*Journal of Harbin Engineering University*
*ISSN: 1006-7043*

Vol 44 No. 7
July 2023

# Impact Assessment and Cost Benefit Analysis on Public-Private Partnership of Private Dental Institutions Along with Public Government-Run Primary Health Centers in Improving Oral Health Care Services to The Underprivileged Population of Tamilnadu State, India.

**Gousalya V[1ss], Sindhu R[2], Leena V[3], Prabu D[4], Rajmohan M[5], Dinesh Dhamodhar[5], Bharathwaj V V[2], Sathiya Priya[2]**

[1]Post graduate student, SRM Dental College and Hospital, Department of Public Health Dentistry, Ramapuram, Chennai, India

[2]Master of dental surgery, Senior Lecturer, SRM Dental College and Hospital, Department of Public Health Dentistry, Ramapuram, Chennai, India.

[3]Bachelor of dental surgery, Undergraduate student, , SRM Dental College and Hospital, Department of Public Health Dentistry, Ramapuram, Chennai, India.

[4]Master of dental surgery, Professor and Head, SRM Dental College and Hospital, Department of Public Health Dentistry, Ramapuram, Chennai, India.

[5]Master of dental surgery, Reader, SRM Dental College and Hospital, Department of Public Health Dentistry, Ramapuram, Chennai, India.

**Abstract-**This study aims to evaluate the impact of a public-private partnership (PPP) between private dental institution and public government-run primary health centres (PGRPHC) on improving oral health care services for the underprivileged population of Chennai Tamilnadu, India. This study involves two primary health centers one is the Bajanai Koil Primary Health Centre, Ramapuram and the other is Sakthi Nagar Primary Health Center, Porur. A total of 73 participants were recruited for the study. The total number of participants received comprehensive preventive treatment (1,773) and atraumatic restorative treatment (284). Total cost required for the provision of preventive dental treatment by the private dental institutions for the public at the public government run primary health centre was 45,055 Indian Rupees, but the program benefited the poor at free of cost. The partnership can facilitate the implementation of outreach programs, including oral health education and awareness campaigns, particularly targeting the poor. The impact of this PPP can lead to improved oral health outcomes and contribute to the overall well-being of the underprevileged population in Tamil Nadu.

## INTRODUCTION

Oral health is important for overall health, as well as self-esteem, quality of life, academic and occupational performance. Most of the people are unaware of this fact, and those who are are confronted with potential barriers such as a scarcity of healthcare centres, exorbitant treatment costs, a scarcity of dental professionals, and so on. Overcoming these obstacles is critical currently.[1]State and national governments are primarily responsible for health-care delivery, but inadequate funding, a heavy workload, a lack of equipment, and high absenteeism stymie the government's efforts. In India, on the other hand, the private sector is perceived to be more accessible, better managed, and more efficient. Although the private sector provides a significant amount of health care, there is little or no regulation. The private sector is not only the least governed sector in India, but it is also the most powerful and largely unexplored sector, with a higher urban bias than the public sector. Despite the availability of health care in both the public and private sectors in India, oral health has yet to reach its peak. One of the most effective

strategies for improving oral health is to encourage public-private partnerships. The term "public-private partnership" refers to the collaboration of a group of workers with the common goal of improving the health of a population based on mutually agreed-upon roles and principles.[2]A partnership implies that both parties have agreed to collaborate in the implementation of a programme and that each party has a distinct role and say in how that implementation occurs. Agreement involved in the public private partnership includes reciprocal obligations, mutual accountability, voluntary or contractual relationships, the sharing of investment and reputational risks, and joint design and execution responsibility.[3] In this paper the private sector is denoted by the dental institution i.e, SRM Dental College, Ramapuram and the public sector is denoted by the government primary health centres (PHC). This study involves two primary health centres one is the Bajanai Koil PHC, Ramapuram and the other is Sakthi Nagar PHC, Porur. The dental institution and the primary health centres have a mutual tie-up for providing oral healthcare services for the underprivileged population. This paper aims to evaluate how efficiently this public-private partnership is beneficial to the underprivileged population.

**MATERIALS AND METHOD**

Private dental institution (PDI) and public government-run primary health centers (PGRPHC) was developed for improving oral health care services in underprivileged population of Chennai Tamilnadu, India.Private dental institution comes under the Valasaravakkam zone which has fiveupgraded primary health centers.

**TABLE 1: LIST OF UPHS IN THE VALASARAVAKKAM ZONE**

| **ZONAL DIVISION NUMBER** | **URBAN PRIMARY HEALTH CENTRES** |
|---|---|
| 144 | Maduravoyal UPHC(Unit office 32 Poonamalle high road), Ch-95 |
| 145 | Nerkundram UPHC New colony Perumal koil street, Nerkundram, Ch107 |
| 148 | Kamarajar Salai,Nerkundaram,Ch |
| 153 | ***Unit Office,Sakthi Nagar,Porur*** |
| 154 | ***Ramapuram, Unit Office 154, Kambar Salai, Ramapuram*** |

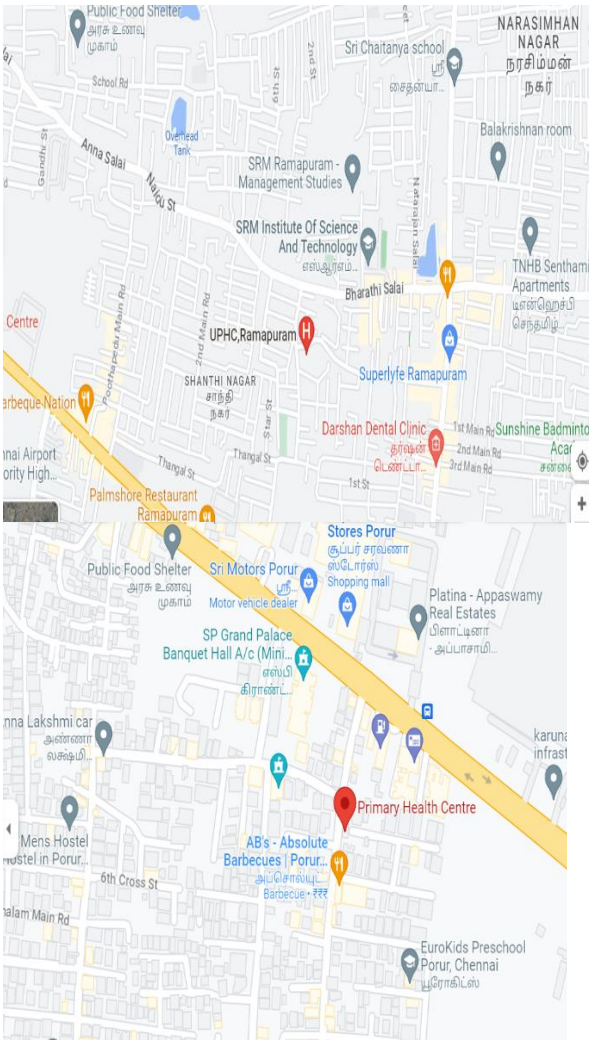


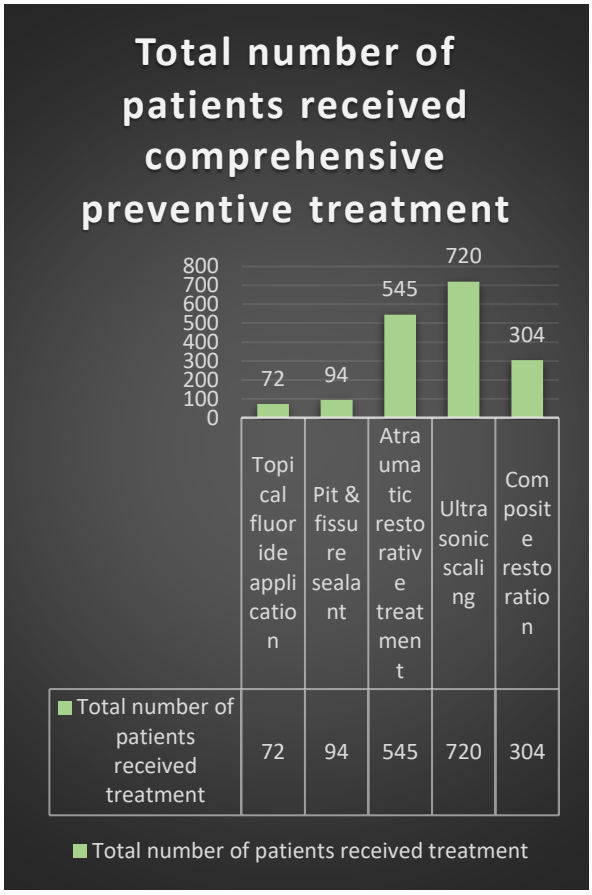

**Fig 1 :**Spot map representation of the location of both public government-run primary health centers

The PDI and PGRPHC partnership was established in two sites.One is Bajanai Koil primary health center, Ramapuram and the other site is Sakthi Nagar primary health center, Porur. The private dental institution and the public government run primary health centres have a mutual tie-up for providing oral healthcare services for the underprivileged population. Private Dental Instituition- SRM Dental College, RAMAPURAM, Chennai.Public government run primary health centers – Bajanai koil Primary health center and Sakthi nagar Primary health center. The oral health care services was provided by the dentists and

postgraduate student from the Department of Public Health Dentistry. Two registerswere maintained for both the primary health centers. Two supervisor wereallotted for each primary health centers for supervising the procedures done by the postgraduates from the Department of Public Health Dentistry.

**RESULTS**

**GRAPH 1: Bar chart representing the total number of patients received comprehensive treatment.**




**Total no of patients screened in both the public government run primary health centres-15602**

**Total number of participants received comprehensive preventive treatment-1,773**

**COST BENEFIT ANALYSIS**

Cost-benefit analysis is a way to compare the costs and benefits of an intervention, where both are expressed in monetary units.[4]

**Background of the current study**

Total no of beneficiaries screened – 15602

**TYPES OF COST** [5]

- DIRECT COST
- INDIRECT COST

**DIRECT COST**

- Payment for the oral health care staff
- Cost of the materials required for providing treatment

**Cost of materials**

- Pascal Anticavity Topical fluoride gel APF* Preventive treatment gel – 2500 Indian Rupees[6]
- Pit and Fissure sealant Ivoclar Helioseal F-1070 Indian Rupees[7]
- Etchant Ivoclar Eco etch pack of 2 – 690 Indian Rupees[8]
- GIC posterior restorative material –1350 Indian Rupees[9]

**USAGE OF MATERIALS FOR THE PATIENTS**

- One Topical fluoride gel bottle serves approximately 150 patients
- One pit and fissure sealant Helioseal F can be used for approximately 70 patients
- One etchant syringe can be used for approximately 80 patients
- One GIC bottle can be used for approximately 180 patients

**MANPOWER SYSTEM FOR THE PROVISION OF TREATMENT IN THEPUBLIC GOVERNMENT RUN PRIMARY HEALTH CENTER**

Treatment at the public government-run primary health centers (PGRPHC) was provided by the dentist of Private Dental Institution on routine basis. Preventive treatments like topical fluoride application, pit and fissure sealant, atraumatic restorative treatment, scaling, extraction and composite restoration were done at the primary health center.

**TABLE 3: AVERAGE AMOUNT REQUIRED FOR THE ACCOMPLISHMENT OF PUBLIC PRIVATE PARTNERSHIP**

| Procedures | Total number of participants benefited | Number of materials utilized for the participants | Total amount required for the materials |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Total number of participants received pit and fissure sealants | 94 | 94/70=1.34 Approximately 1 ½ i.e., 2 syringes of pit and fissure sealants required | 2×1070= 2140Indian Rupees |
| | | 94/80=1.175 Approximately 2 syringes of etchant is required | 2×690=1380Indian Rupees |
| Total number of participants received topical fluoride application | 72 | 72/150= 0.48 Approximately 1 bottles are required | 1 ×2500=2500Indian Rupees |
| Total number of participants received atraumatic restorative treatment | 284 | 281/180 =1.56 Approximately 2 bottles required | 2×1350=2700Indian Rupees |
| Total number of participants received scaling treatment | 720 | 1 packet contains 100 suction tips720/ 100 =7.2 Approximately 8 packets required for 720 patients | 8×170= 1360Indian Rupees |
| | | Scaler 5 units required for scaling of 13 patients per day | 5 × 6995=34,975 Indian Rupees |
| **Total** | | | 45,055 Indian Rupees |

Actual cost required for the provision of preventive dental treatment by the private dental institution for the public at the public government-run primary health centreswas 45,055 Indian Rupees, but the program benefited the underprivileged population at free of cost.

**TABLE 3: TIMING REQUIRED FOR THE PROVISION OF THE TREATMENT IN THE PGRPHC BY THE PDI.**

| **PROCEDURES** | **CALCULATION OF TIMINGS** | **TOTAL TIME CONSUMED FOR THE PROGRAM** |
|---|---|---|
| Total number of participants received dental checkup | 15602× 3 | 46,806 minutes |
| Total number of participants received oral health instruction | 15602× 5 | 78,010 mins |
| Total number of participants received pit and fissure sealants | 94×7 | 658 mins |
| Total number of participants received | 72×6 | 432 mins |

| | | |
|---|---|---|
| topical fluoride application | | |
| Total number of participants received atraumatic restorative treatment | 545×7 | 3,815 mins |
| Total number of participants received scaling treatment was | 720×10 | 7,200 mins |
| Over all time required | | 1,36,921 mins (2282 hrs approximately) |

**BENEFITS OF THE PUBLIC-PRIVATE PARTNERSHIP OF PRIVATE DENTAL INSTITUTIONS ALONG WITH PUBLIC GOVERNMENT-RUN PRIMARY HEALTH CENTERS IN IMPROVING ORAL HEALTH CARE SERVICES TO THE UNDERPRIVILEGED POPULATION OF TAMILNADU, INDIA.**

- Thousand seven hundred and seventy-threeparticipants received comprehensive preventive treatment
- Fourty five thousand and fifty-five Indian Rupees worth the treatment was provided at free of cost by the private dental institution for provision of preventive treatmentto the underprivileged population at thepublic government-run primary health canters.
- Two Thousand Two hundred and Eighty-Two hours consumed for the provision of preventive treatment in the public government run primary health centres by the private dental institution.

**DISCUSSION**

The public-private partnership (PPP) between private dental institution and public government-run primary health centres in Tamil Nadu, India has the potential to greatly impact the oral health care services provided to the underprivileged population. The most important thing in the world is one's health. The health of a population has a significant impact on the development of a country.[10] Despite various steps taken to improve people's oral health, oral health problems continue to be a burden in many communities, particularly among the poor.[11] The current paper explored the potential benefits associated with the public private partnership, as well as its overall impact on improving oral health care services. Benefits of the Public-Private Partnership enhanced the access to Oral Health Care by combining the resources and expertise of private dental institutions and public government run primary health centres, the partnership provided the improved access to oral health care services for the underprivileged population. This ensures that individuals who may not have access to such services previously can now receive the necessary treatment and preventive care. Private dental institutions often have state-of-the-art infrastructure and advanced dental technology. By collaborating with public health centres, these resources can be shared, allowing for better diagnosis, treatment, and overall quality of oral health care services. The partnership can facilitate the implementation of outreach programs, including oral health education and awareness campaigns, particularly targeting the underprivileged population. This proactive approach can lead to improved oral hygiene practices and preventive care among individuals who may not have had access to such information before. While private dental institutions can bring advanced resources, they often come with higher costs. Ensuring affordability of services for the underprivileged population and maintaining the financial sustainability of the partnership may require careful planning and resource allocation. It is crucial to ensure an equitable distribution of resources and services between public and private partners. Efforts should be made to prevent any imbalance or concentration of services in urban areas, while also catering to the needs of rural and remote populations. Establishing a robust regulatory framework and

quality control mechanisms is essential to maintain the standards of oral health care services provided through the partnership. Regular monitoring, evaluation, and accountability measures should be implemented to ensure that the services meet the required standards. A scoping review on public private partnerships in primary health care also stated that to begin public private partnerships in PHC, governments should consider long-term plans and sustainable policies, as well as local needs and context.[12] Effective collaboration and coordination between private dental institutions and public government-run primary health centres are essential for the success of the partnership. Clear communication channels, shared decision-making processes, and defined roles and responsibilities should be established to avoid conflicts and promote effective teamwork.

**CONCLUSION**

The public-private partnership between private dental institutions and public government-run primary health centres has the potential to significantly improve oral health care services for the underprivileged population of Tamil Nadu. By leveraging the strengths of both sectors, this partnership can enhance access to care, promote skill enhancement, and facilitate outreach programs. However, addressing the challenges of affordability, equity, regulatory framework, and collaboration is crucial for the partnership's success. With careful planning, implementation, and continuous evaluation, the impact of this PPP can lead to improved oral health outcomes and contribute to the overall well-being of the underprivileged population in Tamil Nadu.

**REFERENCES**

1. Chavan S, Kemparaj U, Baghele ON, Rajdha A. Public-private partnership to enhance oral health in India. Journal of Interdisciplinary Dentistry. 2012 May 1;2(2):135.
2. Eckerle M, Crouse HL, Chiume M, Phiri A, Kazembe PN, Friesen H, Mvalo T, Rus MC, Fitzgerald EF, McKenney A, Hoffman IF, Coe M, Mkandawire BM, Schubert C. Building Sustainable Partnerships to Strengthen Pediatric Capacity at a Government Hospital in Malawi. Front Public Health. 2017 Jul 27;5:183. doi: 10.3389/fpubh.2017.00183.
3. Chakravarty N, Sadhu G, Bhattacharjee S, Nallala S. Mapping private-public-partnership in health organizations: India experience. International Journal of Medicine and Public Health. 2015;5(2).
4. *Cost-Benefit Analysis | POLARIS | Policy and Strategy | CDC*. (n.d.-b). Centers for Disease Control and Prevention. Date accessed on 27 April 2023
5. Ichihashi T, Muto T, Shibuya K. Cost-benefit analysis of a worksite oral-health promotion program. Industrial health. 2007;45(1):32-6. DOI: 10.2486/indhealth.45.32
6. https://www.dentganga.com/product/anticavity_topical_apf*_preventive_treatment_gel?vendor_id=73&gclid=CjwKCAjwl6OiBhA2EiwAuUwWZdowMOoGi3NyHGEeF3JYfkE9oC9gdmi4y7mCWI2d3tdqwvEhQnghdBoCdzoQAvD_BwE
7. https://www.dentalkart.com/ivoclar-vivadent-helioseal-f-plus.html?source=google&medium=sem&campaignid=17918683141&adgroupid=&device=c&gclid=CjwKCAjwl6OiBhA2EiwAuUwWZeNIxCIftj2jYnCRXtgMWKIvMGNY13dZLbniIX9VWfTWhmZA9oRB4BoCQoYQAvD_BwE
8. https://pinkblue.in/ivoclar-vivadent-eco-etch-refill-2-x-2gm.html
9. https://www.indiamart.com/proddetail/gc-gold-label-9-posterior-restorative-gic-2849020275655.html

10. Prashanthy MR. A comparative analysis of Misery Index and its impact on health indicators across the globe. Indian Journal of Forensic Medicine & Toxicology. 2021 Aug 16;15(4):35-40.
11. Mohan R, Venkatanarasu B, Rao BV, Eswara K, Martha S, Hemasundar H. Assessment of oral health status and dental treatment needs among 12-and 15-year-old school-going children of fisherman community residing at east coast road, Chennai: A cross-sectional study. Journal of Pharmacy & Bioallied Sciences. 2019 May;11(Suppl 2):S385.
12. Joudyian N, Doshmangir L, Mahdavi M, Tabrizi JS, Gordeev VS. Public-private partnerships in primary health care: a scoping review. BMC health services research. 2021 Dec;21(1):1-8.