

Original Research Article

# Developing an Innovative Model of Oral Health Service Delivery in India

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- Dental procedures

Abstract

**Introduction:** Rural healthcare is one of the biggest challenges that India is facing today. High mortality rates are subjected to poor healthcare facilities in the rural areas of India. Oral Health is one of the neglected domains both by the government and people as compared to general health. In the recent years, several public bodies and Non-Government Organization's (NGO) in India have come forward to bridge this gap. One such project is the Impact India Foundation's "Lifeline Express" (LLE), a well-equipped hospital on train that travels to the remote rural areas of our country and provides healthcare facilities to the underprivileged masses. The aim of the study was to meet the unmet need for dental treatment across remote and rural population and to bridge the gap by providing the dental treatment.

**Methodology:** The train also has an exclusive fully-functional dental unit with a panel of experienced dentists who diagnose and treat oral health diseases. The patient centric model of care is through the partnership established between healthcare professionals, government agencies and the community. A structured questionnaire capturing the demographic data and dental findings were recorded and patients willing for treatment were provided with treatment facility at the LLE. Oral health awareness session was conducted in the school across the locations.

**Results:** About 5727, patients were screened for different dental diseases across the 9 locations. The range of patients screened was from 455 – 1101, most of treatment was undertaken by male (60%) than female (40%) and those above 18 years of age. Majority of patients were treated for teeth cleaning, followed by extraction of teeth.

**Conclusion:** LLE is an innovative model of healthcare in remote and rural regions of India. The model is an attempt to addresses the gap of unmet dental need of the community in remote locations across the country.

**Abbreviations:** NGO: Non-Government Organization; ENT: Ear-Nose-Throat

## INTRODUCTION

India is the second highest populated country with more than 1030 million populations [1], out of which approximately 72% live in rural areas and the remaining 28% in urban areas [2]. The dentist to population ratio is 1:10000 in urban areas, whereas it is 1: 150,000 in rural areas [3]. The traditional institution and clinic-based oral healthcare delivery system is failing to reach a large segment of this rural population. There are several challenges being faced in the delivery of oral healthcare to these areas, such as lack of manpower and poor accessibility which is compounded by poverty and illiteracy. Tribes are ignorant of the intricate nature of the disease, and the treatment of disease is primarily based on the indigenous sources. In the past years, there has been a perceptible augmentation in the dental healthcare services for the Indian populace; however, these improvements are not being experienced evenly across the population.

Oro Facial Diseases, mainly dental caries and periodontal diseases, are preventable but due to neglect among masses, result in considerable public health burden in India. Oral diseases not only cause pain, sensitivity, agony, functional and aesthetic, low self-esteem but also result in loss of productivity due to absence at work. In the long run, it significantly impacts the economy.

Estimates suggest that about 50 % of school children suffer from dental caries [4,5] and more than 70 % of adults suffer from periodontal diseases [6]. The use of tobacco products both smoking and smokeless form has resulted in India being a capital of oral cancer [7,8,9]. The precancerous lesions and conditions are affecting the young people and are increasing across the gender and socioeconomic strata. The cost of treatment places a huge burden on common masses with limited access to government facility.

There have been several public health organizations and

Non-Government Organization working towards bridging this gap between the rural and the urban populations. One such NGO is the Impact India Foundation which runs the Lifeline Express' (World's First Hospital on Train), more commonly known as "The Magic Train". The Lifeline Express is the world's first hospital on train that treats the poor and underprivileged masses of rural India. It was developed in collaboration with the Indian Railways and Ministry of Health and has been funded by Impact United Kingdom (UK) international charitable sources, Indian corporate houses and individuals.

## MATERIALS AND METHODS

Lifeline Express and Indian Dental Association partnered recently to improve the oral health of people in the remote and rural areas of India. The collaboration was an ideal opportunity to understand the need of dental care to remote and rural population. It has a special Dental unit with all the modern equipment and instruments. A team of dentists along with the infrastructure provided at the Lifeline Express addresses the issue. Lifeline Express schedules a planned visit of four weeks to a location of a particular railway station where people have access and logistic arrangement can be made use of. The operational model of Lifeline Express is that of providing curative surgeries and treatment using the network of Indian Railways. Indian Railways as an extensive network spanning across the North - South and East - West. Each month, the Lifeline Express gets stationed for 4 weeks with a range of planned activities of ENT consultation and surgeries, dental services, cataract surgeries, orthopedic surgeries and epilepsy care. (Figure 1, Table 1).

Oral healthcare services are planned for seven days. In this seven-day schedule, patients are screened for oral diseases. A descriptive cross-sectional study was planned using a convenience sampling in order to understand the dental needs and address it through the initiative. A structured questionnaire consisting of demographic details, tobacco and alcohol habits as well as areca nut use was developed. This is followed by a detailed oral examination to identify dental caries, periodontal diseases, oral precancerous lesions or conditions, malocclusion and soft tissue changes. Those identified as positive for potential treatment are rendered treatment: mainly restorative, oral prophylaxis, extraction and root canal treatment. Those identified as positive for premalignant lesions or conditions are counselled for cessation of habits and referred to tertiary care for advanced investigations.

Apart from screening and treatment at the Lifeline Express, the dental team reaches out to the school for oral health promotional activities. Each school has a 30 minutes' lecture focusing on proper brushing, diet, visit to a dentist and traumatic injuries. The session emphasizes and motivates school children for good oral hygiene. It is addressed in the local language and all school children are given a sample of brush and toothpaste. The independent variable were mainly age, gender and dependent variable were dental treatment need mainly scaling, extraction and restoration.

## RESULTS

Overall, in 9 locations over a period of 9 months, 5727 patients

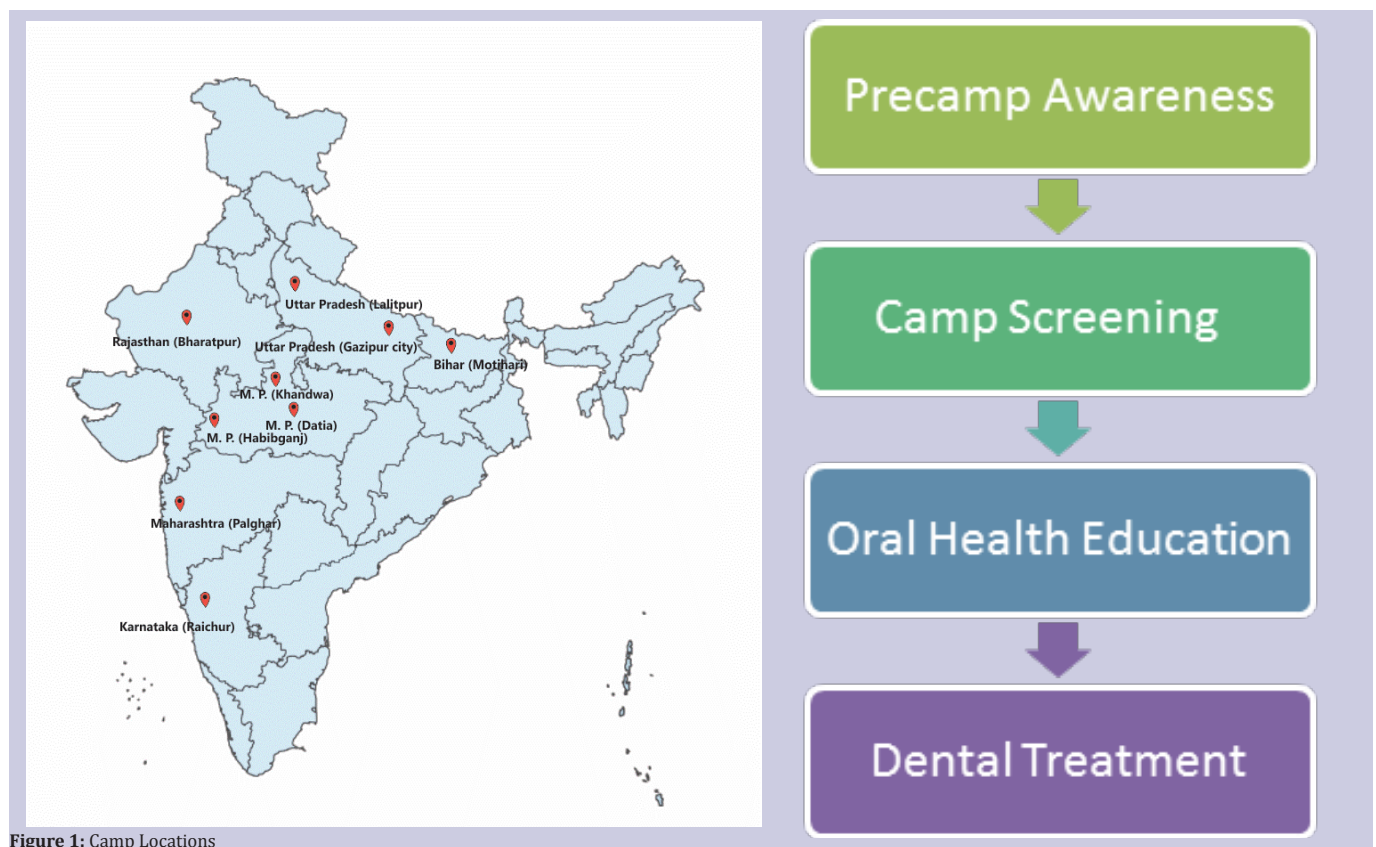


Figure 1: Camp Locations

were screened for oral facial diseases. The reach was capturing the remote and rural areas where in access to oral health services were limited. The range of patients screened was from 455 – 1101 (Table 1), and a total of 2827 school children were address on oral health and its maintenance across different location. Table 2 mentions the demographics of the patients screened. The total number of patients is the total patients screened at the given locations while the remaining columns segregate them based on their gender and age group. The proportion of seeking dental treatment was more among male (60%) than female (40%) and population above 18 years of age.

**Table 1:** Geographic location of LLE along with Number of Patients Screened for Dental Treatment

Sr. No.	Location	State	Patient (N)	School Children's (N)
1	Palghar	Maharashtra	580	0
2	Motihari	Bihar	880	180
3	Khandwa	Madhya Pradesh	768	302
4	Raichur	Karnataka	455	280
5	Habibganj	Madhya Pradesh	492	0
6	Datia	Madhya Pradesh	760	420
7	Bharatpur	Rajasthan	540	350
8	Lalitpur	Uttar Pradesh	151	755
9	Gazipur	Uttar Pradesh	1101	540
	Total		5727	2827

**Table 2:** Demographic details of the patients screened across different geographic location

Location	Total no. of Patients	Total no. of Male N (%)	Total no. of Female N (%)	Age Group Below 18 N (%)	Age Group Above 18 N (%)
Palghar	553	291(53)	262(47)	74 (13)	478 (87)
Motihari	654	366 (56)	288(44)	151(23)	500(77)
Khandwa	742	388(52)	348 (48)	72(9)	527 (91)
Raichur	450	294(65)	156 (35)	42(9)	380 (91)
Habibganj	492	329(67)	163(33)	52(11)	429(89)
Datia	760	495(65)	263 (35)	67(9)	683(91)
Bharatpur	537	329(61)	207(39)	92(17)	444(83)
Lalitpur	151	98(64)	53 (36)	15(10)	134 (90)
Gazipur	1101	631(57)	458(43)	182(16)	875(84)

Table 3 depicts the treatment needs of the patients. Amongst the 553 patients screened in the Palghar district of Maharashtra four of them required no dental treatment, 200 of them required scaling, 87 of them had restorable cavities and required fillings while 259 of them have grossly damaged non-restorable teeth which needed to be extracted. Similarly, out of the 1101 patients screened in Gajipur district, 331 required no treatment, 516 needed scaling, 115 needed restorative fillings, 233 needed extractions; three of them required a combination of these

treatments and one of them needed to be referred to a specialist.

**Table 3:** Treatment needs of the patients across different geographic location

Treatment Need	Screening N (%)	Scaling N (%)	Filling N (%)	Extraction N (%)	Combination N (%)	Referred N (%)
Palghar	7(1.3)	200(36)	87(16)	259(46)	0	0
Motihari	404(62)	69(10)	9(1)	172(26)	0	0
Khandwa	313(42)	132(18)	47(6)	215(29)	0	35(4)
Raichur	226 (50)	47(10.4)	88(19)	54(12)	0	126(28)
Habibganj	400(81)	50(10)	16(3)	21(4)	1(0.2)	4(0.8)
Datia	677(89)	34(4.4)	3(0.3)	46(6)	0	0
Bharatpur	126(23)	206(38)	50(9)	93(17)	0	62(11)
Lalitpur	21(13)	73(48)	36(23)	19(12)	0	2(0.01)
Gazipur	233(21)	516(46)	115(10)	233(21)	3(0.27)	1(0.91)
Total	2407	1327	451	1112	4	230

## DISCUSSION

In recent times, there is increased awareness among the people but it is limited to urban segment only with limited reach to rural masses. The decline in risk factors is either not present or very small in lower socio-economic class. It has resulted in major health in-equities with both acute and chronic dental diseases. There is an urgent need to re-channelize the efforts of public, private and government towards the primary and primordial prevention of oral – dental problems. The budget allocation for healthcare is very meagre with only an infinitesimally small amount allocated for oral healthcare services. The mushrooming of private sector with urban centric approach of the workforce has resulted in increased health inequity among the poor. The urban poor also face a challenge of accessibility to oral healthcare. It further complicates the problems as the rural population then rely more on quacks for their oral healthcare needs. The aim of the study is to do the need assessment of dental treatment for rural population and availability of treatment in rural India.

Freeborn and Greenlick (1973) defined “access as availability of resources, wherever and whenever the patients needs them” [10]. A study conducted in Mangalore, Karnataka showed that nearly 30% of the study population had never visited a dentist although 44% of them had dental problems [11]. Our society in its attitude towards dental health has been giving it less importance as compared to general health. There has been a lack of public identification of oral health deterioration and wide acceptance of morbid mouths along with widespread prevalence of oral diseases and lack of reasonable oral health-care services in the past. Dental public health programmers have not been able to achieve the depth and penetration into society required to bring about the change in societal attitude. There is a serious lack of authentic and valid data for assessment of community demands, as well as the lack of an organized system for monitoring oral healthcare services needed to guide planners. Human resource planning and utilization should be based on the aim for sustained

development along with a system of monitoring and evaluation of programmes. Policy maker should work on dental insurance in order to cover patients and improve access to dental treatment [12]. The cost of treatment is mainly of procurement of material and logistic arrangement for the dentists. The voluntary participation of dentists reduces the cost substantially; hence making it financially viable to the organization. A study conducted on oral health status and access to oral health care for U.S. adults aged 18-64 in 2008 showed the major reason for not visiting a dentist was affordability or lack of dental insurance [13].

Life-line express through its innovative model has addressed the issue of accessibility and affordability towards healthcare services. The model provides a comprehensive understanding of the increasing need for provision of healthcare services to the remote and rural masses. The rural reach along with the infrastructure gives an opportunity for the dentists to deliver oral healthcare services.

The participating dentists in a week's span gain good hands on experience on different dental procedures. Similarly, patients also benefit by the services which are rendered free of cost. Those requiring complex treatments or multiple sitting are also addressed in the Lifeline Express. The organization creates a supportive environment by connecting the dots in the form of providing infrastructure so that dentists and patients are benefitted.

## CONCLUSION

The Lifeline Express truly helps bridge the gap between the rural and urban populations of India in terms of healthcare facilities. The oral healthcare services which were once unaffordable to the underprivileged people in the inaccessible regions are delivered free of cost through this project. This ingenious model has not only succeeded in addressing the oral healthcare needs of the masses but has also created greater awareness among them, thus improving lives.

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## DISCLOSURE

The authors declare no conflicts of interest.

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