-0.319	-0.218*	40.37	0.073	0.984	-0.101	-0.528
Education	0.219*	10.16	0.055	1.661	-0.084	-1.320	-0.189	-61.47	0.038	1.472	0.197	2.918
Size of the family	0.225*	23.80	0.319**	11.08	0.171	8.364	-0.104	-77.30	-0.381**	-17.070	-0.591**	27.360
Income	0.581**	0.041	0.735**	0.012	0.586**	0.030	-0.160	-0.079	-0.012	-0.0002	-0.269	-0.013

* Significant at 5 % level
** Significant at 1 % level

r = Correlation co-efficient
b = Regression co-efficient

4.6.5.1 Environmental care

The relationship between the selected factors and expenditure on environmental care in urban area revealed a significant and positive relationship between income, education, size of the family and environmental care. Age was the nonsignificant factor influencing expenditure on environmental care in urban area.

In rural area, out of the 4 selected factors 3 factors viz., age, size of the family and income were positively significantly correlated with the expenditure incurred on environmental care. Whereas, education did not influenced the behaviour of the subjects belonging to rural urea.

In slum area, family income showed positive significant correlation with expenditure incurred on environmental care. Whereas, age and education of the housewives were nonsignificant factors influencing expenditure on environmental care.

Regression analysis in Table 13, showed that the factors like size of the family and education contributed significantly to the variations in expenditure incurred on environmental care. The amount of money spent on environmental care increased with the increase in family size and education of the housewives .

4.6.5.2 Health care

Table 13 indicates that in urban area, age of the housewives had positive significant correlation with expenditure incurred on health care. On the other hand in rural and slum area, it did not influenced health care expenses.

Data also indicate that in urban urea, education of the housewife and family income did not show significant relationship with expenditure incurred on health care.

In rural area, size of the family had negative significant correlation with the expenses made towards health care. It was obvious to observe that with an increase in size of family expenditure incurred on health care was decreased.

Similarly, in slum area, it was observed that housewives belonging to higher income group and large size families incurred less amount of money on health care than lower income group and small size families. This negative correlation was significantly established, when coefficient of correlation was calculated.

Hence, it is inferred from the above discussion that in urban area, age of the housewives was a significant factor influencing expenses to be incurred on health care. In rural and slum area, small size families were able to spent more money on health care than large size families. It was observed that education of the

housewives did not exert any influence on expenditure incurred on health care.

4.7 Methods of disposal/recycling/utilization of household waste adopted by the selected families and money recovered by making sale of household waste

Methods of disposal and recycling of household waste, money recovered through sale of household waste has been presented in Table 14, 15 and 16, respectively.

4.7.1 Areawise modes of disposal of household waste

It was observed that majority of the urban families (50 %) maintained a dustbin inside the house for all the types of waste except plate waste and stale food. Then they empty it on the roadside when it gets filled up. Around 30 per cent urban families throw the waste directly into the drainage such as tea waste, plate waste, hair waste, polythene bags and waste from fruits and vegetables. It indicates that in majority of the urban families, only dry waste was collected inside the house in the dustbin and wet waste was thrown directly into the drainage. Around 10 to 17 per cent urban families from one particular locality were found to be emptying dustbin in a dry well. In 14 per cent urban families garden waste was disposed by incineration method. Use of dustbin was not observed in

Table 14: Areawise modes of waste disposal at household level

Type of waste	Use of dustbin inside the house Thrown to road			Thrown to drainage			Thrown to roadspde			Incineration			Use of dustbin inside the house & thrown into well		
	Urban	Rural	Slum	Urban	Rural	Slum	Urban	Rural	Slum	Urban	Rural	Slum	Urban	Rural	Slum
1. Garbage	---	---	---	58 (23.2)	---	12 (4.8)	---	---	38 (15.2)	---	---	---	42 (16.8)	---	---
2. Waste paper	58 (23.2)	---	---	---	---	---	---	---	---	---	---	---	42 (16.8)	---	---
3. Tea waste	---	---	---	82 (32)	100 (40)	50 (20)	---	---	---	---	---	---	---	---	---
4. Rubber, leather tube & tires	58 (23.2)	---	---	---	40 (16)	---	---	60 (24)	38 (15.2)	---	---	---	42 (16.8)	---	---
5. Garden waste	---	---	---	---	---	---	---	---	---	35 (14)	---	---	---	---	---
6. Glass	58 (23.2)	---	---	---	85 (34)	35 (14)	---	15 (6)	15 (6)	---	---	---	42 (16.8)	---	---
7. Ceramics	58 (23.2)	---	---	---	60 (24)	22 (8.8)	---	40 (16)	28 (11.2)	---	---	---	42 (16.8)	---	---
8. Plate waste	---	---	---	88 (35.2)	12 (4.8)	50 (20)	---	---	---	---	---	---	---	---	---
9. Stale food	---	---	---	10 (4)	12 (4.8)	---	---	---	---	---	---	---	---	---	---
10. Hair waste	15 (6)	---	---	60 (24)	90 (36)	26 (10.4)	15 (16)	10 (4)	24 (9.6)	---	---	---	10 (4)	---	---
11. Bones, egg shells	48 (19.2)	---	---	---	---	---	---	---	---	---	---	---	32 (12.8)	---	---
12. Polythene bags	68 (27.2)	---	---	10 (4)	46 (18.4)	42 (16.8)	12 (4.8)	54 (21.6)	8 (3.6)	---	---	---	10 (4)	---	---
13. Cardboard	45 (18)	---	---	8 (3.2)	---	---	5 (2)	54 (21.6)	15 (6)	---	---	---	42 (16.8)	---	---

* Figures in parenthesis indicate percentages

rural and slum households for any type of waste. In these areas domestic waste such as tea waste, glass, ceramics, hair waste, polythene bags, rubber, leather, tube and tires, waste were directly thrown into the drainage or to the roadside.

From the above results obtained it can be concluded that the in majority of the selected families, waste disposal methods were not satisfactory. Even in urban area, waste collection system was found to be inefficient as public dustbins on roadsides were not maintained in selected localities.

4.7.2 Areawise methods of recycling/utilization of waste at household level

Various methods of waste recycling/utilization adopted by the selected families is reported in Table 15.

In rural area, all the families were found to be utilizing garbage and crop residue (FYM) for compost making, coconut shells and ash were utilized for cleaning vessels and wood was used as a fuel and clothes were utilized for making cushions and doormats. Cow dung cakes were used as a fuel in many rural families (88 %), and in 12 per cent rural families, biogas plant was in use. Majority of the rural families were using plate waste stale food, fruits and vegetables waste as feed for domestic animals. Exchanging waste materials for other things was not in vogue in rural area.

Table 15. Areawise methods of waste recycling/utilization at household level

Sr. No.	Methods of recycling/ utilization of waste	Urban (N=100)	Rural (N=100)	Slum (N=50)
1.	Composting	Tea waste (12)	Grabage (100), waste from fruits and vegetables (100), Seed waste (82), rice husk (21)	--
2.	Exchanged for other things	Clothes (48), iron (55) brass (78), copper (65) Aluminium (81)	--	--
3.	Used as a scrubber and agent for cleaning utensils	Coconut shells (100)	Coconut shells (100), Ash (100)	Coconut sheels (50), ash (50)
4.	Used for making utility items such as cushions and door mats	Cloth (52)	Cloth (100	Clothes (50
5.	Cow dung cakes	--	Cow dung (88)	--
6.	Biogas plant	--	Cow dung (12)	--
7.	Used as a fuel	--	Wood (100	--
8.	Used as feed for animal	Plate waste (12), stale food (90), waste from fruits and vegetables (40)	Plate waste (88), stale food(88), waste from fruits and vegetables (100)	--

(Figures in parenthesis indicate percentages).

In urban area, few families (12 %) were observed to be using tea waste as manure for plants and plate waste as a feed for animals. Exchanging household waste such as clothes, iron, brass ,copper and aluminium waste for stainless steel utensils was popular in majority of the urban families.

In slum area, utilization or recycling of waste was observed to be almost nil except few such as old clothes, coconut shells and ash.

An overview of these findings inferres some of the conclusions such as in rural area, major composition of the waste was organic waste such as garbage, crop residue and in urban area inorganic matter such as plastic, polythene paper, cloth were the main constitnents of waste. This was the reason because of which rural families were able to make more reutilization of waste than slum and urban families.

4.7.3 Annual recovery of money by making sale of household waste

An average amount of money recovered annually by making sale of different types of household waste is illustrated in Table 16. It can be seen from the table that maximum amount of money i.e. Rs. 310 was recovered by the rural families by selling of garbage and agricultural waste such as seed waste, rice husk, banana waste in the form of manure. Garbage and agricultural waste was not sold in the urban and slum area.

Table 16: Annual recovery of money by making sale of household waste

Type of waste material	Amount of money (Rs.) recovered		
	Urban (N=100)	Rural (N=100)	Slum (N=50)
1. Garbage and agricultural waste (FYM)	---	310.0	---
2. News paper and waste paper	158.24	---	---
3. Plastics and glass	42.72	---	36.74
Total	200.90	310.0	36.74

Highest amount of money i.e. Rs. 158.24 was recovered by urban families from the sale of newspaper and waste paper, whereas in slum and rural area such type of selling of newspaper and waste paper was not in prevalence.

Maximum amount of money was recovered by urban families by making sale of plastic and glass material i.e. Rs. 42.72 per year. In slum area, only plastic and glass waste was sold by the families and average amount i.e. Rs. 36.74 was recovered by making sale of plastic and glass.

On an average rural families recovered more money (Rs. 310) by making sale of agricultural waste and garbage compared to urban (200.9) and slum (36.74) families. Rural families were able to collect more amount of money through sale of garbage etc. because it was sold in the form of

compost or manure. It indicated that recycling of waste have led to very profitable utilization of waste in rural families than urban and slum families.

4.8 Areawise constraints in management/utilization of the household waste

Areawise constraint in management/recycling of the household waste are illustrated in Figure 7, 8 and 9 and are listed briefly in Table 17. Selected subjects were asked to give ranks to various constraints as per the sevearity they perceived. For the highest rank, higher score was assigned and thus weighted score was calculated. On the basis of total weighted score rating percentages were calculated and ranking was done. Housewives own ranking for the various constraints faced in different areas has been presented in Appendix 3.

Table reveals that in urban area, lack of knowledge regarding various recommended measures to manage household waste was a major constraint. Next followed were lack of awareness, time, training, space and money. Similarly, in rural area lack of awareness was the major problem in management of household waste. Economic constraint was major problem of families from slum area in management of household waste followed by lack of awareness and knowledge regarding management and recycling of waste.

Table 17: Areawise constraints in management/recycling of the household waste

Constraints	Urban (N=100)			Rural (N=100)			Slum (N=50)		
	Weighted score	Ranking percentage	Rankging	Weighted score	Ranking percentage	Rankging	Weighted score	Ranking percentage	Rankging
1. Lack of money	134	6.4	IV	164	7.8	V	290	27.60	I
2. Lack of knowledge	554	26.4	I	557	26.5	II	214	20.30	III
3. Lack of time	416	19.8	III	352	16.7	III	80	7.60	VI
4. Lack of awareness	502	23.9	II	558	26.8	I	223	21.40	II
5. Lack of training	284	13.5	IV	333	15.8	IV	123	11.70	IV
6. Lack of space	210	10.0	V	136	6.4	VI	120	11.40	V
Total score	2100			2100			1050		

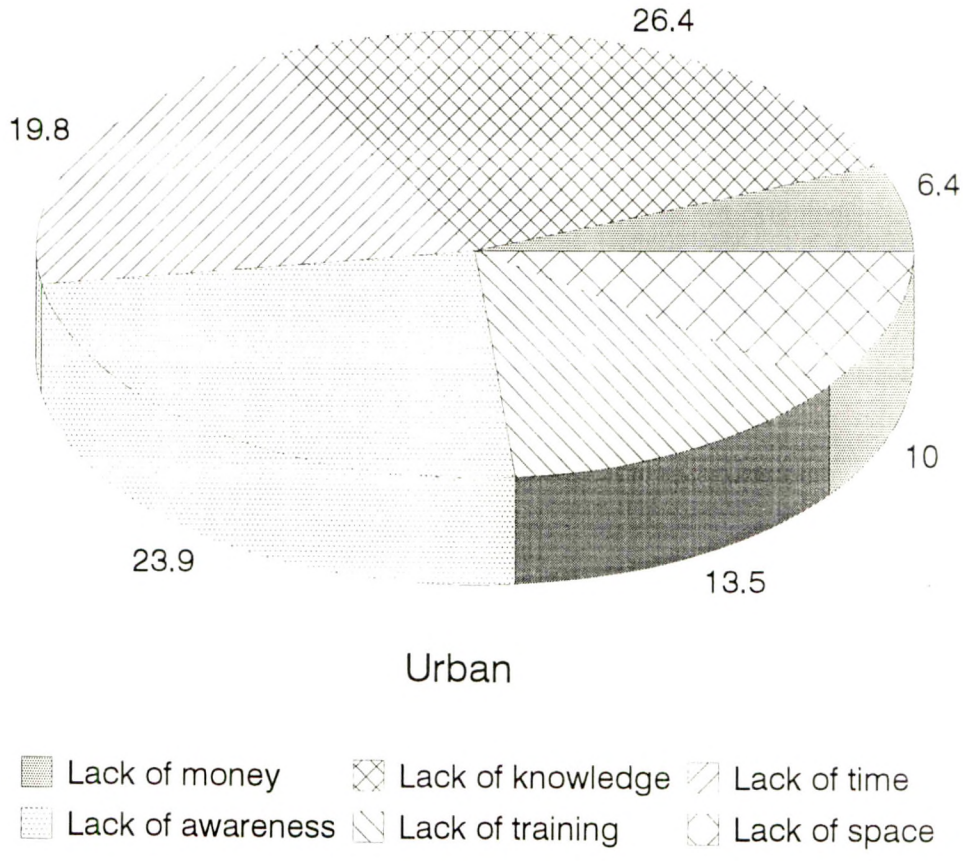

Fig. 7. Constraints in waste management/recycling in urban area

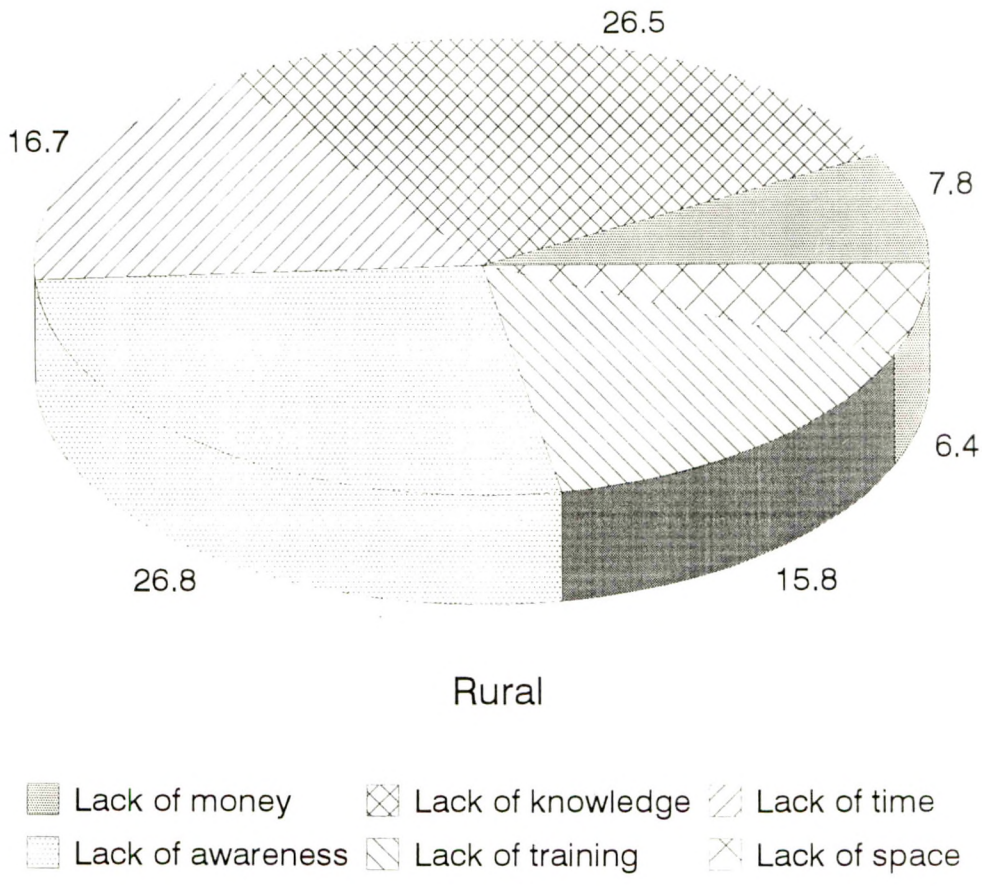

Fig. 8. Constraints in waste management/recycling in rural area

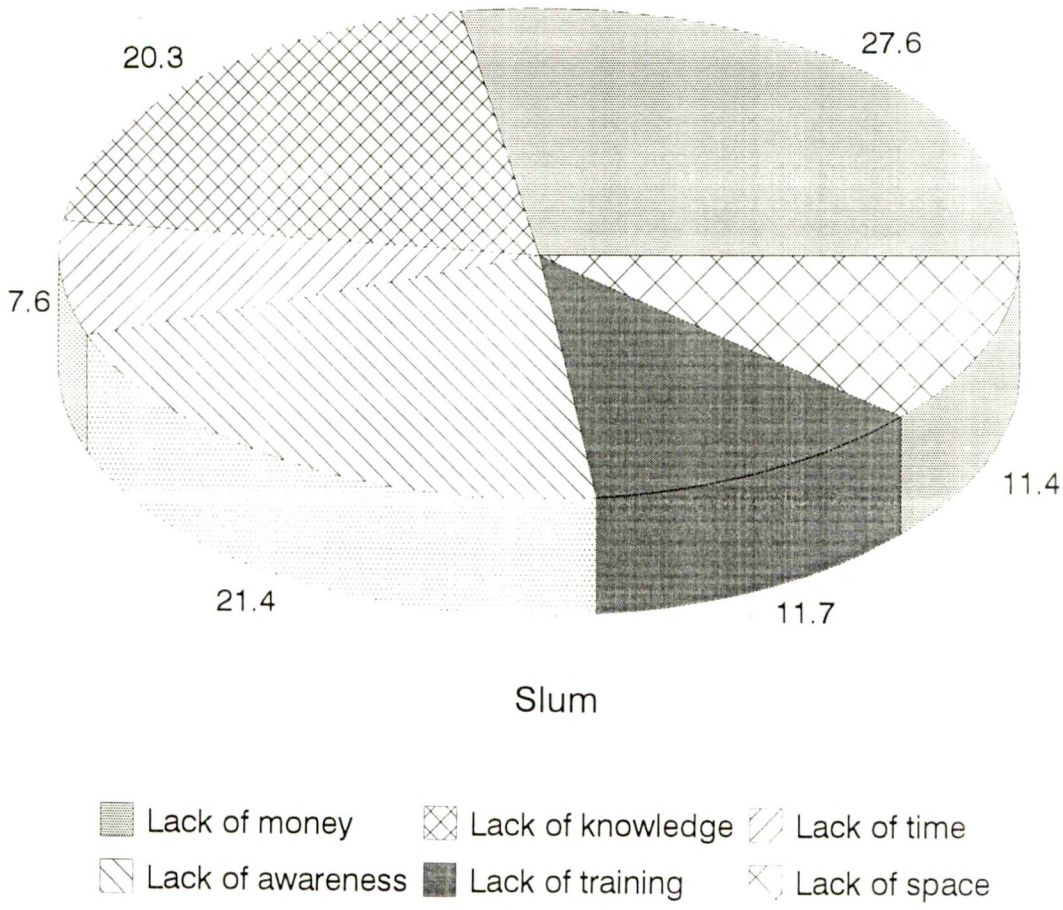

Fig. 9. Constraints in waste management/recycling in slum area

On the basis of results, it can be concluded that lack of awareness, knowledge and money were the major constraints faced by the selected families from rural, urban and slum areas, respectively. It is suggested that there is a great need of sincere efforts to educate and train the housewives with regard to household waste management and recycling.

Summary

Chapter V

SUMMARY AND CONCLUSION

Adoption of environmental and health care practices at household level

The present investigation was planned and conducted in Parbhani district of Marathwada region. A total sample of 250 families was selected randomly from six different residential areas and two slum areas of Parbhani city and two villages from Parbhani district. The specific objectives of this study were to know adoption and awareness level of the housewives regarding environmental and health care practices, factors associated with it, and to analyse expenditure incurred on environmental and health care and to study modes of waste management in selected areas. Keeping in view these objectives of the study, questionnaire was prepared. The data were collected by conducting personal interview of the housewives with the help of prepared questionnaire by the investigator. The level of adoption and awareness was decided by using index which was worked out on the basis of total score obtained by the respondents. The obtained data were tabulated and analysed statistically. The findings are dealt as under.

1 Personal and family characteristics of the selected housewives

In the present study majority of the respondents were young and unemployed belonging to small and nuclear type family with average monthly income of Rs. 6024.

Illiterate, belonging to joint, large size family staying in own house with main occupation of farming were the characteristics of the majority of the rural housewives. Main occupation of the slum housewives was labour work and majority were having own house with 5 to 8 number of family members. Whereas majority of the urban housewives were non employed, high school educated with small family staying in own house.

2 Adoption of the environmental and health care practices at household level

On an average adoption of the environmental and health care practices in the selected families was very less in all the three selected areas. Areawise different reasons were expressed by the subjects for being low adoptors of the environmental and health care practices. For urban area, recommended measures were not suitable due to lack of space and time. Lack of knowledge was the main constraint in adoption of environmental and health care practices in rural area. Whereas financial problems were greater in slum area along with lack of knowledge to adopt recommended measures.

3 **Awareness level of the housewives regarding environmental and health care practices**

On an average awareness level of the selected housewives regarding environmental and health care practices was moderate. The value of awareness index was highest for urban area followed by rural and slum areas respectively.

Comparison of the adoption and awareness index of the subjects regarding environmental and health care practices was carried out. It indicated that in all the selected areas, awareness level of the housewives regarding environmental and health care practices was higher than their adoption level.

4 **Factors correlated with awareness and adoption of the environmental and health care practices in the selected families**

Adoption : Education of the housewives and family income showed significant influence on adoption behaviour of the subject regarding environmental and health care practices.

Areawise analysis indicated that in slum area, age of the housewives' was the only factors which influenced adoption level regarding environmental and health care practices. In urban area, housewives' belonging to large size families showed significantly higher level of adoption regarding environmental and health care practices.

Awareness: Education of the housewives and family income were significantly correlated factors with awareness level of the subjects regarding environmental and health care. Whereas size of the family showed negative significant correlation with awareness.

Areawise analysis indicated that urban area, educated housewives' showed significantly higher level of awareness regarding environmental and health care practices.

In rural area, awareness and adoption behaviour of the subjects with respect to environmental and health care was independent of their personal and family characteristics.

5 Family expenditure on environmental and health care practices

Areawise annual household expenditure on environmental and health care indicated that an average amount of money spent by urban families on environmental care was maximum i.e. Rs. 1132.4 followed by Rs. 323.3 and 108.2 by rural and slum families respectively. Similarly per capita areawise annual health care expenditure incurred by urban families was maximum i.e. Rs. 1466.2 which was 6 to 8 times higher than that of the rural and slum families i.e. Rs. 232.4 and Rs. 157.3 respectively.

Based on the total expenditure incurred on environmental and health care practices, percentages of annual expenditure on environmental and health care practices were estimated. It was revealed that allocation of income on health care (11 %) was more than environmental care (10 %).

It was observed that education and family size were significantly correlated factors with expenditure to be incurred on environmental and health care

6 Areawise modes of disposal/recycling of household waste

Indiscriminate throwing of waste on roadside or in the drainage was the common methods of waste disposal followed in all the three selected areas.

In rural area, major composition of waste was a organic material such as garbage and crop residue which was found to be utilized for compost making. Exchanging inorganic waste such as clothes, iron, brass, copper, aluminum waste for stainless steel utensils was popular amongst majority of the urban families. Maximum amount of money i.e. Rs. 310/- per annum was recovered by rural families through making sale of compost. In urban families on an average Rs. 42/- were recovered by making sale of plastic and glass waste, whereas Rs. 36.7 were recovered by the slum families.

7 . **Areawise constraints in management of the household waste**

On the basis of housewives' own ranking, it was concluded that lack of awareness, knowledge and money were the major constraints in management of the household waste in rural, urban and slum areas respectively.

The study concluded that irrespective of areas majority of the selected housewives' were low adopters of environmental and health care practices. The study pointed out strong relationship between education, family size and income and adoption and awareness in relation to environmental and health care practices. Thus, there is a need to educate and train the people with view to build up a new value system and create a acute awareness related to environmental protection and pollution control habits.

RECOMMENDATIONS

1. There was a difference between awareness and adoption level of environmental and health care practices by the home makers. Inspite of having better awareness, majority of the housewives were found to be low adoptors of pollution control measures due to many constraints. It is therefore imperative to study indepth constraints faced in management of waste and pollution control measures.

2. There is a urgent need to investigate and introduce the families about new technologies for recycling/ utilization/management of household waste.

3. Further research need to be planned to study awareness of all the people including children regarding environmental and health care practices. These findings will have implications for the contents of health education.

4. There is a need to educate and train the people with a view to inculcate the value of waste management or pollution control habits in families.

5. Sincere efforts including financial help is required to develop latrine consciousness amongst rural and slum communities.

Literature Cited

LITERATURE CITED

Anonymous (1981). Biogas technology and utilization, A status Report, Department of Science and technology, New Delhi, Govt. of India.

Anonymous (1983). Community Bio-gas project shows profit, environmental resources Absract, Nov.-Dec.1(1):109-110.

Anonymous (1984). Untapped potential of recycled paper, Environmental Resources Abstract. May-June, Vol. 2(3): 100.

Anonymous (1984). Biogas from distillery waste, Environmental Resources Abstract, Jan-Feb., Vol. 2(1): 119.

Anonymous (1985). Bombay fast turning into city of garbage, Environmental ResourcesAbstract, May-June, Vol. 3(3):71.

Aggarwal, S.K. (1997). Waste management the technological approach, Invention Intelligence, July, pp. 304-308.

Berk, Z. (1979). Production of feed as an objective for bioconversion systems, bioconversion of organic residues for rural communities, Tokyo, The united nations University, pp. 23-25.

Herry, E., Besley and H.R. Chales (1972). Urban wastes management, J. of Environment Quality, 1(1):78-81.

Jain, R.C. (1994). Managing waste: Ecological, Economic and social dimensions. Economics and political weekly, Nov. 5-12, pp. 2907-2911.

Kunhikannan, T.P., K.P: Aravindan (1996). Family Health Expenditure after Liberalization, Economic and Political Weekly, Jan. 13-20, pp. 85-87.

Lakshmi Santa, R. (1981). Relevance of biogas production to improvement of resources in the home. A thesis submitted to the University of Madras in fulfillment of the requirement for the degree of Doctor of Philosophy in Home Management.

Mukhopadhyay, S.P., S.C. Seal, J. Mitra and K.K. Das, (1993). A study on the measuring the Interactions of the determinants of Health. Indian Journal of Public Health, 37(4): 114-124.

Patel, J.J. (1979). Changing Rural India, Alladin's Lamp in Every Indian Village, Four Seasons, 1(1): 68-72.

Purohit, B.C. (1994). A study of Household Expenditure on Health Care, Economic and Political Weekly, June, 25, pp. 1587-1588.

Ravichandran, M., T. Uma Maheswari and B. Chellum, (1997). Environmental care at the household level. A case study, Kurukshetra, Jan.-Feb., pp. 87-89.

Sinha, A. (1996). A study on vermicomposting of household Garbage in Delhi, Science for villages, Nov.-Mar., pp. 96.

Sidney Sieyel (1956). Non parametric statistics for the Behavioural Science. Mc Graw- Hill Kogakalcha Ltd., New Delhi, pp. 225-227.

Sunder, R. (1994). A study on the household survey of health care utilization and expenditure, margin July - Sept., New Delhi. pp. 865-874.

Trivedi, P.K. (1984). Smoky problem, Environmental Resources Abstract, Nov-Dec. Vol. 6, pp. 145.

Ventkateswaran, S., A. Desouza, A. Rosario, (1994). Managing waste: Ecological, Economic and Social Dimensions, Economic and political weekly, November, 5-12, pp. 2907-2911.

Appendix

APPENDIX -I

Questionnaire to elicit information regarding health & environmental care practices adopted by the selected housewives from Urban and Rural area.

1. Name of the housewives :
2. Age :
3. Address :
4. Education :
5. Type of family :
   Nuclear/Joint/Extended
6. Occupation :
7. Tenure of the home :
   Own/Rented
8. Monthly income of the family :
9. Number of the family members :
10. Family back ground :

Sr. No.	Name	Relation to the respondent	Sex	Age	Education	Occupation	Income

11. Have you adopted following pollution control measures in your house ? Kindly mention the reasons for non adoption

Measures	Yes/No	Reasons for non-adoption
1) Smokless chulha		
2) Biogas plant		
3) Vermiculture		
4) Compost pit		
5) Drainage facility		
6) Use of solar cooker		
7) Night soil composting		
8) Algal production in stablization ponds		
9) Agricultural application of waste water		
10) Aquatic weed production in ponds		
11) Soil fertilization with untreated stored night soil		
12) Latrines with septic tank		

12) Do you know about following recomended envrionmental and health care practices. If yes, Have you adopted it? What is the reason for adopting and non-adoption ?

Environmental & health care practices	Extent of Awareness			Reasons for	
	Aware	Partialy aware	Unware	Adopt	Non-adopt
1) One should minimize the use of non-renewable resources such as forest produce, kerosene cooking gas, coal electricity water etc.					
2) Paper must not be wasted bothside of it should be used because wastage of paper is wastage of forest and environemental					
3) Use of polythene carrybags should be minimized because it is non-decompostible garbage					
4) Public washeries should be provided for washing clothes to minimize water pollution of river.					
5) One should try for recycline of domestic waste material					
6) Proper maintenance & use of automobiles & their minimum use. Use of public conveyances should be encouraged.					
7) Decompostible domestic garbage & non-decompostible rubbish & hard material should be collected in seperate bins.					
8) Earthworm farming is another bio-technique for converting the solid waste, be it sewage sludge, domestic waste or from agriculture into compost.					

9) Use of low-cost latrines may be resorted to insted of relieving one self in the open.

10) Hygienic care must be taken for all those low-lying water logging areas more specially for those which are closer to settlement.

11) One should stop smoking drinking & taking all other types of intoxicating materials

12) Hazardous waste from Hospitals to be incinerated/sterilised

13) Purification of drinking water

14) Periodical medical checking

15) Washing of vegetable before cooking minimizes nutrient loss

16) Washing of fruits before eating is hygienic practice

17) Immunization for child and mother is essential

18) Animal should not be bathed in the same water where people also bathe

19) Proper management of domestic waste is to be practised in order to avoid pollution

20) One should be have aproper drainage system of manage domestic waste water

21) Use of smokeless fuel efficient chullahs biogas & should be encouraged and charcoal or coalchallah which pollules atmosphere must be prohibited

22) Spraying of disinfectant on drainage is one of the measure to control mosquitoes & files

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13) **Kindly mention the health & environmental a care practices adopted by you but not mentioned in the above list.**

14) **How much amount of money you spend on following environmental and health canre activities ?**

Health & Environmental care practices	Expenditure (Rs.) Monthly/Half monthly/Yearly
1) Control of household pest	
A) Mosquito	
1. Mosquito Net	
2. Mosquito Repellents	
3. Net for doors and windows	
B) Flies	
1. Use of pestisides	
C) Cockroach	
1. Use of pestisides	
2. Cost of equipments used for spraying pestisides	
D) Rat	
1. Use of pestisides	
2. Cost for equipemnts used for spraying pestisides	
2) Mopping of the floor	
A) Disinfectant	
B) Cleansng agents used for Wall/Floor cleaning	
C) Money paid to maid servants	
3) Dust cleaning	
A) Cost of equipments such as vaccum cleaner & Brooms	
B) Money paid to maid servants	
4) Garden maintenance	
A) Cost of equipments	
B) Money paid to maid servants	
C) Cost of pestisides	
5) Waste water disposal	
A) Cost of equipments used for cleaning of household drainage	
B) Money paid to maid servants	

Health & Environmental care practices	Expenditure (Rs.) Monthly/Half monthly/Yearly

6) **Night soil disposal**
   A) Cost of cleansing agents used in latrines and Bathroom
   B) Cost of brush, broom used for cleaning
   C) Money paid to maid servants

7) **Garbage disposal**
   A) Money paid to maid servants
   B) Cost of equipments such as dustbin, dust collector

8) **Drinking water treatments**
   A) Water purifying equipments such as, water filter, acquagurad zero, B.etc.
   B) Cost of water purifying agents, eg. Alam, any other chemical agents/bleaching powder

9) **Front yard & back yard maintenance**
   1) Money paid to maid servants

10) **White washing/colouring of the house**
   A) Money paid to maid servants
   B) Cost of colour brush

11) **Vessel cleaning**
   A) Washing powder/soap
   B) Money paid to maid servants
   C) Cost of equipments & serubs

12) **Care of clothes**
   A) Cost of equipments used for washing cloth
   B) Money paid to maid servants
   C) Cost of soap/detergent

13) **Personal care**
   1) Toilet/Bath soap
   2) Shampoo
   3) Tooth paste
   4) Hair oil
   5) Periodical medical checking
   6) Medicine
   7) Any others

15.What type of method you adopt for the disposal/recycling of household waste ?

Type of waste material	Method of disposal	Method of recycling	Amount of money recovered by making sale (Rs.)
1. Garbage			
2. Paper			
3. Packings			
4. Wood			
5. Cloth (Rag)			
6. Rubber			
7. Leather			
8. Garden waste			
9. Plastics			
10. Glass			
11. Ceramics			
12. Glass (Bottles)			
13. Plate waste			
14. Hair waste			
15. News paper			
16. Tea waste			
17. Tube & Tires			
18. Coconut shells			
19. Bones, egg shells			
20. Cow-dung			
21. Polythene bags			
22. Stale food			
23. Ash			
24. Night soil			
25. Iron			
26. Brass			
27. Correr			
28. Aluminium			
29. Card board			
30. Waste from fruits & vegetables			
31. Seed waste			
32. Rice husk			
33. Rice bran			
34. Banana waste			
35. Maize waste			
36. Fodder waste			
37. Sofflower husk			
38. Any others			

Method of disposals:

1. Use of dustbin inside the house and thrown into the common dustbin
2. Directly thrown into the common dustbin
3. Thrown into drainage
4. Thrown to roadside
5. Dumping of waste inside the compound
6. Compostmaking
7. Incineration
8. Use as a fuel
9. Used as a feed for animals/birds
10. Any other please mention

Methods of recycling:

1. Recovery of money by making sale of waste
2. Composting
3. Exchange for other things
4. Any other use please mention

16. What are the constraints that you face in management/ recycling of household waste. Kindly give the rank

Problems	Rank
1. Lack of money	
2. Lack of knowledge	
3. Lack of time	
4. Lack of awarness	
5. Lack of training	
6. Lack of space	
7. If any other please mention	

APPENDIX II

Areawise frequency distribution according to awareness level of the housewives regarding environmental and health care practices

Environmental and health care practices	Urban (N=100)			Rural (N=100)			Slum (N=50)		
	Aware-ness	Partly aware	Un-aware	Aware-ness	Partly aware	Un-aware	Aware-ness	Partly aware	Un-aware
1	2	3	4	5	6	7	8	9	10
1) One should minimize the use of non-renewable resource such as forest produce kerosene cooking, gas, coal etc.	42 (16.8)	58 (23.2)	--	31 (12.4)	60 (24)	9 (3.6)	7 (2.8)	28 (11.2)	15 (6)
2) Paper must not be wasted bothside of it should be used because wastage of paper is wastage of forest & environment	--	7 (2.8)	93 (37.2)	--	--	100 (40)	--	-	50 (20)
3) Use of polythene carrybags should be minimized because it is non-decompostible garbage	--	43 (17.2)	57 (22.8)	18 (7.2)	43 (17.2)	39 (15.6)	--	4 (1.6)	46 (18.4)
4) Public washeries should be provided for washing clothes to minimize water polluion of river	45 (18.0)	55 (22.0)	--	--	22 (8.8)	78 (31.2)	--	21 (8.4)	29 (11.6)
5) One should try for recycling of domestic waste material	--	7 (2.8)	93 (37.4)	--	57 (22.8)	43 (17.2)	--	14 (5.6)	36 (14.4)
6) Proper maintenance & use of automobiles & their minimum use of public conveyances should be encouraged	40 (16.0)	60 (24.0)	--	31 (12.4)	42 (16.8)	27 (10.8)	6 (2.4)	18 (7.2)	26 (10.4)
7) Decompostible domestic garbage & non-decompostible rubbish & hard material should be collected in seperate bins	48 (19.2)	52 (20.8)	--	57 (22.8)	43 (17.2)	--	14 (5.6)	36 (14.4)	--
8) Earthworm farming is another bio-technique for converting the solid waste, be it sewage sludge, domestic waste or from agriculture into compost	22 (8.8)	38 (15.2)	40 (16)	57 (12.8)	43 (17.2)	--	9 (3.6)	23 (9.2)	18 (7.2)
9) Use of low-cost latrines may be resorted to intead of reli-eving one self in the open	42 (16.8)	58 (23.2)	-	22 (8.8)	78 (31.2)		32 (12.8)	18 (7.2)	

1	2	3	4	5	6	7	8	9	10
10) Hygienic care must be taken for all those low-lying water logging area more specially for those which are closer to settlements	45 (18.0)	55 (22.0)	--	31 (12.4)	69 (27.6)	--	14 (5.6)	36 (14.4)	--
11) One should stop smoking drinking and taking all other types of intoxicating materials	32 (12.8)	68 (27.2)	--	13 (5.2)	87 (34.8)	--	13 (5.2)	37 (14.8)	--
12) Hazardous waste from Hospitals to be incinerated/sterilised	--	22 (8.8)	78 (31.2)	--	13 (5.2)	87 (34.8)	7 (2.8)	43 (17.2)	--
13) Purification of drinking water	59 (23.6)	41 (16.4)	--	31 (12.4)	69 (27.6)	--	24 (9.6)	26 (10.6)	-
14) Periodical medical checking	12 (4.8)	88 (35.2)	--	--	--	100 (40)	--	2 (0.8)	48 (19.2)
15) Washing of vegetable before cooking minimizes nutrient loss	48 (19.2)	52 (20.8)	--	18 (7.2)	82 (32.8)	--	10 (4)	40 (16.0)	-
16) Washing of fruits before eating is hygienic practice	48 (19.2)	52 (20.8)	--	18 (7.2)	82 (32.8)	--	7 (2.8)	40 (16.0)	3 (1.2)
17) Immunization for child and mother is essential	79 (31.6)	21 (8.4)	--	21 (8.4)	79 (31.6)	--	26 (10.4)	24 (9.6)	
18) Animal should not be bathed in the same water where people also bathe	44 (17.6)	54 (21.6)	--	22 (8.8)	78 (31.2)	--	22 (8.8)	28 (11.2)	
19) Proper management of domestic waste is to be practised in order to avoid pollution	22 (8.8)	40 (16)	38 (15.2)	14 (4.8)	58 (23.2)	30 (12)	7 (2.8)	28 (11.2)	15 (6)
20) One should be have aproper drainage system of manage domestic waste water	22 (8.8)	40 (16.0)	38 (15.2)	20 (8.0)	43 (17.2)	37 (14.8)	--	21 (8.4)	29 (11.6)
21) Use of smokeless fuel efficient chullahs biogas & should be encouraged and charcoal or coalchallah which pollules atmosphere must be prohibited	59 (23.6)	41 (16.4)	--	20 (8)	43 (17.2)	37 (14.8)	7 (2.8)	28 (11.2)	15 (6)
22) Spraying of disinfectant on drainage is one of the measure to control mosquitoes & files	59 (23.6)	41 (16.4)	--	48 (19.2)	52 (20.8)	--	8 (3.2)	42 (16.8)	-

Figure in parentheses indicated percentage

APPENDIX -III

Areawise constraints in management /recycling of waste at household level

	Housewives' own ranking						Housewives' own ranking						Housewives' own ranking					
	I	II	II	IV	V	VI	I	II	II	IV	V	VI	I	II	II	IV	V	VI
1. Lack of money	--	--	--	4	26	70	--	--	--	--	63	38	45	--	05	--	--	--
2. Lack of knowledge	60	34	06	--	--	--	57	43	--	--	--	--	02	30	13	--	--	--
3. Lack of time	18	08	56	12	04	--	--	--	52	48	--	--	01	--	--	05	14	31
4. Lack of awareness	22	58	20	--	--	--	43	57	--	05	--	--	02	17	28	01	05	01
5. Lack of training	--	--	18	52	24	06	--	--	48	47	--	--	--	--	--	30	13	07
6. Lack of space	--	--	--	32	46	22	--	--	--	--	37	62	--	03	04	14	18	11