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RESEARCH ARTICLE

PUBLIC HEALTH DENTISTRY- A TREND ANALYSIS ON CURRENT STATUS AND FUTURE SCOPE PROSPECTUS OF DENTAL PUBLIC HEALTH IN INDIA

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ABSTRACT

Aim: To analyze the changing trends in dental public health in India and to assess job prospectus and provide solutions. **Materials and Method:** The databases accessed were those provided by the Central Bureau of Health Intelligence, Dental Council of India, Indian Association of Public Health Dentistry and Ministry of Health and Family Welfare and further this data was statistically analyzed. **Statistical analysis used:** Descriptive statistics. **Results:** At present there are about 1600 public health dentists in India, out of which 678 (42.3%) were working in dental academic institutions. According to time trend analysis the future projectile growth of public health dentists for the year 2045, will be 5,825. The job positions for public health dentists that rightfully to be placed in government sector are the Directorate of Medical Services (DMS) and Directorate of Public Health (DPH) which numbers around 6,716. Hence, according to the time trend analysis, when rightfully the positions are created the job demand for public health dentists in India would be on rise till the year 2045. **Conclusions:** currently, significant proportion of public health dentists to outlive joblessness they seek other jobs irrelevant to their scope. The growth trend projection of public health dentists makes no scope in academics for their future. Hence government positions pertinent to treatment aspects and administrative aspects under Directorate of Medical Services (DMS) and Directorate of Public Health (DPH) will create more job opportunities that will seek to provide satisfaction and career development for future public health dentists and mandatorily serve the needy population, which is alarmingly need of the hour.

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INTRODUCTION

India is the second-most populous nation in the world with 1.38 billion population. Its health-care delivery system consists of both public and private health-care setups. In India, health is mostly a state issue and different states have different health-care agendas. Public health-care has been organized into primary healthcare provided by primary health-care centers, secondary care by community health centers and tertiary care by referral and super-specialty hospitals. Dental health-care is not integrated with general health in most of the public health-care setups. Dental care is not provided at the primary health-care level; it is provided to some extent at the secondary level but mostly at tertiary care centers (<http://mohfw.nic.in/>). But in certain states they are employed on contract basis in PHC's.

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Oral diseases are a major public health problem, and their burden is on increase in many low and middle-income countries. The main role of public health dentistry is to prevent dental diseases, prolong life and promote health through organized community effort (Gambhir 2016). Public Health Dentistry, synonymously known as Dental Public Health is a discipline of dentistry which enables a dentist to solve oral problems in a community by multifarious interventions such as health education, health promotion, surveying, problem identification, planning and policy formulation to solve oral health problems in a community based on the perceived needs of the people in a community and also aims to improve the oral health of the population through preventive and curative services. The dental public health professional, with his/her understanding of dental problems and his/her competence in dealing with community affairs, can be a decisive influence in the development of health programs which are the best interests of both the public and the dental profession (Kothia 2015).

Even though the specialty has been doing its stint in improving the oral health situation since its inception, in the year 1973 as preventive and social dentistry in Government Dental College, Bangalore (<http://dciindia.gov.in/History>), there has been little to state about the accomplishment of opening up the job prospectus in India. Therefore, the present study focuses on some of the important aspects related to public health dentists in India such as a role in oral health care, workforce, and curriculum, utilization of public health dentist's personnel in health centers and future manpower in public health dentistry. The study also focuses on the job prospects of Public Health Dentists in various health sectors.

METHODOLOGY

Data search for the present review was done both electronically as well as manually. Government agencies such as Dental Council of India (DCI), Ministry of Health and Family Welfare and Indian Association of Public Health Dentistry (IAPHD) were also consulted to get relevant data regarding Public health dentistry. The information concerning the number of dental academic institutions, number of public health dentists working in academic institutions both in Government and private sector, available public health dentistry postgraduates seats in government and private institutions and dentists registered in the Council were obtained from the database of Dental Council of India. Since Dental Council of India is a legislative body comprised under the Dentist Act of 1948 has multitudinous data on dental institutions and manpower in the states. A literature search was performed using the MeSH terms "dental public health," "public health program," "dental manpower" in latest journals, current and past publications in presumed journals were also used to collect more vital data. Number of health centers and qualifications of the working professionals in health centers were obtained from Ministry of Health and Family Welfare (MOHFW) and Indian Public Health Standard Guidelines (IPHS). Information regarding faculties in public health dentistry working both in government and private dental institutions across India were also obtained from the database of Indian Association of Public Health Dentistry (IAPHD). The data were retrieved from all above mentioned source and entered in Excel for descriptive Statistics.

RESULTS

Table 1 shows that there were about 318 dental institutions in India, of which 258 institutions were having post graduate specialties, and further 79 institutions were having Public health dentistry as a post graduate specialization. In these 79 institutions, 72 were under private and 7 institutions were under Government. Consecutively there were 678 public health faculties working in academic institutions and about 233 post graduate seats were available for the specialization in public health dentistry per year all over India. (<http://www.dciindia.org.in/>). Figure 1 shows the total number of dental institutions from 2000 to 2019 in India. There were about 134 dental institutions in the year 2000-2001, and currently 2018-2019 there were 318 dental institutions in India (<http://www.dciindia.org.in/>). Figure 2 shows that in the year 2000 there were about 22.38% dental colleges under government sector and 77.61% were

under private sector and currently in the year 2018 -2019, 13.15% were owned by government and the remaining 84% were under private (<http://www.dciindia.org.in/>). Figure 3 shows that in 2014- 2015, 71.6% of public health dentists faculties were working in academic institutions and 28.3% were other public health dentists. And in the year 2018 -2019, there are about 1600 public health dentists in India (<https://www.iaphd.org.in/>) out of which 42.3% were working in dental institutions and 57.6% were other public health dentists (<http://www.dciindia.org.in/>). Figure 4 shows that there are 318 dental institutions in India, out of which 258 (81.1%) are post graduate institutions, 79 (24.8%) dental institutions were having Public Health Dentistry (PHD) as specialization, furthermore, 72 (22.6%) institutions with Public Health Dentistry as specialization were under private sector and only 7(2.2%)of institutions with Public Health Dentistry as specialization were under Government sector (<http://www.dciindia.org.in/>). Figure 5 shows that there are 233 seats are available in public health dentistry all over India, out of which 214 (91.8%) seats were under Private sector and only 19 (8.1%) of seats were under Government sector. (<http://www.dciindia.org.in/>). Figure6 shows that there are 233 Public health dentistry seats available over all India, out of which 6.8% are available in East zone, 14.1 % are available in West zone, 6% are available in Central zone, 0% in North East zone, 22.3% are available in North zone, and 50.6% are available in South zone. (<http://www.dciindia.org.in/>). Figure 7 shows that there were 678 Public health dentists working under private and Government sector, out of which 629 (92.7%) were working under Private sector and 49 (7.2%) were working under Government sector, Also number of public health dentists working in community health center was zero. (<http://www.dciindia.org.in/>). Table 2 shows that India's population is 1.38 billion (<http://indiapopulation2020.in/population-of-tamilnadu-2020.html>). At present there are 1600 Public Health Dentists, which infers that the Public Health Dentist to population ratio is 1:8, 62,500. (<https://www.iaphd.org/>). And also according to the current population, dentist population ratio in India is 1: 4,976.

Figure 8 shows the job positions for public health dentists that rightfully to be placed in government sector are the Directorate of Medical Services (DMS) and Directorate of Public Health (DPH) which numbers around 6,716. In which 1, 148 Public Health Dentistry positions to be created at state level, Zonal level and District under Directorate of Public Health (DPH) for administrative aspects and 5,568 Public Health Dentistry positions to be created at community health centers under Directorate of Medical Services (DMS) for treatment aspects. Further available Public Health Dentists currently not working in academic institutions were 922. Excluding this, 5,794 job positions for public health dentists are to be created by the government health sector. (<https://mohfw.gov.in>). Figure 9 shows that currently, 922 Public Health Dentists were not working in academic institutions, and further 233 Public Health Dentists were passing out every year. Considering this, the time trend analysis shows that the future projectile growth of public health dentists for the year 2045, will be 5,825.

Table 1. The Geographical Pattern and distribution of Dental colleges, Post Graduate institutions, public health dentists working in academic institutions, institutions with public health dentistry specialization and total number of Public health dentistry seats in India

ZONES	States	Total Number of Dental Institutions	Total number of post graduate Institutions	Total number of Faculties in public health Dentistry	Institutions with Public Health Dentistry specialization			Total Number of Public Health Dentistry seats
					Government	Private	Total	
EAST	Orissa	19 (5.9%)	13 (5.0%)	29(4.2%)	1(14.2%)	5 (6.9%)	6(7.5%)	16(6.8%)
	Bihar							
	West Bengal							
	Jharkhand							
WEST	Rajasthan	69(21.6%)	59 (22.8%)	102(15.0%)	0	12(16.6%)	12(15.1%)	33(14.1%)
	Maharashtra							
	Gujarat							
	Goa							
	Diu Daman							
CENTRAL	Madhya Pradesh	21(0.6%)	18(6.9%)	39(5.7%)	0	4(5.5%)	4(5.0%)	14(6.0%)
	Chhattisgarh							
NORTH	Uttar Pradesh	69(21.6%)	58(22.4%)	128(18.8%)	3(42.8%)	15(20.8%)	18(22.7%)	52(22.3%)
	Himachal Pradesh							
	Uttaranchal							
	Punjab							
	Haryana							
	Jammu & Kashmir							
	Delhi							
Chandigarh								
NORTHEAST	Assam	5(1.5%)	0	1(0.1%)	0	0	0	0
	Manipur							
SOUTH	Telangana	135(42.4%)	110(42.6%)	379(55.8%)	3(42.8%)	36(50.0%)	39(49.3%)	118(50.6%)
	Tamilnadu							
	Karnataka							
	Kerala							
	Andhra Pradesh							
	Pondicherry							
	Total	318 (100%)	258 (100%)	678 (100%)	7 (100%)	72 (100%)	79 (100%)	233 (100%)

Table 2. Public health dentist Population Ratio in India

S. No	Dentist Population Ratio	Ratio
1	Public Health Dentist :Population Ratio (In India)	1: 8,62,500
2	Dentist Population Ratio (WHO Recommendation)	1: 7,500
3	Dentist Population Ratio (In India)	1: 4,976
4	Population in India	1.38 billion

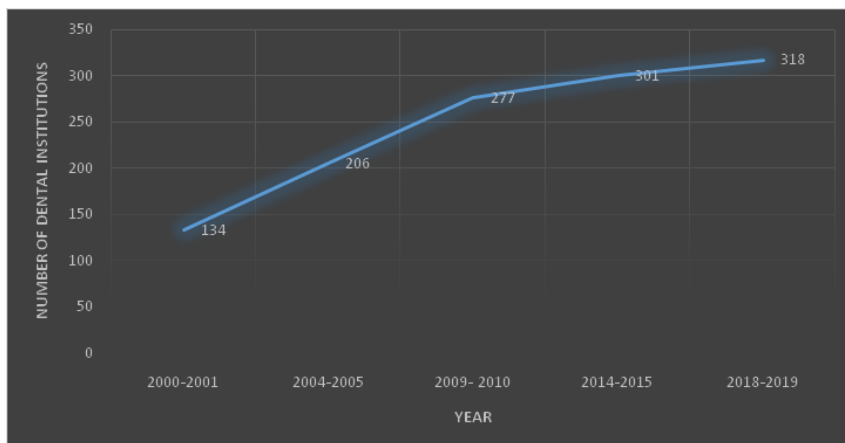


Figure 1. Total number of dental institutions from 2000 -2019 in India

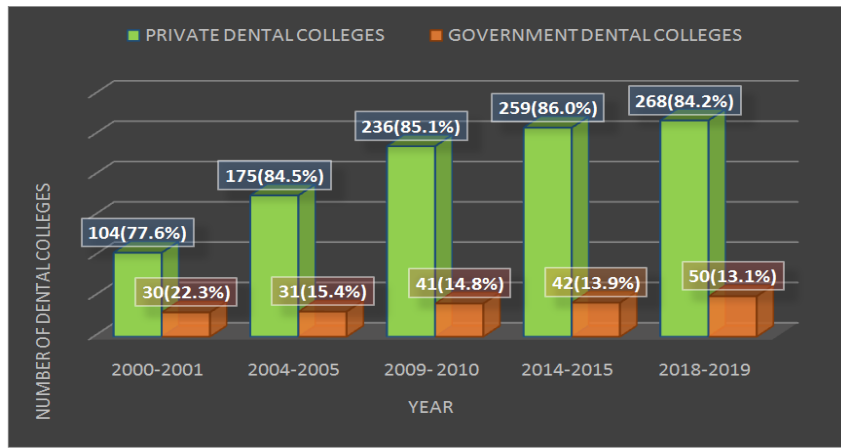


Figure 2. Total number of private and government dental institutions 2000 -2019 in India in India.

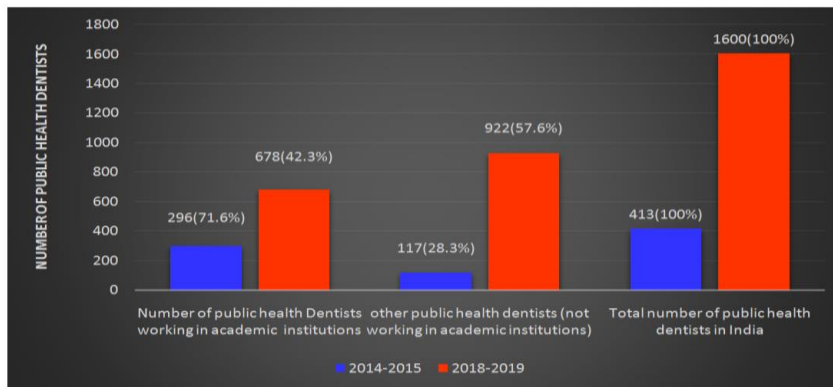


Figure 3. Total number of Public Health Dentists working in academic institutions and other public health dentists in India

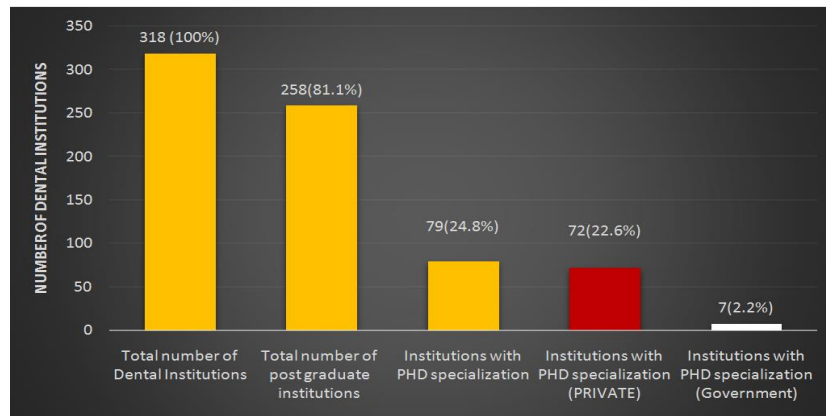


Figure 4. Total number of dental institutions, post graduate institutions, Institutions with Public health dentistry as specialization under Government and Private sector in India

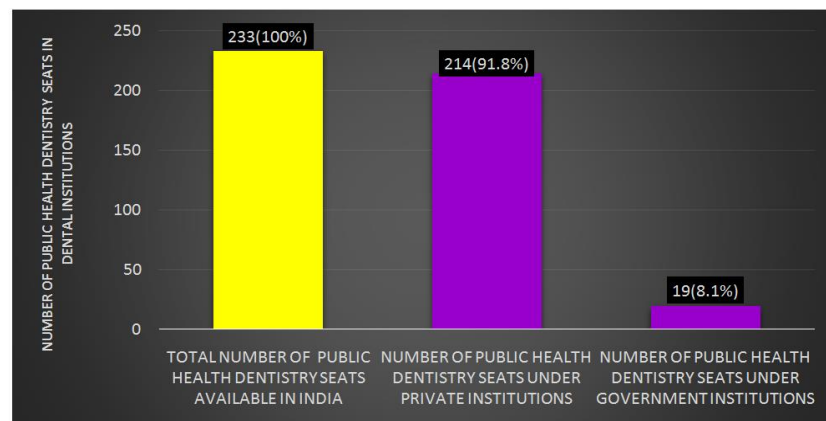


Figure 5. Total number of seats available for public health dentistry specialization and number of seats under private and Government sector institution in India

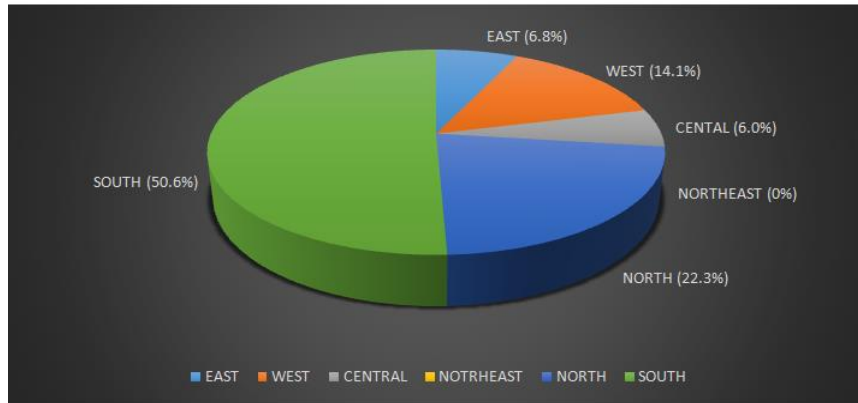


Figure 6. Zonal -Wise Distribution Pattern of Public Health Dentists (PHD) Seats in India

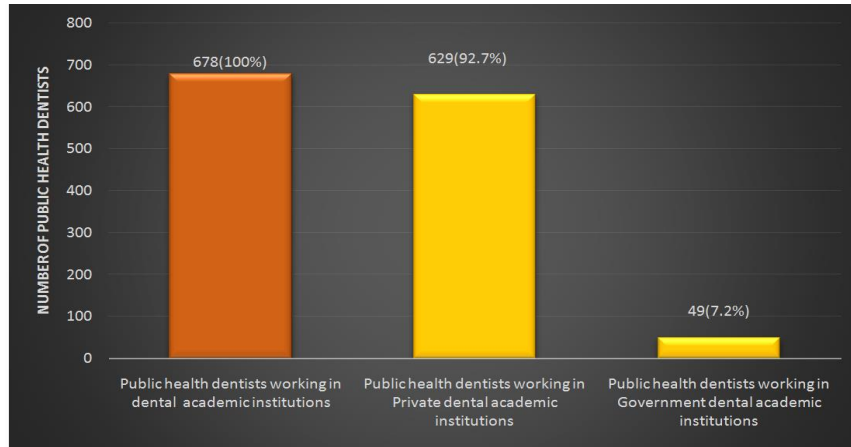


Figure 7. Number of Public health dentists working under private and Government sector

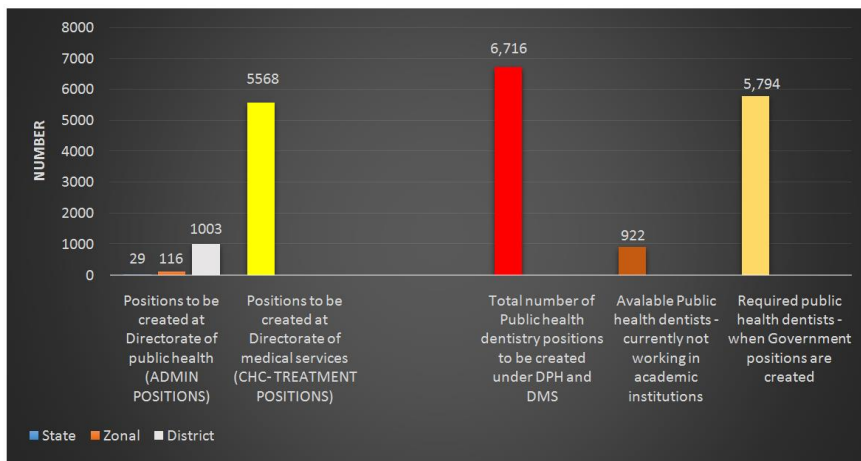
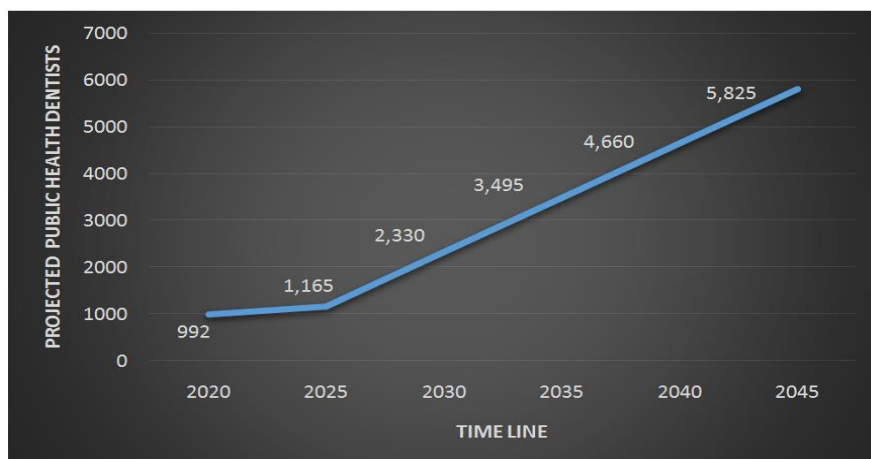


Figure 8. Public health dentistry eligible positions in both treatment and administrative aspects in Government health sector



*calculated according to the growth rate of passed out Public Health Dentists on yearly basis

Figure 9. Time trend analysis to fill up demand and supply gap if the rightful positions in Government is opened up

Table 3. Mandatory inclusion of Public Health Dentists at Community Health Centers (CHC) and General Dentists at primary health centers (PHC) in Indian Public Health Standards (IPHS) guidelines (2012) to be added in the consecutive guideline for implementation

Category of Manpower	Current status (PERSONNEL)	Qualification	Recommendations to be implemented
Manpower in Community health center(CHC)	1. General surgeon -1 2. Physician -1 3. Obstetrician & gynaecologist-1 4. Pediatrician -1 5. Anaesthetist-1 6. Specialist of AYUSH 7. Dental surgeon 8. General medical officer 9. Public health specialist	1. MS/DNB, (General Surgery) 2. MD/DNB, (General Medicine) 3. DGO /MD/or DNB 4. DCH/MD(Pediatrics) 5. MD(Anesthesia) 6. Post Graduate in AYUSH 7.BDS 8. MBBS 9. MD (community medicine) DPH/MPH	9. Public health dentist-1* (MDS – Public health dentistry)
Manpower in Primary health center (PHC)	1. Medical Officer -1 2. Medical Officer (AYUSH)- 1 3. Pharmacist -1 4. Pharmacist AYUSH- 1 5. Nurse-midwife (Staff-Nurse) - 3 6. Health worker (Female) -1 7. Health Assistant. (Male) -1 8. Health Assistant -1.	1.MBBS 2. Graduate in AYUSH 3.B.Pharm	+ Dental surgeon-1* (Holding Bachelor of Dental Surgery (BDS) degree

When the rightful positions are created for public health dentists by Directorate of Medical Services (DMS) and Directorate of Public Health (DPH) the job demand for public health dentists in India would be on rise till the year 2045.

DISCUSSION

The upsurge of dental Institutions in India had been since 1920, which was first on the go by Dr. Rafiuddin Ahmed in Kolkata. Since then quite a while, the first private Dental College was set up in 1966, thus far all the dental establishments were merely under Government sector. From the year 2000 to 2019 dental institutions both in government and private sector were aggrandized by opening 184 new dental institutions ubiquitous in India, which was bounteous when juxtaposed with 112 new dental institutions in the year 1980 – 2000 (Figure 1). In 2004, Dentist-population ratio in India was 1:30000 as indicated by World Health Statistics – 2014, wherein World Health Organization (WHO) recommended Dentist-population ratio to be 1:7500 (Sankalp, 2016). In India during 2004, dentists were comparatively less for the population, and hence the legislature may have extended the dental colleges, which will build the dentist population proportion as expected in future. This could be the explanation for huge increment in number of dental institutions from 2000 – 2019. In the year 2000 just 22.3% of dental institutions were under Government sector and 77.6% were under Private sector. In this scenario the dentist population ratio was low (<https://mohfw.gov.in/>) which the Government of India failed to compensate by establishment of new Government Dental Colleges.

Consecutively the Approval for the establishment of new private colleges by Dental Council of India (DCI) was undeniable due to the demand of dentist Population ratio which led to upsurge of private dental colleges. However in the present study, 84% were under private sector and just 13.5% were under Government sector. From 2000 to 2019 private dental institutions were expanding enormously, yet a similar aggrandizement was not found in Government sector. At present in the year 2019, dentist population ratio was 1:5000, which is optimum and hence the Dental Council of India (DCI) should take strict action over curtailing the number of dental colleges by strict guidelines (Yada S, 2016), and also government should make a fundamental move to

instantaneously build government dental colleges with legitimate standards. Though there are numerous dental colleges in India its distribution is uneven. (Table 1). South zone having more number of dental academic institutions with 42.4% in contrast with central zone having 0.6%. Likewise among all the 6 zones, south zone has the highest percentage of 42.6% among the dispersed post graduate institutions of India with faculties in public health dentistry of 55.8% and 50.6% of post graduate seats available in the field of public health dentistry. This uneven distribution will influence undergraduates hugely so that zones with more institutions and post graduate seats were bound to seek after undergraduate courses than those zones in which dental institutions and post graduate seats are not accessible. Hence the equitable distribution is mandatory contemporarily for the undergraduates as well as public's benefit (Prabu, D. 2018). There were 318 dental institutions in India, out of which 258 (81.1%) were post graduate institutions. Further out of 258, only 79 dental institutions were having public health dentistry as specialization which was further classified as 72 institutions under private sector and only 7 institutions under Government sector. Consecutively the distribution of Public Health Dentistry (PHD) seats were more under private sector (91.8%), and less (8.1%) under Government sector. This less number of Government institutions and Public Health Dentistry seats might attribute to give a negative influence for under graduates who wish to seek public health dentistry specialization, and also to the public health dentists who wish to work in academic institutions. A study conducted by Ramandeep Singh Gambhir et alin 2014 showed that there were almost 71.6% Public health dentists were working in academic institutions whereas this study showed that in the year 2019, public health dentist who were working in academic institutions has reduced to 42.3% and further the percentage difference between working faculties in academic institutions and other public health dentists had decreased from 43% to 15%. Thus it shows that Public health dentists who were not associated in academic institutions increased steadily, and this may be due to lack of vacancy in academic institutions which might be attributed to the enthusiasm for private practice though it requires gigantic venture like region of facilities and exorbitant gear's which need a tremendous measure of financial help. This ought to be tended to by the Government and rectified by their necessities totally. Public Health Dentists are trained to provide comprehensive oral health care in a Community Health Center. The myth that

exists about Public Health Dentistry is that Public Health Dentists are trained only in an administrative and organizational capacity and are not skilled in providing dental treatment. But they are highly trained in overall treatment and preventive aspects specially trained to work at government community health centers. However, Public Health Dentistry comprises of two arms, an administrative arm with representation in a Directorate of Public Health Services as district oral health officers and a treatment arm with representation in a Directorate of Medical Services in government community health centers. The three years post-graduation training in Public Health Dentistry equips a dentist with a skill-set to institute welfare programs for the successful resolution for oral health problems in a sustained manner. Focusing not only on curative but also preventive services at community level through research planning and implementation of programs to prevent oral health problems from occurring before invasive treatments become necessary. They also equip a Public Health Dentist to institute comprehensive oral care treatments in a Community Health Center. Employing a dentist with a specialization in any other discipline of dentistry in a Community Health Centers would limit the range of dental treatments that can be provided in a Community Health Center because Post Graduation in all other disciplines of dentistry besides Public Health discipline equips a dentist with a skill-set solely oriented inside that particular area of expertise. In page 9 of the Indian Public Health Standards (IPHS) guidelines for Community Health Centers (CHC), there are provisions for employment of a Public Health Specialist with a degree in Community Medicine, Masters in Public Health or Diploma in Public Health and a Public Health Nurse. It should be modified that to include a Public Health Dentist withholding a Masters in Dental Surgery (MDS) degree in Public Health Dentistry to be employed in the Block Public Health Unit (<http://cghealth.nic.in/>).

Hence recruitment of Public Health Dentists should be made mandatory to treat patients in Community Health Centers in place of a general dentist withholding Bachelor of Dental Surgery (BDS) degree as Public Health Dentists are trained to provide comprehensive treatment in all disciplines of dentistry in a Community Health Centers. In other countries like Kenya, ministry of health (Nairobi) recruits public health dentistry for the post of community oral health officer to supervise sub district hospitals, district hospitals in administration aspects and also for treatment aspects in community health centers (<http://www.health.go.ke/>). According to the current organizational structure of National Oral Health Program NOHP (2012-2017), the State Nodal Officer should be in charge of the State Oral Health Cell and the District Nodal Officer should be in charge of the District Oral Health Cell. This change is required as per the NOHP guidelines including employment of Special Program Officers at the State-level who must be a Public Health Dentist and recruitment of Public Health Dentist to serve as District Oral Health Officer. The criteria for selection of Public Health Dentists should be transparent and follow an official systematic recruitment process by the government; where the level of posts can be varied according to the eligibility and seniority (<http://www.nrhmhp.gov.in/>). According to the time trend analysis in this study, the future projectile for the year 2045 shows that 5,825 public health dentists will pass out and there will be enough job opportunities for them, if rightful positions are created by the Government for the same in

administrative aspects under Directorate of Public Health (DPH) and treatment aspects under Directorate of Medical Services (DMS).

Recommendations

- Government health ministry and Dental Council of India (DCI) should take necessary steps to implement National Oral Health Program mandatorily through Public Health Dentists as they were specially trained for delivering oral healthcare through proper planning and evaluation protocol.
- Every state should conduct medical recruitment board (MRB) Exams to recruit Public health dentists on yearly basis to serve the public all community health centers.
- The administrative and treatment positions from Community health center to state level should be specifically mentioned in job profile of public health dentist in the under graduate public health dentistry curriculum syllabus to avoid conflict of interest with other specialties during recruitment process
- Implementing the State Arm of Government of India's National Oral Health Program by mandatory inclusion of Public Health Dentists in respective regions.
- Public health dentistry was formerly known as preventive and community dentistry since primary role of public health dentists is to prevent oral disease and promote oral health. Hence the name Public Health Dentistry (PHD) should be prefixed with preventive as Preventive and public health dentistry which will help in the recruitment of specialists in preventive aspects of oral health in the government sector.

Directorate of Medical Services

Recommendations to change revised Indian Public Health Standard (IPHS) guidelines (2012) to recruit Public Health Dentists all through India should be made mandatory to treat patients in all 5,568 Community Health Centers in place of a general dentist withholding under graduate degree because Public Health Dentists are trained to provide comprehensive treatment in all disciplines of dentistry in a Community Health Center (CHC) (<https://www.iaphd.org/>)

Directorate of Public Health

- Recruitment of Oral health officers at State level as nodal officer mandatorily be a Public Health Dentists.
- Recruitment of District Oral Health Officers at District level should be Public Health Dentists.
- Zonal level and state level oral public health administrative jobs to be created for Public Health Dentists by the Ministry of Health in parallel to general health services.

Limitations and Conclusion

Calculation of projected Public Health Dentists in time trend analysis may vary according to the establishment of dental academic institutions or an increase in number of post-

graduation seats or Public Health Dentists who wish to go abroad in future for career opportunities. Also public health dentist's positions to be created by the Government may also vary according to upgrading primary health centers (UPHC) which will increase as community health centers (CHC) in future. In conclusion, a major imbalance exists in the distribution of Public Health Dentists across different zones in India. There is a need to broaden the scope of this specialty and to make it more practical. Public health dentists should be recruited under Directorate of Medical Services (DMS) and Directorate of Public Health (DPH) by the Government to improve oral health problems in the community and also to arrest the growing unemployment. To recruit both in directorate of public health and in medical services the concerned association that is Indian association of public health dentistry should give the required representation to the central government ministry of health and family welfare to alter the Indian public health standard guidelines and to accommodate dental public health personnel in community health centers so that they would be recruited uniformly all over the country.

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