

Assessment of Environment friendly behaviour among medical students in Tamil Nadu- A cross-sectional study

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ABSTRACT

Introduction

The world today faces significant environmental challenges which have been directly or indirectly due to actions of mankind. A pro-active, environmental-friendly behaviour from individuals, communities and policy-makers to protect and prevent further degradation of environment is an immediate need.

Materials & Methods:

This descriptive, cross-sectional study was conducted among second and third year students of a medical college in Tamil Nadu during the period July to August 2016 using a self-administered questionnaire to assess the individual behaviour and family practices. Kaiser-Meyer-Olkin (KMO) and Barlett's test were used to assess sampling adequacy. The responses were expressed as frequencies and percentages.

Results: A total of 210 students participated in the study. Individual eco-friendly practices with Likert-type responses were coded for a maximum of 60. Among the total 210 participants, 22.8%, 74.8% and 2.4% achieved high, medium and low scores respectively. The mean score was 35.23 with standard deviation (SD) 6.698. Assessing family practices, for a maximum score of 9, the mean score was 3.7 (SD 1.5).

Conclusion: The self-reported behaviour varied between domains. Participants had better practices related to energy-efficiency at home compared to waste reduction, recycling and transport behaviour suggesting the role of other socioeconomic determinants. The relatively poor scores among medical students and their families, a specific population with adequate exposure to environmental education suggest need for more effective measures to inculcate eco-friendly behaviour.

Keywords: Eco-friendly, environment-friendly, energy efficiency, pro-environmental, practices

INTRODUCTION

The world today faces significant environmental challenges such as global warming, urban air pollution, water scarcity and loss of biodiversity with an increasing number of fauna and flora under threat of extinction, which have been directly or indirectly due to actions of mankind over the centuries¹. Mitigating the effects of these environmental challenges will require a proactive environmental friendly behaviour. Simple individual household eco-friendly measures could play a collective role in contributing to a healthy environment.

Lynn and Longhi report that only 16% of the population consider themselves environment friendly from a longitudinal household survey in United Kingdom and this proportion increases to 24% among those 50 years or older². But the effects of environmental degradation are so profound that there is a need to inculcate positive environmental sense right from childhood. It is important to enable the children and youth identify and adopt the 4 R's of environmental sustainability- reduce, reuse, recycle and recover as part of their daily life³.

In a right step towards a healthy environment, "Transforming our world: the 2030 agenda for sustainable development", adopted at United Nations Sustainable Development Summit 2015, identifies environmental sustainability as one of the 4 important dimensions for global sustainable development and dedicates 7 out of 17 goals to sustainable environment, to be achieved by 2030⁴. The United Nations further prescribes some simple measures which could be adopted by every individual into their routine lives, which collectively would have a tremendous impact on the environment⁴.

Healthy environment contributes to a healthy community. While the literature review revealed a substantial number of studies on environmental attitudes there were very few studies assessing environmental behaviours of a community. In India, environmental education was made an

integrated component of National Policy on Education in 1986 and has been approved as part of school and college education^{5,6}. As part of curriculum, the medical students learn that environment is a major determinant of health and are motivated to maintain a healthy internal and external environment. This was a pilot study conducted as part of the World Environment Day 2016 initiative among the medical students.

MATERIALS & METHODS

This descriptive, cross-sectional study was conducted among second and third year students of a medical college in Tamil Nadu during the period July to August 2016. After obtaining informed written consent, the students were administered a pretested questionnaire, containing 3 sections-section-A containing the basic identification details of the student; section-B on environment behaviour at individual level and section-C on environmental friendly practices of the family. Section B consisted of Likert-type questions with the responses to individual behaviour being never, rarely, often or always. Items 1,4,5,7,8,9,12,13,14,15,16,17 and 18 of section-B were positive statements of environmental behaviour and were scored directly (never-1; rarely-2; often-3; always-4) such that higher the score, positive the behaviour. Items 2,3,6,10,11,19 and 20 were negative statements and were scored in reverse (always-1; often-2; rarely-3; never-4). The responses were coded and described as frequencies and percentages. The total score of an individual was calculated and the summary data

expressed as mean and standard deviation. The items in section C were assigned responses yes or no. All but one statements were positive and were coded directly (no-0; yes-1). Statement 5 was negative and coded in reverse.

RESULTS

A total of 210 students in the age group between 18 to 24 years, including 89 males and 121 females participated in the study. Kaiser-Meyer-Olkin (KMO) and Barlett's test were used to assess sampling adequacy. For individual environment-friendly behaviour, KMO measure was 0.632 which is higher than the threshold of 0.5 and Barlett's test of sphericity statistic was significant ($p < 0.001$; $\chi^2 = 433.647$). For family pro-environment behaviour, KMO measure was 0.548 and Barlett's test of sphericity statistic was significant ($p < 0.001$; $\chi^2 = 85.913$).

Table 1 reveals the individual environment-friendly behaviour under various domains. The responses related to individual behaviour was scored from 0 to 3 in ascending order for never, rarely, often and always in that order, so that a higher score represents a positive environmental friendly behaviour. The mean score achieved by the study population was 35.23 with a standard deviation of 6.698. The environment friendly behaviour was classified as high, moderate and low based on the scores and the distribution has been shown in Table 2.

The environment-friendly behaviour adopted by the family of the participants is shown in Table 3. The mean family score was 3.7 with standard deviation of 1.5.

Table 1: Individual environment-friendly behaviour

S.No.	Questions	Always	Often	Rare	Never
	Energy efficiency at home				
1	How often do you switch off fans/ lights when you leave a room?	96 (45.7)	58 (27.6)	31 (14.8)	25 (11.9)
2	How often do you use AC more than is necessary just because you are lazy to switch it off?	33 (15.7)	30 (14.3)	64 (30.5)	83 (39.5)
3	How often do you charge mobile or laptops more than necessary?	55 (26.2)	71 (33.8)	61 (29)	23 (11)
4	How often do you turn off computer monitor when not in use?	103 (49)	32 (15.2)	39 (18.6)	36 (17.2)
5	How often do you defrost refrigerators?	26 (12.4)	48 (22.9)	72 (34.3)	64 (30.5)
6	How often do you run water continuously while brushing?	46 (21.9)	25 (11.9)	49 (23.3)	90 (42.9)
7	How often do you bathe in bucket of water & not use shower?	100 (47.6)	43 (20.5)	38 (18.1)	29 (13.8)
8	How often do you wash your car or bike in a bucket of water & not use pipes?	46 (21.9)	22 (10.5)	47 (22.4)	95 (45.3)
9	How often do you stop to switch off fans or close leaking taps on your way?	91 (43.3)	59 (28.1)	43 (20.5)	17 (8.1)
	Waste reduction and recycling				
10	How often do you waste food?	25 (11.9)	48 (22.9)	92 (43.8)	45 (21.4)

11	How often do you throw waste on roadside & not dispose in dustbin?	22 (10.5)	43 (20.5)	103 (49)	4
12	How often you use both sides of paper?	154 (73.3)	40 (19)	12 (5.7)	(1.9)
13	How often do you seek e-copies instead of paper bills?	33 (15.7)	51 (24.3)	61 (29)	65 (31)
14	How often do you use paper cups & other degradable items?	48 (22.8)	83 (39.5)	65 (31)	14 (6.7)
	Eco-purchasing				
15	How often do you carry cloth bag while shopping?	18 (8.6)	37 (17.6)	38 (18.1)	117 (55.7)
16	How often do you refuse plastic bags?	27 (12.9)	37 (17.6)	63 (30)	83 (39.5)
	Transport behaviour				
17	How often do you cycle/ walk or use public transport to work/college?	106 (50.5)	48 (22.8)	25 (11.9)	31 (14.8)
18	How often do you carpool/bike-pool?	47 (22.4)	32 (15.2)	44 (21)	87 (41.4)
	Anti-environmental behaviour				
19	How often do you smoke in public?	6 (2.8)	1 (0.5)	1 (0.5)	202 (96.2)
20	How often do you burn waste in public?	10 (4.8)	3 (1.4)	28 (13.3)	169 (80.5)

Table 2: Distribution of individual environmental behaviour score

Score	Frequency (N)	Percentage
High (41-60)	48	22.8
Moderate (21-40)	157	74.8
Low (0-20)	5	2.4

Table 3: Environment-friendly behaviour of the family

S.No.	Questions	Yes	No
1	Do you have Rain water harvesting at home?	131 (62.4)	79 (37.6)
2	Do you recycle grey water (sewage/washing water) in your home/ apartment complex?	32 (15.2)	178 (84.8)
3	Do you recycle waste water from water purification system?	61 (29)	149 (71)
4	Do you segregate and dispose waste at home?	122 (58.1)	88 (41.9)
5	Do you have water stagnation near your house? (generated by your family)	27 (12.9)	183 (87.1)
6	Do you maintain kitchen garden?	113 (53.8)	97 (46.2)
7	Do you maintain trees?	158 (75.2)	52 (24.8)
8	Do you use solar energy at home?	38 (18.1)	172 (81.9)
9	Do you store and recycle leftover food safely at home? (e.g.) tamarind rice	118 (56.2)	92 (43.8)

DISCUSSION

The self-reported behaviour varies between domains, which might indicate differences in economic status and standard of living¹. Since there is a paucity of literature which examines all the practices enlisted in our study or uses a comprehensive score, the individual practices are compared and analysed against other studies.

Energy efficiency at home

It would be interesting to compare our findings with a similar, large-scale study, "Understanding society" conducted in Britain. Our study showed that 45.7% of the participants reported that they would always switch off fans or lights when not in use which is lesser than 63% reported by Britain population². About 73.3% of our participants responded that they always or often switch off lights and fans while leaving a room, which is higher than that reported by Davidson S et al in Scottish population, where 63% reported that they always or often practise the said behaviour⁷. The difference in these studies might be due to the fact that they were community-based and therefore comprising people with various levels of literacy and standard of living.

Waste reduction and recycling

In our study about one-third of the participants always or often wasted food or threw waste on the roadside instead of disposal bins (34.8% and 31% respectively). This suggests inadequate waste reduction, segregation and disposal practices. More than 90% always or often used both sides of paper. Forty percent and 62.3% of the participants always or often sought e-bills instead of paper bills and sought cups made of degradable items for beverages respectively. The preference of paper bills over e-bills by majority of the participants could be expected in a country such as India where the monetary transactions are predominantly cash-based. Ehrampoush MH et al in their study among medical university students reported that only 34% of the respondents participated in any solid waste segregation, disposal or recycling activity and majority of active participants belonged to public health stream⁸.

Eco-purchasing

Only 8.6% of our population reported taking their own cloth bags for shopping compared to a substantiate proportion of the British population². These findings suggest the need for more awareness.

Transport behaviour

It is an encouraging trend to observe that 50.5% of the participants always walked/ cycled or used public transport to get to work or college. This is close to that reported in Britain where 39% respondents claim to use public transport always and 60% walked or cycled short distances². Davidson S et al report a relatively lower proportion of respondents, 33% who walked or cycled or used public transport in their study⁷.

In a developing country where stringent anti-tobacco laws are yet to be implemented and incineration is the main mode of individual waste disposal contributing to profound air pollution, smoking at public places was reported by 3.8% and 6.2% reported always or often burning waste in public. Despite these low estimates, it remains to be seen if this trend would follow in adulthood considering the tremendous rise in smoking and air pollution related diseases in the world.

More than 50% of the participants report positive practices among their families with regard to working rainwater harvesting systems (62.4%), segregation of waste at source and recycling (58.1%), prevention of water stagnation around homes (87.1%), maintenance of kitchen garden and trees (53.8% and 75.2% respectively) and safe storage and recycling of leftover food (56.2%). Recycling of grey water or discarded water from water purification systems was practised in very few families.

Our study reveals that a higher proportion of our respondents reported positive behaviour with regard to energy efficiency practices at home, but the same could not be said about other domains. Energy efficiency practices at home could reflect the eco-friendly behaviour at best because, the other parameters have been revealed to be influenced by convenience, cost, lack of alternatives and other practical considerations⁷. The influence of convenience factor and availability of options for pro-environmental practices has been identified by Wilcox MA in his study on recycling behaviours among college students. While all his participants were concerned to various levels about the impact of waste on environment, majority of them adopted recycling practices only because it was available on-campus⁹. Findings from research by Davies et al also reinforce the positive impact of convenience and availability of services in waste management practices¹⁰.

Our study has a few limitations. The study depends on self-reporting behaviour of the participants which may not be adequately indicative of their actual behaviour at all times. The study does not focus on the attitudes towards environment or delve into other factors influencing their environmental behaviour. Questions and the responses with regard to use of household appliances and motor vehicles may not be applicable to students across the country from different socioeconomic strata. In a society of transition, the behaviour of an individual is dependent on many factors such as education, occupation, socioeconomic status, personal resources and practices in the family and community to name a few^{2,6,7,11}. Despite an adequate level of awareness and attitude, the behaviour of an individual may be less pro-environmental and inconsistent across various behaviours due to factors beyond his or her control¹². The role of these factors would require a larger study. But the very action of answering the questions is believed to initiate a self-assessment process and inculcate environment-friendly behaviour.

There is a necessity for environmental education to be introduced in early childhood and continued through youth as part of school and university environmental programs to develop positive attitudes³. Students in college have the potential to motivate a positive behaviour change among people spanning three generations, their parents and elders at home, peers and the future generation^{3,13}. Mass media should dedicate separate sections to environmental issues as part of social responsibility⁴. There is an urgent need to convince the community on the challenges posed by the deteriorating eco-system and the necessity to initiate effective eco-friendly measures at individual and community level¹². There is a need for epidemiological studies across the country with focus on regional and local practices influencing environment and identification of socioeconomic and cultural factors which have an impact on those practices.

A detailed inter-disciplinary, community-based study is being planned on environmental attitudes and behaviour of families with the energy value of these behaviours in the field-practice areas of our college. The results of the study will be utilised to help the communities to analyse their pro-environmental behaviour induced energy savings and motivate them to adopt and apply the eco-friendly measures in their day-to-day life.

CONCLUSION

Educational activities and epidemiological research focussed on environmental attitudes and behaviour should be facilitated to promote environment friendly communities. Research on environmental attitudes and behaviours would help assess the level to which the environmental education objectives have been achieved and assist in identifying the issues impeding positive population behaviour. By adopting environmental-friendly behaviour, every individual can play an active role towards long-term environmental protection and sustainability.

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