

**A Study of Littering Behavior of students of Devi Ahilya University
with respect to Clean India Mission**

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Abstract

Rationale:

In cleanliness survey 2019, Indore have been awarded as cleanest city of India third time in a row. In this context, the study of littering behavior of the youth of Indore becomes very significant. This study is an attempt to analyze littering behavior of students of Devi Ahilya University of Indore.

Objective:

The objective of this study is to explore students' littering behavior. The research has developed valid and reliable scale to measure littering behavior, livability quotient (LQ), Personal Norms (PN) and Motivation & Barriers for littering behavior. In light of the 'Clean India Mission', the impact of the livability quotient (LQ), Personal Norms (PN) and Motivation & Barriers for littering behavior on Littering Behavior is studied.

Methodology:

Data for this descriptive research were collected via a questionnaire based survey of 400 students from Devi Ahilya University. Stratified sampling was adopted for this study and multiple regression was implied to analyze the impact of selected variables such as LB, LQ, P and motivation & barrier.

Major Result:

The findings show that 98% of students are aware about 'Clean India Mission' & 64% of total response identified TV & radio as primary media for information. It is found that the LQ shows a negative relationship with LB. Mean PN scale found to have a negative relation with LB. A positive relationship is found between motivation & barrier scale & LB.

Expected Contribution:

The inferences deduced can be used for promoting good habits of young citizens which will contribute in making anti-littering awareness programmes more effective in India.

Key Words: - Littering Behavior, 'Clean India Mission', Anti-litter movement, Cleanliness, Students' Awareness

1. Introduction

Social campaigns have a huge impact on the mindset of people (Devendra K. Tayal, 2017 november). One such campaign was launched in India on October 2, 2014, named 'Clean India Mission'. The foundation of this movement was laid by our prime minister 'Shri Narendra Modi'. This 'Clean India Mission' was launched to ensure that each citizen of India must get access to the basic necessities of cleanliness and hygiene (Pushpanjali Swain, 2016). This study aims to identify and understand the littering behavior by determining dependent and independent variables such as livability quotient, personal norms, motivation and barriers, with respect to 'Clean India Mission' amongst the students of Devi Ahilya University. Along with that, choice of media for promotion of such social campaign will be explored. The study also intends to explore the awareness and impact of the anti-litter movement amongst the students of Devi Ahilya University. Devi Ahilya University is a state university whose dominion includes seven districts of Indore division. (wikipedia.org, 2014) Before studying the littering behavior, we must know what the litter actually is. According to (Geller, 1980) Litter is any piece of misplaced solid waste. The solid waste can be small items like cigarette butts, candy wrappers or it can be any appliances or even spacecraft. In context of India the biggest problem is not the litter, but the individuals who litter and how often does they litter. Further, specified the volume of litter that collects nationally & worldwide, it become very crucial to understand the littering behavior of individuals. (P. Wesley Schultz, 2013). Previous research on littering behavior done by (Terry J. Brown, 2010) investigated that the greatest success to influence someone's actions towards littering comes from the ability to understand what they believe about a particular behavior.

Thus, this study intends to create a basis for identifying and measuring the various behavioral and environmental factors which influence the littering behavior of a student at Devi Ahilya University. Anti-litter movements have been a part of almost every country for the cleanliness, hygiene, improvement of community standards and environmental welfare.

According to Water, Sanitation, and Hygiene (WASH) Performance Index 2015, developed by the Water Institute at the University of North Carolina, India was a bottom performer and was ranked 93 (Babita Jangra, Dec 2016). In their survey the author identified the water index level to be very low in many countries including India. These are the countries which are facing challenge in providing appropriate sanitation for their population which leads to people at risk for water, sanitation, and hygiene related diseases.

On the basis of inferences drawn from our study, many respondents think that littering is a behavior which is done purposely and is influenced by their own personal traits. The origin of such behavior has seen from primordial caste system when untouchability was practiced. But, in current time with the technological development in India, most of the respondents are being influenced by the media promotion. (Specifically “Indore rahega number one” tag line or “Hai Halla” promotional song on this anti-litter campaign). Also, it was discovered by (Durdan, 1985) that the written prompts encouraging positive messages like “ Please be helpful!” motivated litter reduction.

The objective behind ‘Clean India Mission’ is to keep cleaner surroundings, proper sanitation and safe drinking water. There were a few applied studies on this context overseas and that was of very little use in developing effective litter reduction strategies since the culture, mindset and demography of our country is far more diverse. Several studies have been conducted to analyze the outcome of ‘Clean India Mission’. These studies focus on the analysis of material results of the mission. Little or almost no work has been done to measure the behavioral impact of this campaign.

This study is basically conducted to study the littering behavior and its determinants and also to observe the remarkable impact created by ‘Clean India Mission’ on the littering behavior of students of Devi Ahilya University. The various variables taken in account are observed and interrelated to analyze the positive effect of campaign. The study intends to investigate the behavioral aspect of littering tendency amongst students of Devi Ahilya University. What makes the study even more reliable and considerable is the fact that Indore has been awarded the title of cleanest city consecutively in the last three inspections. Thus, observing the behavioral aspect of youth here would really contribute valuable deductions to the movement analysis.

2. Review of Literature

Litter has become one of the most crucial problems of society (Simone Leijdekkers, 2015). In Netherlands, teenagers aged between 13 to 18 are the biggest contributors of litter. But it is very difficult to make effective Conclusions to address this problem as studies regarding the motivations and behavior of this age group towards litter are yet to be pursued.

(Maptuh, Feb 2013) conducted study that intends to explore whether a relationship exists between knowledge of students and littering behavior in context with the maintenance of a healthy environment. The study was conducted in five Arabic boarding schools (Pondok Pesantren) in Cikoneng, Ciamis district. Author found in his study that there exists a positive relationship between knowledge of environmental hygiene behavior in the maintenance of a healthy environment. It means that higher the knowledge of environmental hygiene of the students, better will be the behavior of the students in the maintenance of environmental hygiene in Pondok Pesantren. Further, (Chua Kim Hing, 2012) in their study suggested that the anti-litter Campaigns plays a significant role to be a more profitable alternative for the betterment of hygiene in the states of Malaysia as compared to the traditional methods. Also, prior analysis reports about the conventional anti-litter campaigns explored that the former movements failed to curb the actual littering issue. This study reveals that the cause of failure of earlier movements was because the anti litter movements were concentrating on the litters and garbage generated whereas the main cause were the litterers not the litter. Dissimilar to the traditional approach which focuses on the litter, the anti-litterbugs campaign has a high chance of improving and maintaining urban immaculateness.

(P. Wesley Schultz, 2013) Another study towards finding personal & environmental predictors of the littering behavior suggested that, not unlike all other social problems, the main cause of litter is human behavior. Even if with the intention or by accident, litter initiates with the individual citizen. Taking into consideration social, environmental & national issues which are an outcome of litter, there are many theories have been developed, applied, and also analyzed. But despite of these prior efforts, litter is still a persistent problem.

Another research by (Benno Torgler, 2008) explores the interrelation between environmental participation and littering. Previous analytical work in the area of littering is almost non-existent. Provisions are made to address these deficiencies, confirming a strong empirical link between environmental participation and reduced public littering. The data used for this study is taken from European Values Survey (EVS) data for about 30 Western and Eastern

European countries. The Conclusion points towards a very important perspective that if a country's membership of environmental organizations concretizes the commitments towards cleanliness of country and concerned communities.

A study on behavior analysis approach was undertaken by (Scott, 2004) for inspiring pro-environment behavior. Also the research was focused to discuss the ways in which behavioral science can play essential role in protecting the environment. After reviewing literature regarding the targets, settings & techniques of the behavioral intervention it is stated that behavior analysis can play a essential role in solving environmental problems by:- (a) reexamination & expansion of intervention targets, (b) increased focus on long-term maintenance of pro-environment behavior, and (c) more effective dissemination of intervention strategies and research findings.

3. Research Objective

1. To explore the awareness and choice of media for promotion of Clean India Mission among the students of Devi Ahilya University.
2. To explore and estimate the livability quotient, personal norms, motivation and barriers that affects littering behavior and develop a standard for measuring it.
3. To identify impact of livability quotient, personal norms, motivation and barriers on littering behavior among the students of Devi Ahilya University.

4. Research Methodology

4.1 Research design

This research is a descriptive type research in nature. Qualitative Survey Research methodology was utilized in the study to determine the impact of the 'Clean India Mission' on the students of Devi Ahilya University. The research will uncover details on what is the littering behavior of students rather than why such behavior exists. It is a purely behavior based descriptive study which can be recreated in other locations as well, as the study creates a scale for measuring the behavioral littering tendency of Indore. This scale was adopted from a study conducted in America (Keep America Beautiful, 2009). From this study and Review of Literature factors (i.e. measurement of livability of residential areas, personal norms) that affect littering behavior, motivations that drive the littering or non-littering tendencies of an individual were identified.

4.2 Reliability and Validity Measurement

The scale was duly validated by a panel of judges. Reliability among variables was measured using Cronbach's α . The value of Cronbach's α was higher than 0.7, which is considered good for reliability/internal consistency between the items (Hair Jr., 1998). Then the degree of dependence between these identified variables and littering behavior was found and a relation was established between them.

Reliability statistics

Variable	Cronbach's α
Littering behavior	.97
Livability quotient	.91
Personal norms scale	.85
Motivation scale	.88

4.3 Sample design and data collection

The population of study was Devi Ahilya University. Where the sample of study were students from each department from Devi Ahilya University Indore. The type of sampling used for the study was stratified sampling method. In this type, the target population is divided into stratas on the basis of some common characteristics set by the researcher and sample is selected disproportionately from each of these clusters. The littering behavior and its impact were measured through a set of questions. A total of 400 questionnaires were collected after complete responses and used for further analysis.

5. Data Analysis

The collected data was first tabulated and then analyzed using SPSS (statistical package for social studies) software.

Exploring the awareness and widely used choice of media for promotion of Clean India Mission amongst the students of Devi Ahilya University:

The respondents were asked that on a scale of 1 to 10, where 1 represented not at all important and 10 represented very important; how important Clean India Mission in their city. According to the responses obtained, 64 % of total sample identified television and radio

as the primary source of information. Whereas 21% respondents gave credits to social networking sites and only 10% people admitted newspaper and hoardings as an informal media.

Exploring and Estimating the livability quotient, personal norms, motivation and barriers that affects littering behavior of students of Devi Ahilya University

Measured on a 10 pointer scale, the community livability questions were constructed to determine the effects of clean and safe community characteristics on the littering behavior. The items measured are community cleanliness, structural maintenance, ease of navigation for pedestrians, safety, landscaping, and infrastructure. The ratings from each were averaged to produce a score of the livability quotient.

Mean score values

Norms of Livability Quotient	Mean
Visible litter	8.26
Cleanliness	8.56
Maintenance	6.01
Safety	7.89
Attractiveness	6.98
Landscaping	8.21
Attractive landscape	5.23
Public facilities	7.62
Personal norm scale	
No litter in absence of dustbin	5.39
Pick up other's litter	6.72
Not litter if dustbin is too far	7.89
Not litter bottle/can in absence of dustbin	8.95
Norms of motivation and barrier scale	
Unrecyclable	5.7
Bad mood of respondent	4.32
Unaccountability	6.09
Lack of time	5.26
Unavailability of dust bin	7.55

Non biodegradable litter	5.23
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From analysis of above mean score values we can interpret that cleanliness, maintenance, safety, attractiveness, landscaping and public facilities are the most important factors that contribute towards the livability of any residential area. According to the responses obtained, respondents will consider littering if the dustbin is too far and out of their way (78% respondents). They will also litter much when there is no dustbin nearby and they are holding a beverage can/ bottle or food wrapper (89%).

Identify impact of livability quotient, personal norms, motivation and barriers on littering behavior among the students of Devi Ahilya University.

Analysis using Skewness, Kurtosis, Variance inflation factor and multiple regressions: The mean values of variables were calculated and found as follows:

	Norms	Livability quotient	Perso nal norms	Motivation al barriers	littering behavior
Skewness /kurtosis test to check normality of data					
	N	400	400	400	400
	Minimum	2.75	1.75	1.17	1
	Maximum	9.75	9.75	9.83	9.18
	Mean	8.15	7.78	5.32	4.66
	Std. deviation	1.2	1.7	2	1.6
	Skewness	-1.55	-1.24	0.58	1.02
Descriptive statistics for kurtosis					
Kurtosis	statistic	2.31	2.68	-5.86	0.89
	std. error	0.29	0.29	0.29	0.29
Variance inflation factor to check multi co linearity of the data					
	Tolerance	-7.16	0.691	0.958	
	VIF	1.39	1.44	1.04	
Descriptive statics for mean of variable					
	N	400	400	400	400
	Mean	64.26	31.28	34.15	52.54
	Std. Deviation	9.87	9.45	11.32	15.64
	Minimum	22	17	7	11
	Maximum	140	123	59	101

The allowable normal distribution range is from (-2 to +2), all the values obtained for skewness and kurtosis lie in that range. So the data is normally distributed. Breusch-pagantest was applied to check homo-skedasticity of the data and the result shows that data is concentrated and not much scattered. Ideally the value of $p > 0.05$, the required criteria is being met by the data ($p=0.5$). It is considered to be homo-skedastically distributed. With reference to the above table, the value of VIF < 10 , and in the results obtained all VIF values are far less than 10. Thus no multi co linearity exists in the data set. Hence the independent variables livability quotient, personal norms scale and motivational barriers are totally independent and no substantial correlation exists between them. Multiple regression was performed to check whether a relation exists between the variables viz. littering behavior (dependent variable) and livability quotient, personal norm scale and motivation and barrier scale (independent variables).

Proposed model of regression:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3$$

Where, Y= littering behavior (dependent variable) a = the intercept

b1 = the slope of livability quotient

X1 = livability quotient (independent variable) b2 = the slope of personal norms scale

X2 = personal norms (independent variable) b3= the slope of motivations and barrier scale

X3 =motivation and barrier (independent variable)

5.1 Durbin-Watson test to check the auto correlation of the dataset

Mode	R	R Square	Adjusted RSquare	Std. Error	Durbin- Watson
1	0.65	0.42	0.41	1.24	1.3

Predictors: (Constant), motivation and barrier, livability quotient, personal norms

Dependent Variable:littering behavior. Since the Durbin Watson value obtained in this case is 1.3, independence of error (no correlation). From the model summary of Watson Durbin test, r (multiple correlation coefficient) is observed to be 0.62, which means the data is 62% relevant.

5.2 Statistical significance

The F-ratio in the ANOVA table tests whether the overall regression model is a good fit for the data. The table shows that the independent variables statistically significantly predict the

dependent variable, $F(0,259) = 64.07$, $p < .0005$, the regression model is a good fit of the data.

ANOVA

MODEL	Sum of Squares	df	Mean Square	F	sig
Regression	206.06	0	90.06	64.07	0
Residual	400.04	259	1.54		
Total	696.94	263			

To establish a relationship equation between the selected variables, the coefficient table is used

5.3 Coefficient Table

		B	Std.error	Beta	T	sig
Model	Constant	4.027	0.553			0
	livability quotient	-0.22	0.07	-0.16	-0.16	0
	personal norms	-0.02	0.05	-0.02	-0.02	0.02
	motivation and barrier scale	0.505	0.03	0.64	0.64	0

So according to the beta coefficients, the following relation is established:

<p>Littering Behavior = 4.027 + (-0.227)*Livability quotient + (-0.025)*mean Personal norm scale + 0.505 *mean of motivation and barrierscale</p>
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The findings suggested that the livability quotient has a negative relationship with littering behavior. Also, results indicated a negative relation between mean personal norm scale and littering behavior. This means that people are likely to litter more when there is no dustbin around or the dustbin is out of reach. The scale of motivation barrier consists of questions that assess the respondent's current mood, unaccountability of litter, lack of time to pick the litter up, substance of litter. On the basis of which a positive relationship is found between motivation and barrier scale and littering behavior.

6. DISCUSSION

The study attempts to understand the littering behavior of youth of Indore who are studying in Devi Ahilya University along with other variables like livability quotient, personal norms,

motivation & barrier scale. The findings show that maximum people (64 % of total sample) prefer television & radio as the primary choice of media and remaining 21% and 10% rely on social networking sites and newspaper for the information, respectively. These findings supported the result reported in previous study such as (Apejoye, April 2015) , which suggested that the individuals stay glue to their TV & radio set for the information, also they group newspaper for the same purpose. The information is considered to be credible only when it is confirmed by the mass media like television or newspaper.

Moreover, the study explored the effects of clean and safe community characteristics on the littering behavior. Most of the respondents consider littering when the dustbin is too far or out of their way. Further, if the individuals are carrying the litter in their hands & dustbin is not near to them, they will litter more. As per the report generated by a study conducted in Britain's Green Park and St James's Park about littering and recycling, (Unknown, July 2015) people are more prone to litter when they are accompanied with at least one other person, and this littering behavior increases again when they are in groups of four or more. This implies that people feel more assured about littering when accompanied by others. In this study multiple regression was performed to check whether a relation exists between the littering behavior (dependent variable) and livability quotient, personal norm scale and motivation and barrier scale (independent variables). Standard multiple regression can accurately estimate the relationship between dependent and independent variables if the relationships are linear in nature (Waters, 2002) . The findings from multiple regression suggest that livability quotient and personal norms are negatively related with littering behavior. A study performed by (Elizabeth A Smith, 2011) found that the littering behaviour can be affected by item type (eg, cigarette butt vs beverage container) and by location (eg, street vs park vs residential area). These findings are supported by our result which concludes that any individual wants a clean and hygienic residential area so that there will be lesser littering behavior of residents.

7. CONCLUSION

The recent littering rates of students of Devi Ahilya University resulted from this study are very surprising. The mean littering rate of Indore was found to be 53%, which is relatively lower than the mean littering rate of the rest of the country. Community livability according to students was found to be 64%. From this analysis, we can interpret that cleanliness, maintenance, safety, attractiveness; landscaping and public facilities are the most important factors that contribute towards the livability of any residential area. Over the years, considerable has been said about individual environmental references, littering behavior and

litter (Elizabeth Brooks, June 2017), but no study has been performed which is specifically targeted towards youth, anti-litter campaign and simultaneously finding out the impact of a variable on littering behavior. When it comes to littering behavior, responses and characteristics of individuals vary irrespective of the facilities provided. Further, results of a study performed by (Benno Torgler M. A.-V., July 2008) indicate that if individuals are given same infrastructure and opportunities to properly dispose, they will still vary immensely.

In this study, dependent variable is livability quotient and results suggest that the livability quotient shows a negative relationship with littering behavior. It means that the cleaner, hygienic, well maintained, safe and attractive any residential area is, the lesser will be the littering behavior of residents. Also the results show a negative relation between mean personal norm scale and littering behavior. A cross inference can be drawn from this that littering tendency increases in an already dirty place or area with low livability quotient. Finally, a positive relationship is found between motivation and barrier scale and littering behavior. This positive relationship indicates that if the factors related to individual are favorable, then the littering tendency is found to be minimal. Previous research on motivation and behavior of individuals by (Pam Scholder Ellen, 1991) suggested that the marketers are required to target their messages in order to keep their focus on the barriers which are discouraging the performance of specific behaviors such as littering behavior.

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