

Awareness on swachh bharat and exposure to air pollution among construction workers in rural area of Tamil Nadu, India – A pilot study

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Abstract

Introduction: The clean India initiative named as Swachh Bharat Abhiyaan (SBA) is India's flagship program which provides impetus to sanitation, hygiene and micro environment like our immediate surroundings but it has few evidences about its trickling down (awareness levels) among rural masses.

Objective: To find the awareness and knowledge levels on SBA among rural construction workers and to explore impact on respiratory system due to unhealthy environment.

Materials and Method: Four villages were selected from Kanchipuram district and one village was selected randomly. To field test the questionnaire fifty construction workers were identified and data was analysed. Frequencies for some variables and association analysis was done between the subject's year of exposure to dust/occupation and years of exposure to tobacco with lung volume.

Results: The term 'Swachh Bharat' was known by 53.3% and samples who were knowing the aims of the program was 50%. This study came out with a result that 93.3% of the samples reported they open defecate. There was no association was found between years of exposure and lung volumes. Normal lung volume was only 10% prevalent among the samples.

Conclusion: SBA Mission needs to be more rigour in spreading its goals among the rural parts. Personal Protection Equipment (PPE) must be supplied and made mandatory to these construction workers in rural areas to make their working environment more efficient.

Keywords: Swachh Bharat Abhiyaan, SBA, ODF, Air Pollution, Construction workers, Lung Compromise.

Introduction

Swachh Bharat Abhiyaan (SBA) a cleanliness drive announced by our hon'ble Prime Minister Mr. Narendra Modi. It is perceived to be one of the largest program for our country to take hygiene and sanitation practices a step further by attributing our Nation with Social Inclusion and Clean Environment.¹ But still the sightings of open defecation are prevalent in India.² A study done in Kerala suggested that the awareness among rural masses about rural development programs was just 45%.³ SBA also considers Air pollution under Clean Environment. Research works establishing a connection between compromised lung volumes and construction dust exposure is very much limited.⁴ As many of the construction workers are migrants their approach to seek occupational related health services are much low. Thus finding out the prevalence of lung volumes among the construction workers is inevitable.⁵ The objectives of the study were to find the awareness about Swachh Bharath among construction workers, to the hygiene and drinking water practices and to measure the lung volume and to see its association with tobacco usage.

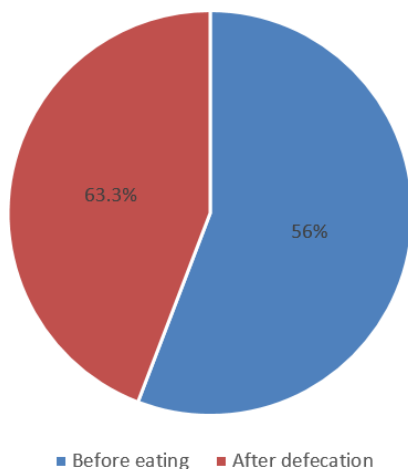
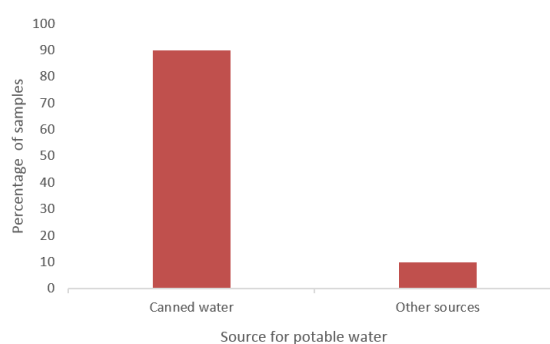
Materials and Method

Four villages were selected from Kanchipuram district namely, Potheri, Kattankulathur, Urapakkam and Vandalur and one village i.e, Vandalur was selected through simple random sampling. A sample of 50 construction workers was selected from Vandalur area belonging to Kanchipuram district of Tamil Nadu. A cross sectional descriptive study design adopted for the survey and a questionnaire was designed and was field tested for face validity and content validity. Oral consent was obtained from the study participants before conducting the survey. A spirometer was used to measure the lung volumes of the participants.⁶ Subjects were asked to hold the mouthpiece and made sure it's sealed tight with their mouth and asked to inhale to their full capacity. Surgical spirit was used to clean the mouthpiece to maintain hygiene. Data analysis was done using SPSS 22 for Microsoft Windows. Frequencies were obtained for Gender, Years of working, hand washing practices before food and after defecation, Awareness of Swachh Bharat and association analysis was done for other few variables.

Table 1: Percentage of Gender, Hand washing, Drinking water & Defecation practices at work site, awareness about Swachh Bharath & Personal Habits (n=50)

S. No	Variable	Characteristics	%
1	Gender	Male	83.3
		Female	16.7
2	Hand washing with soap	Before Eating	80
		After defecation	63.3
3	Drinking Water	Canned water	90
4	Defecation	Open	93.3
5	Swachh Bharath	SBA Term	53.3
		Aims	50
6	Personal Habits	Smoking	46.7
		Alcohol	53.3
7	SBA Toilets	Seen	80
		Constructed	20

Table 1 depicts the information on gender distribution among samples, hand washing practices, drinking water and defecation practises at work place. Also it portrays the awareness on Swachh Bharath, smoking and drinking habits among the samples. About 80 percent of them have seen toilets constructed under SBA and 20 percent among them have constructed SBA toilets. No association was found between tobacco usage, (Pearson .238, p value .626) years of exposure to construction dust (Pearson 7.778, p value 0.51) and lung volume.

**Fig. 1: Pie chart showing the percentage of samples washing hands with soap before eating and after defecation****Fig. 2: Bar chart depicting source for potable water at work site**

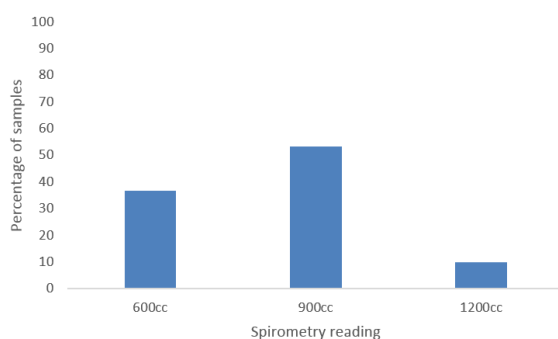
Discussion

It is perceivable that 80 percent of the samples wash their hands with soaps. But when asked whether they wash with soap always before eating even at home, only nine percent practice so. It has to be noted that, since there work environment involves cement, sand, bricks etc their hands get dirty and forces them to wash their hands with soap. Regarding the hand washing with soap after defecation, among 63.3 percent only 7 percent of them have said that they wash always with soap after defecation. This shows the real behaviour of hand washing practices. When considering clean environment under SBA it also applies for occupational surroundings so, compromise of the lung volumes has to be considered as a serious threat for construction workers as it may lead to irreversible obstruction disease of the lungs. On recording of lung volumes, only 10 percent of the samples had normal lung volume even though, subjects were asked to exhale forcefully before the procedure so that expiratory reserve volume doesn't act as a confounder. See Table 2 and Fig. 3.

Table 2: Percentage of samples classified according to their lung volume performances in spirometer (n=50)

cc/sec	%	Cumulative %
600cc	36.7	36.7
900cc	53.3	90
1200cc	10	100
Total	100	

Though it is good to know that 90 percent of them consume canned water for drinking water which is a safe drinking water practice, the reliability of those water can companies are at stake.⁷ But people have perceived benefits for preferring canned water rather than other sources.⁸ Almost 93 percent of them practice open defecation while at work site that to near ponds, lakes or field. This poses a serious threat and risk of water contamination which may lead to outbreaks of various diseases like cholera, typhoid, hepatitis etc and not a trivial issue from Public Health perspective.

**Fig. 3: Bar chart showing the different Lung volumes attained by the workers**

The awareness of Swachh Bharath and its aim seems to be low despite its huge advertisements almost in every Government's ad in newspapers and television is accompanied by its logo. Though 80 percent of them have seen toilets constructed under Swachh Bharath, it has to be noted that the answer was elicited from them after saying whether have they seen any toilets constructed out of which Government has paid any money for the same. So it cannot be directly considered as toilet under Swachh Bharat as Nirmal Bharath Abhiyan (NBA) which was the predecessor of Swachh Bharath has also given money to construct toilets at home. Among this 80, around 20 percent of them have constructed toilets under 'Government's money program for toilet construction at home'. A study published in 2015 has found that there are no functional toilets at the home of beneficiaries who got Government's subsidy.⁹ This raises concerns about the various awareness activities and behavioural change strategies that have been undertaken as a part of both under SBA & NBA. The significance in the association between years of exposure and tobacco consumption is compromised because of two factors. One is the sample

size which is not huge and another is the duration and exact years of exposure cannot be calculated. Regarding the tobacco usage, number of cigarettes or beedis smoked per day and the years of smoking was not included in the study which if included would have played a role in establishing significant association with Cardio vascular conditions¹⁰ or respiratory diseases such as COPD.¹¹

Conclusion

To summarize, hand washing practices after defecation is less prevalent. Innovative steps to imbibe behaviour change among people are foreseen. The usage of packed/sealed water cans is good health behaviour but credibility of processed potable water companies should be identified apart from Government's instruction to watch for 'Indian Standard Institute' (ISI) symbol. Swachh Bharat Mission needs to be more rigour in spreading its awareness and goals among the rural parts. Personal Protection Equipment (PPE) must be supplied to these construction workers in rural areas to pre-emptively check occupational hazards. Large sample size and precise questions about smoking and dust exposure can be added to know the association between these exposures and lung volume compromise.

Conflict of Interest: The Authors declares that there is no conflict of interest regarding the publication of this paper.

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