Introduction

Primary Health Care depends on holistic health care approach from “womb to tomb” embracing prevention of all types of risk factor exposure including the provision of safe water and scientific sanitary facilities as. With all-round development and with considerable population movement, the need for safe water and toilet facilities in all the places has increased manifold. It is a day to day necessity, which becomes cause for concern if adequate water supply and toilet facilities are not available in all the places of human movement and congregation. Otherwise, this can often be embarrassing, especially for women (more so for pregnant and menstruating women) when they are away from home for long hours. The research group felt that there is need for adequate safe water and sanitary services in the places of travel and human congregation like railways, buses and bus stands, ships and jetties, market places, schools, colleges, cinema halls, theaters, etc. This has become

Abstract

There is abundant literature on domestic safe water supply and hygienic sanitation. Yet, there is a paucity of research studies on adequate supply of safe drinking water and toilet facilities in places of population movement and congregation in India. This study stresses on the importance of availability of safe water and sanitation facilities in all the places of human congregation and movement in India. 49 research studies were identified from 169 potentially relevant publications. Studies were selected: first, all protocols of water and toilet facilities among published literature were meticulously searched. Second, information sources on sanitation facilities in public life, viz., railways, roadways, waterways, market places and shopping complexes, schools, and other higher educational institutions, fairs and festivals, entertainment establishments, healthcare facilities, were explored from publications of various resources of different levels. Third, published reports from apex bodies of national and international importance like Indian Council of Medical Research, World Health Organization (WHO), UNICEF, USAID, etc. were given due weightage.

Of late, the concept of cleanliness and making communities free from open defecation are in limelight as the Government of India has taken up Swachh Bharat Mission (SBM); even then, contextual gaps remain. This is the cause for concern as both safe water supply and basic sanitation are directly linked to health promotion of the community. Further, this research group have noted that due importance has not been integrated in the planning of SBM regarding availability of safe water and scientific sanitation facilities in all the places of human movement and congregation. Hence, there is more need for creating awareness among general population as well as stakeholders regarding this aspect of cleanliness. It is noted that despite considerable improvement in safe water and sanitation facilities in domestic life, there is considerable population left, who are still lacking access to these facilities in public space.

Keywords: Hygienic toilet, public facilities, safe drinking water
more relevant in light of Prime Minister’s “Swachh Bharat Abhiyan” or “Swachh Bharat Mission (SBM).” This study was done with the objectives to find provision of safe water supply and good sanitation facilities in various places of human congregation and movement in India.

**A Review: Global Vs India**

We have identified 49 research studies from 169 potentially relevant articles. Studies were selected: first; all protocols of water and toilet facilities among published literature were meticulously searched. Second, safe sanitation in railways, bus tracks, seaports, market places and shopping complexes, schools, higher education institutions, fairs and festivals, entertainment establishments, and healthcare facilities was explored from publications of various resources of different levels. Third, published reports from apex bodies of national and international importance like Indian Council of Medical Research, World Health Organization (WHO), Centre for Disease Control (CDC), Atlanta USA, UNICEF, USAID, and others were given due weightage for their multi-authored authenticity.

**Swachh Bharat Mission**

Swachh Bharat Mission was promulgated by the government of India as the largest behavior change program in the world, introduced under the able guidance of, the Honorable Prime Minister of India on 2nd October, 2014 honoring Mahatma Gandhi’s vision of a “Clean India” to eliminate open defecation by 2 October 2019. UNICEF-WHO Joint Monitoring Program (JMP) estimated in 2013, 41% of rural and 67% of urban population had improved sanitation facilities to meet global targets of Sustainable Development Goal 6, to ensure universal access to safe drinking water and sanitation by 2030. Impact evaluation after 5 years has shown that in many places even if sanitary domestic toilet facilities are adequately available, people are still at ease to go for open-air defecation. This futuristic vision encompassed the responsibility of each and every citizen of India as a participatory contribution to the nation. This program started with a bang and aroused huge enthusiasm from all corners of our country where many celebrities, stakeholders, and especially common men accepted this program with great vigor in search of a healthy India. The positive impacts of Swachh Bharat Abhiyan are as follows as per public opinion that was collected by a survey as follows: (A) 18% people stated that the public toilets in their cities have been improved after Swachh Bharat; (B) 32% people believe that Swachh Bharat has made the students aware of cleanliness and overall civic sense; (C) 22% believe that municipalities have become more responsive to complaints regarding garbage collection and street cleaning; (D) 50 lakh household toilets have been constructed in the country. Yet, this Abhiyan fell short of expectations regarding education, awareness-raising, and behavior change communication required to achieve the Sustainable Development Goal Target 6 (SDG6) to end open defecation by 2030 by inconsistent and irregular use of the sanitary facilities in spite of huge achievement in household-level toilet construction at subsidized cost. Huge population movements, general ignorance regarding hygienic practices, unavailability of infrastructure including shortage of water, and general reluctance to use the available resources should be managed by prompt redressal of public grievances, re-mediation of sanitary services, and improved use by intensive health education. Further, it was felt by this research group that in reality, there was deficiency of vision regarding water and sanitation facilities in the sectors dealing with human congregation or places of huge public movements, viz., public transport systems, market places, educational institutions, fairs and festivals, leisure hubs, and outside homes, which led to take up this study. 

**Cost benefit of safe water and sanitation**

United Nations reported globally 663 million people still do not have access to safe drinking water and over half of the global population lack safe sanitation; at least, two billion people drink contaminated water leading to the death of specially under-five children from diarrheal diseases. Up to 5% GDP loss accounts for loss of productivity from water and sanitation-related diseases and global disease burden is predicted to be reduced to 10% by mere improving access to safe drinking water and adequate sanitation. In urban areas, for every $1 invested in basic drinking water, an average of more than $3 is returned in saved medical costs and increased productivity. For every $1 invested in basic sanitation, the return is $2.5. In rural areas, the return on investment is even higher: with every $1 invested in basic drinking water, an average of nearly $7 is returned in saved medical costs and increased productivity. And in the case of basic sanitation in rural areas, every $1 returns on average more than $5 in saved medical costs and increased productivity.

**Global Status**

Global population is reeling under pathetic “man-made” unhygienic environment with a paucity of safe water supply as important risk factor and risk correlates of sprawling communicable diseases. Only about 45% of the world’s population (3.4 billion people) have access to sanitation services and about 14% (1.0 billion people) used sanitary toilets or latrines. About 2.0 billion people still do not have access to basic sanitation facilities. This shows that 673 million still defecate in the open. It is well evident that poor sanitation leads to transmission of diseases such as diarrhea, dysentery, cholera, hepatitis A, polio, typhoid, intestinal worms, schistosomiasis, trachoma, etc. About 1.5 million children below the age of five die from diarrhea every year; it also contributes to malnutrition. United Nations General Assembly (2010) acknowledged that safe and clean water and sanitation services is fundamental human right and appealed to all countries to provide these services that are safe, clean, accessible, and affordable. Target 6.2 of United Nations Sustainable Development Goal (SDG) aims to “achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.”

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*Paul, et al.: Public facilities of water and toilet in India*
South East Asia
There has been an improved commitment by all the Governments especially in the South East Asian region by way of increasing investment to improve water, sanitation, and hygiene (WASH - USAID) providing access to safe water and sanitation facilities to billions of people: In spite of this, it is disheartening to note that more than 600 million who still go for open defecation are from South East Asia. The schools in large number still lack availability of safe drinking water and sanitation facilities, which not only causes various morbidities and mortality but also contributes to the reduction of quality of education in primary and secondary schools. Many of the South East Asian countries are reporting high rates of mortality and morbidity in newborns and mothers due to poor condition of drinking water and sanitation services even in health care facilities, which is more aggravated by inappropriate hygienic practices by healthcare personnel and patients.[19,20]

India
Half of India’s population do not have access to a toilet and about 600 million people go for open defecation as compared to 14 million Chinese populations doing so (according to 2011 census, China’s population is more than India). It is surprising that though India’s population is only 17% of the world’s population, 60% of the world’s population who lack access to sanitation are from India.[21,22] The government of India launched National Urban Sanitation Policy in the year 2008 with the aim of having “totally sanitized cities.”[23]

Ground realities

Indian railways
The Indian Railways (IR) is 168 years old railway network across the country with more than 12,617 passenger trains and 7,421 freight trains covering about 115,000 km of track including 7112 stations. Between 2013 and 2014 alone, it has transported more than 8 billion passengers, which is more than the population of many countries. Though the services rendered by the railways are commendable for general population and for trades, it’s good work is marred by deposition of about 3,980 tonnes of human excreta (about 497 truck-loads) strewn all along the railway tracks by the huge number of (24 million) passengers travelling each day. This not only causes environmental pollution of the 67,368 km network but also corrodes the valuable railway tracks. A government panel report asserts that human waste from open-discharge toilets is indeed damaging tracks and associated infrastructure. This is compounded due to the ignorance and apathy of general public seen urinating and defecating in public near train lines, mostly in suburbs. In addition, many passengers disregard the notice to not use toilets when trains halt. The practice leads to clogging of drains at busy stations causing unbearable stench as well as environmental pollution. In this regard, a report from safety review committee appointed by the railway ministry estimated that more than $609.5 million are required to fit new toilets. The report also recommends that sanitary toilets be installed in all the trains.[24-26] Often people prefer trains over buses, because they are economic and there are toilets available in them. There is no need to stop on the way and wait the passengers to attend to natures call. But the saddest part is that all these toilets either emanate unhealthy and unpleasant appearance with stench foul smell or are completely unusable due to choking or already full of decomposed fecal matter, where anybody will dare to enter. In almost all the trains, there are usually four toilets in a coach situated at the ends, though in all the suburban trains no toilets are available. Patient to toilet ratio changes from class to class of travel. Average person per toilet in various classes of travel is First class AC sleeper (1A) 4.5 to 8 passenger per toilet; Executive class (1A) 14 to 18; Second class AC sleeper (2A) 10 to 13.5; Three-tier AC sleeper (3A) 16 to 18; AC sleeper Economy (3E) 19.5 to 20.5; First Class Non AC (FC) 8.33; AC chair car (CC) 18 to 19.5; and Sleeper class Non AC (SL) 18-20 Second Sitting (2S).[27]

In tune with the Prime Minister’s Swachh Bharat Mission, Indian Railways planned to install bio-toilets in all the coaches and stop discharge of excreta on to the railway tracks and thus making it to a discharge-free zone. As a part of this scheme, the railways initiated steps to replace all earlier “hole-in-the-floor” toilets with bio-toilets and during 2015-2018 alone, the railways have installed more than one lakh bio-toilets in trains, as against their own target of 87,000. These toilets are actually fitted with sewage-treatment systems below, where the fecal matter is digested by bacteria, leaving behind water and methane. Only the water after disinfection has to be let out on the tracks. Indian Institute of Technology, Madras in their study, reported that these toilets are no better than a septic tank as most of them started getting choked and stinking as a result of misuse due to dumping of waste items in the pans by the commuters, resulting in foul smell. They suggested measures for their improvement and directed to search for a full proof mechanism for the effective use and management of the bacteria meant to be used in these bio-toilets. The ambitious scheme of installing bio-toilets was dumped by the railways within one year of starting by doing a silent burial.[28-30]

To start with, Indian Railways decided to install vacuum toilets in 13 premier trains similar to that are used in aircraft. The vacuum toilet sucks out waste without much water (vacuum toilet needs about half liter of water against bio-toilet requiring 10–15 liters of water), which also help reduce the foul smell. In addition, they are provided with bio-digester to convert the waste into water, which can be later discharged safely. Now, it is only the time, which will tell whether these vacuum toilets akin to that fitted in airplanes, will be successful and will be able to satisfy the Indian commuters or not.[31]

Roadways
With more than 800 bus operators and 12000 bus routes and about 15 lakhs private buses, bus services is one of the cheapest and most used public transports in India for shorter distances. Although there are thousands of commuters utilizing the service every day, there is conspicuous inadequacy of toilet facilities,
both inside the buses and in the bus stands. Wherever they are available, they are in filthy and stinking condition, as it is sometimes a daunting task to reach the toilet seat and complete the act. Normally, the long route buses make regular toilet stops, where passengers can attend to the natures call in the open air (mostly the male passengers).[32,33]

**Waterways**

Historically ships play a major role in spreading infectious diseases across countries. This is true even in this era of 20th century if proper sanitation facilities are deployed. India has vast coastline (7517 km) with 12 major and 187 minor and intermediary ports along the lines. Trade in India is increasing day by day with a present total tonnage of ships is 11207119. With more than 903 coastal vessels, 399 overseas vessels, 34 passenger-cum-cargo ships, and 73 passenger ships in India, there are vast number of employees manning these ships. In addition, thousands of passengers are travelling every day. Barring few toilets attached to the officers and crew members, all other toilets in the ships, including those for passengers are in a pathetic condition, either with waterlogging and leaking or stinking with stench smell, making the passengers to release themselves here and there on board. This is due to the bad maintenance and regular cleaning of the toilets.[34,35]

**Market places and shopping complexes**

Indian market and shopping complexes are crowded throughout and as such toilet facilities are mandatory requirement there too. But the situation is not very bright as there is a conspicuous absence of toilets in almost all places and even if they are available, their conditions are so pathetic that one dare use them. In other places, the whole of the backside of the market place is used as a big open toilet, causing life miserable for the shop owners as well as the people visiting these markets due to stench stink everywhere. In addition, wherever toilets are available, the authorities have completely ignored the womenfolk and as such it is pathetic condition for the lady vendors, who have to stay almost whole day in the market and the condition is worse for the menstruating women. They have to literally beg the nearby buildings like hotels for releasing and for cleaning.[36,37]

**Educational hubs**

Schools are where our future progeny are provided with facilities to grow and develop into healthy and responsible citizens. As such it is more so important to see that they are given the best of environment in the schools and colleges where they stay for a considerable period of their life. Although latrine construction positively impacted educational outcomes like enrolment, dropout rates, and number of students who appeared for and passed exams, it is observed that millions of children all over the world are not having access to even decent toilets and water at schools. Global assessment of water and sanitation in schools by WHO and UNICEF reports that 620 million children do not have access to decent toilets at school and around 900 million cannot wash their hands properly. In India, Orissa, Meghalaya, Chhattisgarh, Jharkhand, Assam, Uttar Pradesh, and Bihar study reports that about 13.8 million children (50%) do not have access to a toilet at school. About 23 million boys (22%) still lack access to separate boys’ toilet facilities. Regarding the availability of water for cleaning and flushing of toilets: Boys’ toilets: Toilets available: 85.8%; water available in toilets for flushing and cleaning: 27.4%; Girls’ toilets: Toilets available: 90.6%; water available in toilets for flushing and cleaning: 31.5%. Although 89 million girls have access to toilet facilities in school, still many are unfortunate. The number of schools with a separate toilet facility for girls increased from 0.4 million (37%) in 2005-06 to 1.24 million (88%) in 2012-13 and for boys from 0.4 million (31%) in 2005-06 to 0.9 million (67%) in 2012-13. The condition is even worse for girls as for want of separate toilets especially during periods they preferred to stay at home resulting in missing too many classes every month. Another important aspect is the functionality of the available toilets. Assessment in schools reveals that wherever toilets exist only one in two is usable; it is less than the national average in 13 states. A lack of proper toilets threatens the health, education, and safety of at least 620 million school children around the world, which kills 289,000 under-fives a year and hinders overall growth. Girls on their periods would skip school because there is no proper and safe way for them to access a toilet, because of this, one in five girls has dropped out of school.[38,39]

**Entertainment zone**

As per norms, there should be one WC and one Urinal for every 50 persons and less, separately for each gender. Drinking water should be provided in adequate quantity. But in reality, baring a few top-end cinemas and malls, none are following this and as a result, we find stinking and pathetic toilet facilities in many of the cinema theaters as well as malls.[40]

**Fairs and festivals**

Fairs and festivals are a very religious community and throughout the year, fairs and festivals is a regular feature with large number of gatherings attending these functions, where in there will be chances of contracting many diseases, which may also land up with epidemics. As such, there is a need for arrangement of adequate safe water and toilet facilities in these gatherings. But in reality, except for a few big melas, none have proper management of these facilities. Even in internationally famed kumbhmela though water and toilet facilities are done in a grand scale, one can find many deficits at the ground level, e.g., in many of the toilets, no water is available and there is no regular cleaning of these toilets often.[41-43]

**Healthcare establishments**

Healthcare facilities are places where people come for relief from sickness, pain, and injury. All these can be accomplished only if additional services like availability of water, sanitation, hygiene, and waste management are provided adequately. Instead, it is reported that 1 in 8 health care facilities has no water service and 1 in 5 has no proper sanitation service available. In a report released jointly by WHO and UNICEF from 54 low- and middle-income countries representing 66,000 health facilities showed that water not readily available in about 40%, about
one-third facilities lacked hand washing soap, and one-fifth lacked toilets. In many countries where water was available, it was not safe for consumption.

To sum up, water supply and sanitation facilities have been boosted in India, but still there is a lot to be done, especially in all the places of human movement viz. railways, waterways, roadways, shopping and market places, educational hubs, entertainment zone, healthcare facilities, etc. In many places, sanitation facilities are kept unused, even if they are available; people still feel at ease to go in the open air for nature’s call, as they are unaware on benefits of sanitation. In many places, the facilities are in so pathetic situation that people are reluctant to use them. It is thus important to strengthen and maintain all the existing facilities along with carrying out intense awareness program regarding benefits of use of safe water and toilet facilities.44

**Research efforts**

Global research groups feel that poor sanitation, hygiene, and lack of safe water claims nearly one million lives in low- and middle-income countries annually, i.e., 60% of total diarrheal deaths. Of these deaths, 432 000 deaths are due to poor sanitation. It has been estimated that about 297000 deaths in children under 5 years could be prevented by merely improving water sanitation and hygiene. Under 5 mortality is highest and malnutrition and poverty is also very high with an added risk factor that open defecation is rampant. Improvement in sanitation not only reduces risk of diarrhea but also reduces the spread of intestinal worms, schistosomiasis, trachoma, and malnutrition; it also promotes dignity among women and girls with improvement in school attendance. A WHO study in 2012 calculated that for every US$ 1.00 invested in sanitation, there was a return of US$ 5.50 in lower health costs, more productivity, and fewer premature deaths. “Cleanliness is indeed next to Godliness” said John Wesley. It is evident that if we fail in this most important task/responsibility, we surely will fail as a human being to do justice and stay healthy. As Indians, we have a habit of keeping our house spic and span and not giving any heed to keep our surroundings also clean, thereby allowing the dirt and garbage to accumulate in and around our premises and thus permitting diseases to multiply and spread. This also worsens the esthetic value of our premises, which becomes an ugly sore, more so it gives an opportunity to the visiting foreign friends to degrade our position in the outer world. In view of this, it must be seen as an urgent requirement for each and every citizen to treat this as an emergency and bear the responsibility of keeping the nation in a clean and healthy environment both outdoors and indoors.45 Researchers from western India felt that the efforts of political push, public financing, partnerships, and people participation jointly revolutionized SBM.45

**Strengths and limitations of the analysis**

The Swachh Bharat Mission has created substantial economic impact and influenced social outcomes. Yet, in this review, the safe sanitation practices in different setups like railways, bus services, shipping, market places, cinemas, malls, and schools have been discussed with different research groups. In spite of this being a sensitive and burning issue, no authorities and Government have yet given it due importance. We have studied the arrangement of water supply and sanitation facilities in various places of human congregation and movement in India with publicly available reports and news available on the web. It would have been better if we could include data on corporate and public office and religious establishments of all shades in our study.

**Conclusion**

The research group felt that the concept of hygiene is the most cost-effective health promotion. Yet, it is observed that safe water supply and basic sanitation facilities are far from satisfactory in places of public gathering and movement in India. Hence, special attention has to be stressed for places like railways, buses and bus stands, ships and jetties, market places, schools, colleges, cinema halls, theaters, etc. This has become more relevant with the hype about providing adequate water supply and basic sanitation to every citizen in India especially in light of Prime Minister’s “Swachh Bharat Abhiyan” or “Swachh Bharat Mission.” This analysis was done to find slackness in safe water supply and good sanitation facilities in various places of human congregation and movement in our country. Our research group also felt that holistic political and administrative supports are needed to scale up any sanitation revolution that includes revamping the financial discipline regarding vertical fund release from union governments to the states for targeted phase-wise implementation in both urban and rural belts.46-49

**Future directions**

- To integrate access to clean water, sanitation, and hygiene to people, especially children, for healthier and fruitful lives and also to include these in education projects to achieve a holistic healthy world
- All children must learn about disease transmission and practice good hygiene which surely will promote students to miss less school
- To achieve universal access to safely managed water, sanitation, and hygiene in railways, bus services, healthcare facilities, schools, institutions, entertainment establishments, and places of festivals in addition to compulsorily having these facilities in home too
- To make mandatory arrangement of handwashing soap in all the toilets in public spaces
- To make arrangements for improvement in accessing safe potable water and sanitation facilities in places of human congregation and movements through Swaccha Bharat Abhiyan program.34

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