



RESEARCH ARTICLE

DENTAL MANPOWER IN TAMILNADU STATE, INDIA AND ITS IMPLICATIONS – A SYSTEMATIC TREND ANALYSIS

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ABSTRACT

Aims and Objectives: To reconnoiter whether dental manpower in current scenario in Tamilnadu is competent in delivering oral health care services to the public at large and to procure elucidations to most important remonstrance confronted in that aspect.

Material and Methods: The current data was obtained from the website of Dental Council of India, Central Bureau of Health Intelligence and the Ministry of Health and Family Welfare and further data regarding number of dental educational institutes across Tamilnadu, the dentist registered in the Council, the number of dental institutions, number of seats in graduation and post-graduation courses were obtained from the database of Dental Council of India. These data were entered in Excel for descriptive statistics.

Results: Among a total of 553 Postgraduate positions, 42 (7.59%) positions are offered by government sector and 511 (92.40%) positions are offered by private sector with the estimated dentist population ratio of TamilNadu for the year 2018 as 1:3666.7. In North zone, for a population of 32.7% (2,36,33,167) there are around 18 (62.3%) dental educational institutes whereas for a population of 18.78% (1,35,53,283) there are around 3.4% (1) of dental educational institutes. Furthermore, the dentists employed in government sector is 569 (2.57%) compared to all remaining 21490 (97.4%) dentists who are self-employed or in private sectors.

Conclusion: The challenges faced by the dental professionals are really grave in nature. The current system prevailing will lead to disastrous consequences unless intervened with emergency without negligence to save the dignity of the profession.

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INTRODUCTION

Dentistry was practiced in innumerable customs ever since time immemorial in India. On the other hand, scientific fruition in dentistry and dental practice can be delineated back to British rule in India. Since then an oodles of changes and enhancements have been unleashed in the country. There was a piecemeal upsurge in Dental Institutions and Manpower which has racked up a saturation point in contemporary hours. With a total population of 6.79 crores, Tamil Nadu ranks sixth in terms of total population among all the states of India

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(<https://statisticstimes.com/population/population-of-indian-states.php>). The prevailing fact that there is only one single school of dentistry owned by the public sector to cater to the needs of over 60 million people is notable. The dental education system and process in Tamil Nadu is not dissimilar to other states in India in that undergraduates in dentistry pass through four years of schooling and one year of compulsory internship in order to be conferred with a graduate degree in dentistry (Bachelor in Dental Surgery, BDS) and to be certified as a practicing dentist by the Dental Council of India (DCI) (Elangovan, 2010). This paper emphasis on the fruition of dentistry in Tamilnadu and throws light into the modern consequence (Vundavalli, 2014). In India, especially Chennai is deliberated as the medical capital of the world and so, on the other hand, to say dentistry has also been unconventional in

this part of the country where people congregate to matriculate latest techniques expedient for their practice (Halappa, 2014). This article also attempts to describe the current situation in Tamil Nadu with regard to dental education institutes and their distribution across the state, the existing dentist population ratio in Tamil Nadu, the unmet dental needs of the people residing in Tamil Nadu and the public and private sectors responsibilities in meeting these needs. As the population had grown exponentially, this paper prospects whether dental manpower has also fully-fledged in equivalent measurement to oblige it or not (Mathur, 2015). It also investigates the geographical dispersal and dispensation of dental manpower and its impact on the oral health of the population be inherent in this part of the country. The scope of this paper is also to reconnoiter whether dental manpower in the current scenario is competent in delivering oral health care services to the public at large and to procure elucidations to most important remonstrance confronted in that aspect.

MATERIALS AND METHODS

This paper anticipates accumulating all ex post facto data from Tamilnadu athenaeum and historical research which was once called as Madras Record Office considered as one of the largest document founts in Southern India. Tamilnadu Archives is pondered to be one of the exemplary centers which are contemplated inestimable to researchers concerning in the subject of Madras Presidency. This was ordained in 1672 by the exertions of the then Governor of Madras Presidency Mr. William Langhorne who averred of keeping all records of British transactions for future. The current data is obtained from the website of the Dental Council of India, Central Bureau of Health Intelligence and the Ministry of Health and Family Welfare. The data concerning the number of dental educational institutes across Tamilnadu and the dentist registered in the Council were procured from the database of Dental Council of India. Since Dental Council of India is a statutory body constituted under the Dentist Act of 1948 has innumerable information on dental institutions and manpower in the states. The Ministry of Health and Family Welfare also propagates annual National Health Profile (NHP) through the medium of its nodal agency, Central Bureau of Health Intelligence (CBHI). Latest journals, current and past publications in presumed journals which are published and indexed with innumerable esteemed publishers were also allowed for more vital data. For practical discussion intents regarding the problems and challenges faced were analyzed through newspapers and magazine articles, which forms a major media to highlight the burning issues. The past census were been consulted to understand the demographic profile of the study area and the latest census 2011, released by The Ministry of Health and Family Welfare was set as a benchmark for the accurate current comparison with dental conditions. The data regarding the number of dental institutions, number of seats in graduation and post-graduation courses were retrieved and entered in Excel for descriptive statistics. An appropriate descriptive analysis was used to find out the geographical distribution pattern and its impact on serving the dental needs of this part of the country.

RESULTS

Growth Trends of Dental Educational Institutes in Tamilnadu State: Figure 1 shows the growth trends or

establishment of dental educational institutes in concordance with time. In 1883, Dental Department in Government General Hospital in Madras was created and handled by Royal Army Dental Assistants. Several decades later a Civil Surgeon post was created and later it was assigned as professor cadre in Department of Dental Surgery at Madras Medical College. In 1935 Dr.H. Venkata Rao started the first dental college and Hospital in Madras Presidency. In 1942 Dr. H.M. Rao with DDS qualification from United States of America started the American Dental College of Madras. Due to some uncertain reasons both the colleges were shut before the independence era and hence were not tabulated in this study. There was only one dental college especially in government during a period from 1951-1970. No dental institutes were established in the state. Highest number of dental college (14) was established in the decade from 2000 to 2010 followed by 7 in 1981-1990 and 5 colleges in 1990-2000 (http://www.dciindia.org.in/).

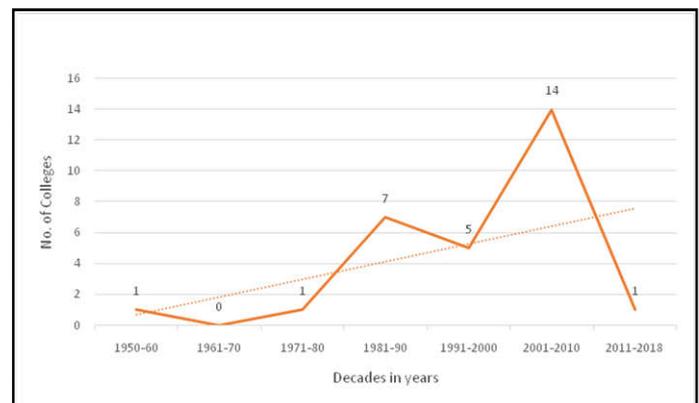


Figure 1. Trends in the establishment of dental colleges existing in Tamilnadu

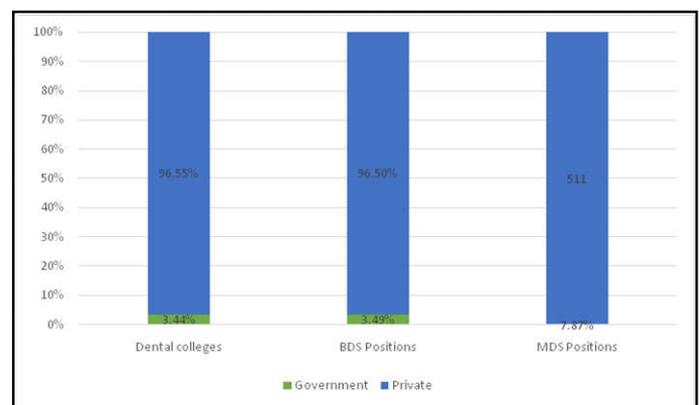


Figure 2. Public and Private Participation in Dental education

Figure 2 shows the share of government and private sector's participation in dental education along with the share of total number of positions in Under graduation i.e., Bachelor of dental surgery (B.D.S) and Post-graduation i.e., Master of dental surgery (M.D.S). The current data shows that there are 2860 positions for first-year Undergraduate students in Tamilnadu; out of which only 100(3.49%) positions are in government merit sector and 2760(96.50%) positions in private dental institutes which are self-financing in nature (http://www.dciindia.org.in/). Figure 3 shows the comparison of Postgraduate positions offered by government and private sectors in Tamilnadu (http://www.dciindia.org.in/) Among the total number of 553 Postgraduate positions, 42 (7.59%) positions are offered by government sector and 511 (92.40%) positions are offered by private sector.

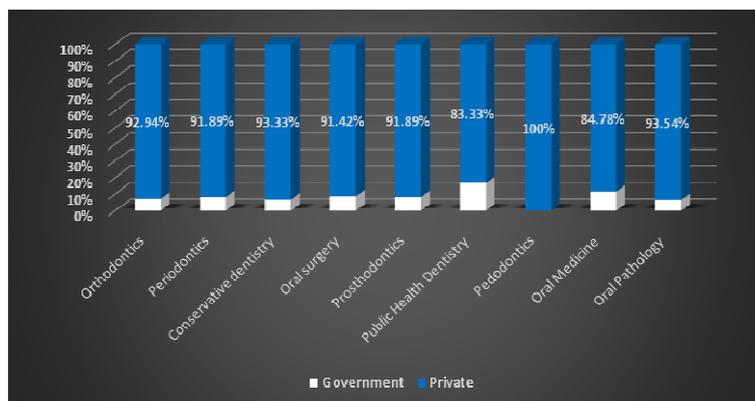


Figure 3. Post graduate positions in Tamilnadu and its Impact

Table 1. Dentist Population ratio in Tamilnadu State

| | Based on 2011 census | Current status 2018 |
|--------------------------|----------------------|---------------------|
| Dental Colleges | 29 | 29 |
| Total No. of dentists | 20514 | 22059 |
| Area in Sq. Kms | 1,30,060 | 1,30,060 |
| Total population | 7,21,47,030 | 8,08,85,600 |
| Dentist Population Ratio | 1.2 : 5000 | 1: 3666.7 |

Table 2. The Geographical Pattern and Distribution of Dental Educational Institutes in Tamilnadu

| Zones | Districts | Area (Sq.km) | Population Distribution | Total No. of Colleges | Percentage of Zonal Distribution of Colleges | Percentage of Zonal Distribution of Population | No. of Under Graduate colleges | No. of Post Graduate colleges |
|-------|-----------------|--------------|-------------------------|-----------------------|--|--|--------------------------------|-------------------------------|
| North | Thiruvallur | 3,424 | 37,28,104 | 1 | 62.3 % | 32.7% | 1 | - |
| | Chennai | 178.20 | 46,46,732 | 9 | | | - | 9 |
| | Kancheepuram | 7857.00 | 39,98,252 | 8 | | | 4 | 4 |
| | Vellore | 6,077 | 39,36,331 | - | | | - | - |
| | Thiruvannamalai | 6,191 | 38,64,875 | - | | | - | - |
| Delta | Villupuram | 7,217 | 34,58,873 | - | 3.4% | 18.78% | - | - |
| | Cuddalore | 3,678 | 26,05,914 | 1 | | | - | 1 |
| | Perambalur | 3690.07 | 5,65,223 | - | | | - | - |
| | Ariyalur | 3,208 | 7,54,894 | - | | | - | - |
| | Thanjavur | 3396.57 | 24,05,890 | - | | | - | - |
| | Thiruvarur | 2,161 | 12,64,277 | - | | | - | - |
| | Nagapattinam | 2715.83 | 16,16,450 | - | | | - | - |
| | Trichy | 4,407 | 27,22,290 | - | | | - | - |
| West | Pudukottai | 4663 | 16,18,345 | - | 20.6% | 23.89% | - | - |
| | Karur | 2,895.57 | 10,64,493 | - | | | - | - |
| | Namakkal | 3363 | 17,26,601 | 3 | | | - | 3 |
| | Salem | 5205 | 34,82,056 | 1 | | | - | 1 |
| | Dharmapuri | 4497.77 | 15,06,843 | - | | | - | - |
| | Krishnagiri | 5143 | 18,79,809 | - | | | - | - |
| | Erode | 8161.91 | 22,51,774 | - | | | - | - |
| | Tiruppur | 5186.34 | 24,79,052 | - | | | - | - |
| South | Coimbatore | 7,469 | 17,29,297 | 2 | 13.7% | 24.63% | 2 | - |
| | Nilagiris | 2452.50 | 7,35,394 | - | | | - | - |
| | Dindugal | 6266.64 | 21,59,775 | - | | | - | - |
| | Theni | 3,066 | 12,45,899 | - | | | - | - |
| | Madurai | 3741.73 | 30,38,252 | 2 | | | - | 2 |
| | Sivagangai | 4,086 | 13,39,101 | - | | | - | - |
| | Ramanathapuram | 4089.57 | 13,53,445 | - | | | - | - |
| | Virudhunagar | 4288 | 19,42,288 | - | | | - | - |
| | Thoothukudi | 4,621 | 17,50,176 | - | | | - | - |
| Total | Kanniyakumari | 1672 | 18,70,374 | 1 | - | - | - | - |
| | Tirunelveli | 6,810 | 30,77,233 | 1 | - | - | - | 1 |
| | | 32 | 141,878.7 | 7,21,47,030 | 29 | 100% | 100% | - |

In comparison of Postgraduate positions in government to private sector among the nine branches of dentistry, the branch of Public Health Dentistry clocks in with a relatively higher percentage (16.66%) of positions in government sector than the private sector. In the branch of Pedodontics, there is a total lack of Postgraduate positions offered by the government sector with all the positions offered by the private sector. Table 1 describes that every year the population in Tamilnadu increases by approximate 10,97,600 people.

The population of Tamil Nadu in 2011 was forecasted as 7,97,88,000 and for estimating the projected population 10,97,600 is added every year for 7 years. Hence the final projected population of Tamilnadu in 2018 is calculated as 8,08,85,600 (<http://indiapopulation2018.in/population-of-tamilnadu-2018.html>). Total number of registered dentist in Tamil Nadu as on July 2018 is 22,059 (<http://www.tndentalcouncil.org/LstRegDentist.aspx>) Therefore the current status of estimated dentist population ratio of TamilNadu is 1:3666.7.

Table 3 shows the geographical pattern and distribution of dental educational institutes in Tamilnadu. Based on this table, the scenario seems to be uneven due to the vast unfair distribution of colleges within each zone.

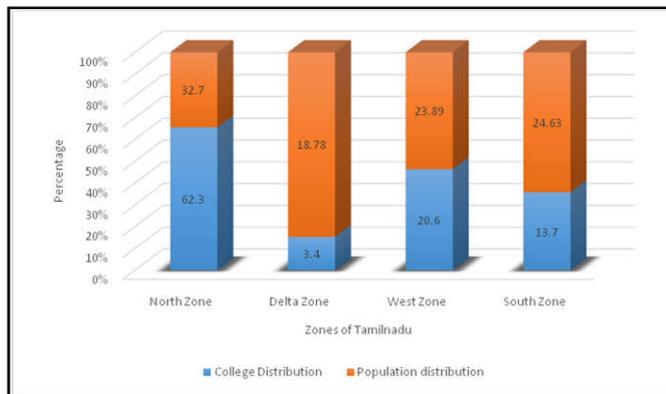


Figure 4 Comparative Analysis of Dental Educational Institutes versus Population Distribution in Tamilnadu

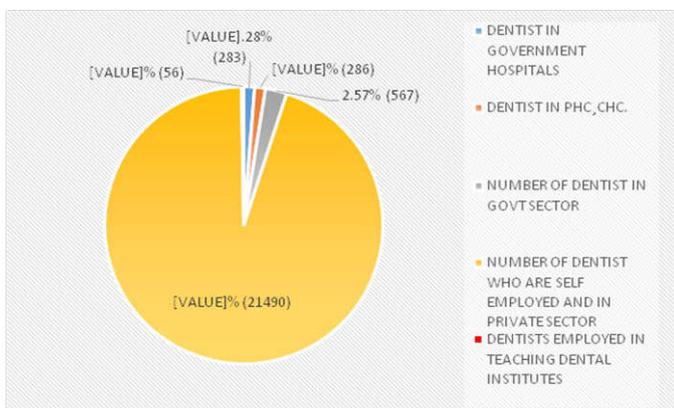


Figure 5. Sector based dental manpower trends in Tamilnadu

The Delta zone with only 1 (3.4%) dental institute especially shows lack of the number of colleges followed by the South Zone with 4 (13.7%) dental institutes and then the West Zone with 6 (20.6%) dental institutes. In contrary the North zone is distributed with abundance of dental institutes i.e., 18 (67.3%). North Zones comprises of 6 districts with 2,36,33,167 (32.7%) total population and has 18 (62.3%) dental educational institutes. Delta comprises of 8 districts with 1,35,53,283 (18.78%) of total population and has only 1 (3.4%) dental institute. Western zone comprises of 9 districts with 1,68,55,319 (23.89%) of total population and 6 (20.6%) dental institutes. Southern zone comprises of 9 districts with 1,77,76,543 (24.63%) of total population and has 4 (13.7%) dental institutes. There are about 22,059 trained and registered dentists in Tamilnadu. In that, 283 (1.28%) dentists have been employed in district and Taluk government hospitals of Tamilnadu. Amidst total 22,059 dentists 286 (1.29%) only are being appointed in contract basis in Primary and Community Health Centers and the remaining have been appointed by the Directorate of Medical Education in the only Government Dental Institute for teaching purposes in Tamilnadu. So, altogether the dentists employed in government sector is 569 (2.57%) compared to all remaining 21490 (97.4%) dentists who are self-employed or in private sectors.

DISCUSSION

Until India's independence in 1947, there were only 2 private dental colleges started in Tamilnadu and in the progression of

time both institutions didn't last long and had relinquished. In December 1949, the Government of Madras by an order sanctioned the opening of a separate Dental wing attached to Madras Medical College and Government General Hospital, Madras, for training candidates for the Undergraduate Bachelor of Dental Surgery course and recommended an intake of fifteen students per year in the year 1953. It remained the only dental educational institute in Tamilnadu until 1980 when first private dental teaching institute in Tamilnadu, Rajah Muthiah Dental College was established (<http://www.tamilnadu.dentalcollege.com/history.php>). The evolution of dental colleges in Tamilnadu has been plodding since 1980 which was markedly high during 2001-2010 which waned later then. From 2001-2010 there was a spurt of 14 dental colleges in Tamilnadu. The reason for the capricious trends in the growth of dental colleges was due to the opening up of the education sector in the decade 1980-1990s by the government to the private players. This attributed to the self-financing approach that envisioned to cater the health needs for the ever-growing population.

By analyzing the scenario of undergraduate and postgraduate positions available, both in government and private sector, only one institute (3.44%) of the 29 dental education institutes was present in Tamilnadu under government sector. This depicts the unevenness of the dental institutes among the government and private sectors. At least one government dental institute per zone of the four zones in Tamilnadu could have been recommended. The proportions of Government Dental Institutes with that of the private sector sustains to be balanced in the state of West Bengal (50%) and nearly balanced in the state of Gujarat (30%) in contrary to Tamilnadu where only one government dental institute is present contemporarily. Furthermore, in Delhi, all dental institutes are under the government sector. As there is a substantial difference in the fee structure between government and the private sector in dental education institutions, the students of middle and low socioeconomic groups become unaffordable in pursuing dentistry. This is attributed to the negligence of the state government in understanding the discrepancies in oral health issues of inaccessible population and troubles faced by weaker sections of dental students that arise due to inadequate solicitations for establishing government dental institutes wherein priority lies only for the medical institution's establishment. Furthermore, in most of the countries the postgraduate or higher education is almost free or subsidized whereas, in India, the dental post-graduation sustains to be the costliest. The students pursuing Bachelor degree fail to pursue master degree due to the inordinate fee which has created a scenario that some dentists intend to seek alternate professions (Jain, 2012). Pursuant to various branches in dentistry also there lies discrepancy.

The Branch of Pedodontics and Preventive Dentistry has a complete lack of government positions in Tamilnadu which is a major concern as Prevention is essential in oral health and care for the children is imperative in the community. When it comes to the dentist population ratio, according to WHO, the ideal ratio is 1:7500 (http://www.who.int/gho/publications/world_health_statistics/EN_WHS2014_Part3.pdf). The dentist population ratio in India was 1:30,000 in the year 2004. Ten years later, the ratio became 1:10,000 in 2014 (Dagli, 2015). This might be endorsed to mushrooming of dental colleges in India which consequently led to oversupply of dental manpower. In a recent study by Jain et al, the projection was more than one lakh dentist oversupply by 2020 (Jain, 2012).

In Karnataka state where there is the highest number of dental colleges in India with a population of 67.6 million currently has a dentist population ratio of 1:1624.9 (<http://www.dciindia.org.in>) whereas in Tamilnadu the ratio is 1:3666.7. This shows that Tamilnadu has equivalent dentist population ratio when compared to Karnataka. According to WHO there should be one dentist for 7500 population whereas in Tamilnadu current data shows that there is one dentist for every 3666 population which depicts overproduction of dentist that is currently alarming. Initiation of the bridging course that caters an opportunity to pursue MBBS in three years with completion of Bachelor of Dental Science by the Dental Council of India has disclosed various job opportunities which happens to revamp the oral health in rural areas by extending their postings (https://www.businessbridge-course-for-bds-students-118031000336_1.html). Prioritizing the oral health issues and policy implementation could blossom a better way to solve the issue of the overflow of dentists and their unemployment in Tamilnadu (<http://www.dciindia.org.in/>). Due to the excess dentist practicing in comparison to population, the Georgetown University School of Dentistry in Washington was shut down in 1990 fearing a loss. This situation must be considered as an alarming eye opener as it is not far too long for the same scenario to be emanated here. Curbing the dental colleges in India, particularly in Tamilnadu could help to keep the dentist population ratio in control (Lewin, 2018). Development and maintenance of databases especially focusing the Tamilnadu state that monitor and predict the actual oral health needs of public in Tamilnadu can aid the government to formulate some Standardized population-based approaches for planning and program implementation pertaining to government job opportunities and public's welfare (http://www.ada.org/en/~media/ADA/About%20the%20ADA/Files/fu%20ADture_execsum_fullreport). When analyzing the issue of equitable distribution of dental educational institutes according to the geographical area, the study pointed out all the ill wills currently prevailing in the country are due to fault lines found in this basic criteria. Tamilnadu state is geographically grouped into 4 zones namely North, Delta, West, and South even though there is no official demarcation as such. The above-mentioned zones are always used to group geographically identified districts into zones during political trend predictions in reputed scientific surveys.

By closely analyzing the results according to zones, there is an inequitable concentration of dental institutes in the state which leads to basic disruption in dental infrastructure. The northern zone to cater to a population of 2,36,33,167(32.7%) there are about 18 (62.3%) dental colleges whereas in the delta region there is only one dental college (3.4%). This clearly underlines the fundamental failure in absence of an appropriate regulation to check this geographical inequality by Dental Regulatory body of India. Due to the presence of densely populated colleges in cities poses a severe problem for the dearth of patients for students during examinations to perform the required clinical procedures and there also occurs incidence of conflict of interest among colleges during public health outreach programs. This leads to unethical behaviors and practices which consequently the dignity of dental profession. As dental education institutes mainly focus on research in other countries, in India the dental institutes are the only hub for both kinds of research as well as treatment procedures. Hence the equitable distribution of the dental institutes is mandatory contemporarily for the public's benefit. The state dental council

maintains a registry in which all the domiciled graduates who wish to serve in this particular state are been registered into two categories as Part-A and Part-B. According to that registry 22,059 dentists are registered until July 2018 data of which nearly 97.4% (21,490) which includes self-employed dentists, practitioners in corporate sectors or dentists who are not continuing in this profession (<http://www.tndentalcouncil.org/LstRegDentist.aspx>) Furthermore from the total number of registered dentist only meager 569 (2.57%) were working in the government sector through dental needs are being extravagant (<http://www.tamilnadudentalcollege.com/faculties.php>). This is attributed to the negligence of the government in handling the dental needs with the available dental manpower for which even more stress is to be applied.

Recommendations

So, in nutshell, the challenges faced by the dental professionals are really grave in nature. The current system prevailing will lead to disastrous consequences unless intervened with the emergency without negligence to save the dignity of the profession. The action is to be initiated from two partners who have all the powers to determine the future course of dentistry and they are firstly the State Government followed by the Dental Council of India. After thoroughly scrutinizing the facts figures and the data, the following recommendations are made as priority areas for intervention. The recommendations are:

State Health Ministry and State Government

- Tamilnadu medical recruitment board should recruit dentists on yearly basis and fill in all the 1369 Primary Health Centers with permanent positions, and all Community Health Centers to be filled with specialists.
- At least one Government College in each 4 zone to cater the weaker sections of the society for which more government dental teaching positions should be filled through the Directorate of Medical Education (DME).
- State government should encourage and evolve policies for relocating the infrastructure of the densely populated colleges to the needy area by incentivizing with free land, corporate tax benefits etc.
- Deputy Director of oral health services should be created which will be headed by public health dental professionals and public oral health district officers along with the infrastructure that should be established for proper planning and implementation.

Dental Council of India

- Geographic location and demographics based criteria should be the utmost priority in granting permissions for the establishment of dental colleges' i.e. not more than one dental institute in a district should be strictly followed and suggestions for rectifying the contemporary flaw should be taken in the war footing.
- Each dental college should not be allowed an intake of more than 60 Bachelor of Dental Surgery student positions per year which would increase the clinical experience by elevating the student patient ratio thus enhancing the quality of dental education that is contemporarily deteriorating.

- In the developed world when there is an excess dentist population ratio, dental institutes hibernate by ceasing to take new student positions and are subjugated to undertake national research and revert back to teaching when the requirement arises which can be tried in dental institutes.
- Medical (MBBS) bridging courses for the bachelor of dental surgery graduates is really the need of the hour and it should be granted at the earliest time possible, with the prerequisite bond to do compulsory rural service for 5 years which would be of great fill up for the depth of medical services in rural areas.

Limitations and Conclusion

Calculation of future projection of manpower as well as oral health burden and manpower of Tamilnadu is beyond the scope of this study and will be established in a separate paper. Furthermore, authentic government database did not furnish few accurate details on dentist working in the department of railways, public enterprises and others present in the state of Tamilnadu emanated a crisis that certain descriptive statistics concerning the above-mentioned data was not possible. Thus, these in grave defies faced by every dental professional has consequently affected their respective personal life. In conclusion, the only solution is the timely intervention by the State Government of Tamilnadu and the regulatory bodies of the country. Further falling short in mending the currently preponderating negligence would cater a prodigious disastrous consequence.

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