

A study on subjective assessment of indoor pollution among rural and urban homemakers of Ludhiana city

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ABSTRACT : Environmental pollution is any undesirable change in any component of the environment may it be air, water, soil, which can cause harmful effects on various forms of life and property. World Health Organization (WHO) also ranks the problem of indoor pollution as one of the worst health risks facing the poor. The pollution can be either indoor or outdoor or both but generally people think that pollution is only outdoor or affecting the indoor environment due to the different outdoor sources. The inside environment of houses often has a higher level of pollutants than the outdoor surroundings. Unfortunately, indoor pollution has not been given much importance. Keeping the concern and significance of indoor pollution in mind a study was planned to assess the indoor pollution subjectively from rural and urban houses, two modified scales were used. Scales used were Physical Environment Assessment Tool (PEAT) and Environment Awareness Scale (EAS).

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Environment is everything that surrounds or environs us. It affects our daily lives or activates in some way or the other. The degradation of environment with respect to water, air and soil is increasing day by day not only in the urban areas but also in the rural areas. There has been an increasing global concern over the impact of environment pollution on public health. Many of the diseases that the mankind is facing are reported to occur due to prolonged exposure to polluted air, water and soil. A common man observe environmental pollution in the form of changing climate, ozone depletion, rising sea level, acid rain and polluted air in the cities, but he is little aware of the household pollution or pollution of the outside environment (Songsore and McGranahan, 1993).

According to international encyclopedia of social sciences, environment is the

aggregate of all external conditions affecting the life and development of an organism. Dictionary of social sciences defines environment as all the external sources of factory to which a person or aggregate of persons are actually or potentially responsive (Dubey and Samal, 1998).

Man is both creature and moulders of his environment which gives physical sustenance as well as provides opportunity for intellectual, moral, social and spiritual growth of human beings. Both aspects of man's environment, the natural and the man-made, are essential to his well-being and to the enjoyment of basic human rights and the right to life itself (Kumari, 2007).

The pollution can be both indoor and outdoor but generally people think that pollution is only outdoor or affecting the indoor environment due to the different outdoor

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sources. Although we spend about 80 to 90 per cent time indoors yet we consider very little about the indoor pollution and causes of the same. As we walk through our homes, the air turbulence created by the movement of human beings stirs up a combination of dust and debris that can be very irritating to the lungs (Godish, 2010). According to the Environment Protection Agency (EPA), at least a dozen organic pollutants occur in concentrations two to five times higher in the home than the outdoors, with concentration of volatile organic compounds being ten times higher inside the buildings (Colbeck *et al.*, 2007).

Therefore, a study was planned to make subjective assessment of indoor pollution in the houses of rural and urban families of Ludhiana district.

EXPERIMENTAL METHODOLOGY

The data for the present study was collected from 120 homemakers comprising of 60 rural and 60 urban respondents. The respondents were selected randomly. Rural data was collected from randomly selected villages *i.e.* Majara and Phullanwal of Ludhiana 1 block of Ludhiana district. Similarly urban homemakers were randomly selected from *Jawahar Camp* and Canal Avenue of Ludhiana -D zone of Ludhiana.

Statistical analysis :

The obtained data was analyzed by statistical significant at $P < 0.05$ level, S.E. and C.D. at 5 per cent level by the procedure given by (Panse and Sukhatme, 1994).

Selection of subjective assessment scales :

For subjective assessment of the indoor pollution

following two modified scales were used. Physical Environment Assessment Tool (PEAT) and Environment Awareness Scale (EAS) were used.

Physical Environment Assessment Tool (P.E.A.T.):

This scale was developed by Hendrick (2004) and it was to assess physical environment and surroundings subjectively. Four major areas were taken as parameters *viz.*, dwelling, cleanliness, social structure and hazards. All areas contained 4 observations each and were given scores. For dwelling score add up was 0-8, for cleanliness 1-4, for social structure and hazards 3-12. Interpretation of scoring was: Score: 7-16 urgent intervention, 17-27 referral assistance, 28-31 less than optional, 32-36 healthy.

Environment Awareness Scale (EAS) :

To study the extent of awareness, regarding environment of selected respondents Environment Awareness Scale was used. The National Institute for Educational Measurement (Cito) has developed a scale to measure environmental awareness (The Environment Awareness Scale). The Environment Awareness Scale consists of two parts, the titles of which were what is your opinion on environmental issues? and what are you prepared to do about the environment? In the first part there were eighteen statements, in the second part there were twenty. The respondents were asked to indicate on a three point scale to what extent a statement applies to them. The statements in the first part involved the attitude of the respondents toward the environment. The second part involves their intentions, that is, to what extent they were prepared to go to behave in an environment-friendly way (Anonymous, 1994).

Table 1 : Distribution of respondents according to their demographic features

Demographic features	Rural (n=60)		Urban (n=60)		Total (n=120)	
	Number	Percentage	Number	Percentage	Number	Percentage
Age (in years)						
Upto 35	14	23.33	22	36.66	36	30.00
35-45	21	35.00	25	41.66	46	38.33
> 45	25	41.66	13	21.66	38	31.66
Mean	44.00		38.98		41.49	
SD	9.86		8.05		9.31	
T-value			0.62			
Education						
Upto intermediate	46	76.66	19	31.66	65	54.16
Graduation	8	13.33	28	46.66	36	30.00
Post graduation	6	10.00	13	21.66	19	15.83

Scores :

When the respondents had filled in the Environment Awareness Scale, the respondents and category (rural and urban) scores were calculated as mentioned in the instruction booklet of EAS.

The data collected were coded and tabulated. For analyzing the data, simple averages, percentages, mean scores, standard deviation were used.

Demographic features of the respondents :

Co-relates of demographic features of respondents is direct, with their extent of knowledge and age. So, demographic features studied in the present investigation included; age, education, type of family, size of family etc.

Age :

The data indicates that majority of the respondents *i.e.* 38.33 per cent were in the age group of 35-45 years, followed by 31.66 per cent who were above 45 years of age, while only 30.00 per cent of the respondents were either upto 35 years or less. Majority of the respondents (35.00 %) were middle aged as seen in rural sample and in urban households 41.66 per cent respondents belonged to the age group of 35-45 years. The data showed that 30.00 per cent respondents were from the younger age group. It means they had less rigid way of thinking and could be molded easily. They can be imparted the intended educational technology effectively. Table 1 further shows that the average age of the selected respondents was 41.49 years. The average age of the rural respondents was 44 years and that of urban respondents, it was 38.98 years. This difference in the age of rural and urban respondents was found to be statistically non-significant.

Education :

Majority of the respondents *i.e.* 54.16 per cent had studied upto intermediate, followed by 30.00 per cent respondents who had done graduation while 15.83 per cent of the respondents were either post graduates or done something beyond graduation like post-graduation

diploma or training. Education level of sampled population was higher in urban areas as maximum number of them (46.66 %) were graduates as compared to only 13.33 per cent of their rural counterparts who had done their graduation. More than three fourth of the rural samples (76.66 %) were only school pass outs. This scenario may be due to lack of educational facilities in villages and reluctance of people for sending their girls to nearby towns for higher studies.

Dwelling being the most dominating element of indoor pollution was assessed using various parameters (proper construction, electricity and water facility and indoor elements congeniality). Cleanliness was the area where considered clutter, bio waste etc. as threats to health. Man being a social animal, the surrounding people and their conduct is the part of social structure. The possible, probable and certain health hazards are more of the impacts of the elements of physical environment. Table 2 depicts the responses of respondents pertaining to these elements. It can be seen from the table that more than half (52.50 %) respondents rated their physical environment to be healthy whereas about one fourth (25.83 %) of them considered it less than optimal. According to 20.83 per cent respondents, 'referral assistance' is required and only one respondent (belonging to rural category), felt that 'urgent intervention' is needed to improve their physical environment.

It can further be noted from the table that there were more urban respondents (61.67 %) as compared to rural (43.33 %) who felt that the elements of physical environment surrounding them were healthy. However, on the other hand more rural respondents (30.00 %), rather than urban respondents (21.67 %) opined that the physical environment was 'less than optimal'. One fourth of rural respondents *i.e.* 25.00 per cent in comparison to only 16.67 per cent urban counterparts agreed to referred 'assistance' to improve their physical environment. It can thus, be concluded that most of the respondents in both rural and urban areas; did not perceive and foresee much of the threats coming from their exterior and interior surrounding environment mainly for their houses, its

Table 2 : Assessment of indoor pollution by respondents on physical environment assessment tool scale

Criteria	Rural (n=60)	Percentage	Urban (n=60)	Percentage	Total (n=120)	Percentage
Healthy	26	43.33	37	61.67	63	52.50
Less than optimal	18	30.00	13	21.67	31	25.83
Referral assistance	15	25.00	10	16.67	25	20.83
Urgent intervention	01	01.67	00	00.00	01	00.83

cleanliness, habitants and hazard their off. Chen *et al.* (2003) also discussed these issues in their research study and found that people generally do not perceive their indoor environment to be unhealthy.

Environmental Awareness Scale (EAS) :

Six statements to have opinions of respondents (scored to maximum of 7.00) and 18 to check the preparedness of pooled sample (scored to maximum of 25.00) were analyzed to assess environmental awareness and preparedness. The data is presented in Table 3. It can be seen from the table that almost three fourth (74.17 %) respondents scored more than the 'standard' revealing the fact that they hold opinions about environment surrounding them quite accurately. More urban respondents (78.33 %) as compared to their rural counterparts (70.00 %) were aware of environmental issues. This may be due to their higher education, more exposure to media like print media (newspapers, magazines, pamphlets etc.) hoardings, exhibitions and rallies organized by civil and professional bodies from time to time. As almost one fourth (25.83 %) respondents scored less than 'standard' (with mean score = 3.50); as expected more rural (30.00 %) compared to urban respondents were found to be below average.

The overall mean score earned by respondents on their opinions for environmental issues was 4.30. This showed that their awareness regarding their surrounding environment was little above the standard average of 3.50. It was also evident from the table that the score earned by urban respondents (mean score = 4.40) was more than their rural counterparts (mean score = 4.20). As discussed earlier, higher educational level and more exposure to other knowledge channels only seems to

be the reason for attaining better score by urban respondents.

As far as preparedness of respondents towards safe guarding and counteracting their polluting and constantly degrading environment, it was seen that overwhelming majority of the respondent (94.17 %) were found to be below the standard mark of preparedness regarding the improvement of indoor environment and rural respondents were marginally higher in numbers (95.00 %) as compared to their urban counterparts (93.13 %).

The overall mean score earned by pooled sample was 9.41 regarding their preparedness to something about the environment. The average standard for this field is 12.50. This showed that virtually in totality the preparedness was non-significant. Moreover, there were better scores earned by urban respondents (with mean score = 9.88) as compared to their rural counterparts (with mean score = 9.00). This implies that educational technologies should be more targeted to rural sample and their cannot be a better platform than print media like 'Changi Kheti' and 'Progressive Farming' and the *Kisan Melas* held both at Punjab Agricultural University and regional research centers, where educational material can be distributed to them.

There seems to be complete lack of knowledge about the harms which can be done to the inhabitants living in these kinds of dwellings which have not been guarded against indoor pollution. There were hardly three rural and four urban respondents who showed responsible level of preparedness to abate indoor pollution. There is urgent need for some educational intervention which must be imparted to the target group to increase their level of preparedness for doing positive changes in their living spaces for managing indoor pollution.

Table 3: Assessment of indoor pollution by respondents on environment awareness scale

Objectives parameters	Rural (n=60)		Urban (n=60)		Total (n=120)	
	Number	Percentage	Number	Percentage	Number	Percentage
Opinion on environmental issues						
Below average score (0-3.49) of standard group	18	30.00	13	21.67	31	25.83
Above average score (3.50-7.00)of standard group	42	70.00	47	78.33	89	74.17
Mean		4.20		4.40		4.30
SD		1.42		1.34		1.38
Prepared to do about environment						
Below average score (0-12.49) of standard group	57	95.00	56	93.33	113	94.17
Above average score (12.50-25.00) of standard group	3	5.00	4	6.67	7	5.83
Mean		9.00		9.88		9.41
SD		1.83		1.65		1.79

Conclusion :

It can be concluded from the preceding paras that subjective assessment of indoor pollution done on P.E.A.T scale, more than half of the selected houses were found to have 'healthy indoors', and only one house needed 'urgent intervention' which was in rural area. Rural houses were found to be less healthy, less optimal and needed more referral assistance.

As per the 'Environment Awareness Scale', almost three fourth respondents scored more than the 'standard' revealing the fact that they hold solid opinions about environment surroundings. About three fourth urban respondents were aware of major environmental issues.

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