New Understanding of Dental Public Health: A Review

Vedanti Kitey [a≡], Kumar Gaurav Chhabra [b*φ], Priyanka Paul Madhu [b#], Amit Reche [b#], Gunjan Hiware [a≡] and Prachi Jawade [a≡]

[a] Sharad Pawar Dental College and Hospital, DMIMS (Deemed to Be University), Sawangi (Meghe), Wardha 442001, Maharashtra, India.
[b] Department of Public Health Dentistry, Sharad Pawar Dental College and Hospital, DMIMS (Deemed to be University), Sawangi (Meghe), Wardha 442001, Maharashtra, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Review Article

ABSTRACT

Oral disorders are a most important public health issue in most of the developing countries, and their prevalence is on the rise. To enhance the population's oral wellbeing by providing preventive and therapeutic services is the main aim of dental public health (DPH). However, due to low requirement of capability and ability among DPH personnel, its accomplishment in India is being probed [1]. For many people, dental care has grown expensive, and a huge number of patients around the world are delaying or ignoring important dental procedures. in addition, the ageing of the worldwide populace, as well as the resulting growth in common and dental concern needs, raises worries about the long-term viability of healthcare organization. These changes underscore the critical requirement for a new dental care representation that is both sustainable and efficient [2]. In this regard, the favorable approach for transforming the scene of oral healthcare is the adoption of scientific advancements in dentistry, commonly known as "digital dentistry" by many. In addition, the World Health Organization (WHO) campaigns revolutionize on a regular basis,

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[≡]*BDS Internship student;*
[φ]*Associate professor and Head;*
[#]*Assistant Professor;*
*Corresponding author: E-mail: rajsushil.chhabra@gmail.com;

encouraging the creation and spread of community wellbeing practices that are holded up by both documentation and conveyance technology (e-Health) and mobile phones (m-Health) [3]. We can see how scientific developments could facilitate to accomplish these aims by offering constructive apparatus if we focus on the concept of Dental Public Health (DPH) as "the knowledge and art of arresting and scheming dental disorders and understanding dental wellbeing through efficient group hard work" [4].

Keywords: Dental public health; digital dentistry; tele dentistry; mobile dentistry.

1. INTRODUCTION

Dental public health refers as "the knowledge and art of arresting and scheming dental disorders and understanding dental wellbeing through efficient group hard work" One frequent misperception about dental community wellbeing is that its main goal is to provide dental protection to impoverished families. The real liberation of dental concern is simply one part of dental community wellbeing, despite its importance. Evaluation, rule growth, and declaration are the three key basic actions of community wellbeing, according to a 1988 Institute of Medicine study. Understanding the need for effective ways to elevate and explain oral health as a matter of public concern. Lacking adequate coverage for oral health, the uninsured may defer treatment until problems become acute, then seek treatment in emergency rooms, where are there are neither dentists to treat the immediate problem nor the kinds of connections to oral health care providers that ensure appropriate referrals and follow-up care. In the absence of systems and structures that ensure access to adequate oral health care, there are profound disparities in oral health care outcomes that fall along the predictable lines of race, place, and socioeconomic status.

Recent tools in dentistry offers a chance to accomplish a true pattern change on or after a "disease-oriented" to a "patient-oriented" concern loom. Tele dentistry, refers as the distant stipulation of oral wellbeing concern with the utilization of intelligent expertise, is another rapidly growing subject with huge future promise. This method can be used in a number of therapeutic settings, from particular requirement of dentistry to oral therapy. In addition, tele dentistry practices might be especially beneficial in nations where millions of individuals lack access to oral healthcare due to geographical distance. Not to reveal the surprising breakthroughs in oral malignancy opinions made possible by new equipment, or the bright future of saliva omics, which involves using saliva as an investigative liquid for both oral and systemic disorders [5].

1.1 History

Dr. Alfred C. Fones established a course of study for his assistant, Irene Newman, in 1906, and the dental hygiene profession was established. The dental hygienist was prepared to provide community-based teaching and treatment in order to serve as a dental advocate. The dental hygiene profession's preventive nature is still a wonderful fit for public health. Oral health professionals continue to collaborate with other groups in public health to enhance the oral health of the communities in which they work or live.

1.1.1 Intensifying oral wellbeing for worldwide health coverage

Oral disorders impacted partly of the world's populace, In accordance to the Global Burden of Disease Study 2016. [6] Oral wellbeing, on the other hand, is an ignored part of universal wellbeing that could facilitate to achieve universal health coverage (UHC). [7] In many countries, UHC can aid in defining the guiding principle conversation to tackle insufficient and scrappy prime oral wellbeing facilities as well as considerable beggared expenses related with oral wellbeing concern, hence assisting in the achievement of UHC.

The three areas of attention for UHC are as follows. First, the essential bundle of oral concern and integrated vital oral wellbeing services. Second, an oral health workforce that is focused on the needs of the general public and public determinants of fitness. Third, economic security and the enclosure of dental inclusion in wellbeing assurance packages, as well as increasing budgetary capacity for dental treatment [8].

Such concerted activity will aid in the reorientation of oral wellbeing strategy and

preparation away from a customary curative dentistry paradigm and toward a preventative representation of supervision that encourages oral wellbeing and is non-discriminatory into health systems at all levels.

1.2 A Conceptual Framework for Commission on Social Determinants of Health (CSDH)

In best possible scenario, conceptual frameworks in public health should lead empirical studies to advance our perceptive of consideration and mechanisms, as well as policy-making to clarify entry points for interventions and policies.

Three main conception alignments from the CSDH framework:

1. Perhaps the significant example of the CSDH conceptual framework is intercession and policy to diminish health imbalance must include policies designed to address structural factors as well as intermediary variables. The term "public factors of health" has traditionally been used to refer to solely intermediary determinants. Intermediary determinant interventions, on the other hand, can enhance average health indicators while leaving health disparities unaltered. As a result, governmental intervention on structural factors is required.

2. Progress in SDH requires cross-sectoral policymaking and execution. Because organizational factors can barely be addressed throughout the policies that extend further than the wellbeing segment, this is the case. The CSDH's main tasks will be to (1) recognize thriving intersectoral SDH accomplishment in jurisdictions with anecdotal level of possessions and organizational capability, and (2) distinguish in detail the opinionated and administrative mechanisms that have allowed efficient intersectoral policymaking and scheme to justify manageably.

3. Social world and ostentatious groups must be included in the development and accomplishment of scheme to combat SDH. The CSDH and its partner governments have an ethical obligation to participate in social activities. Furthermore, empowering public civilization and groups, as well as their possession of the SDH program, is the most efficient method to create a long-term universal movement for wellbeing impartiality that will last after the Commission's effort is completed. [9]
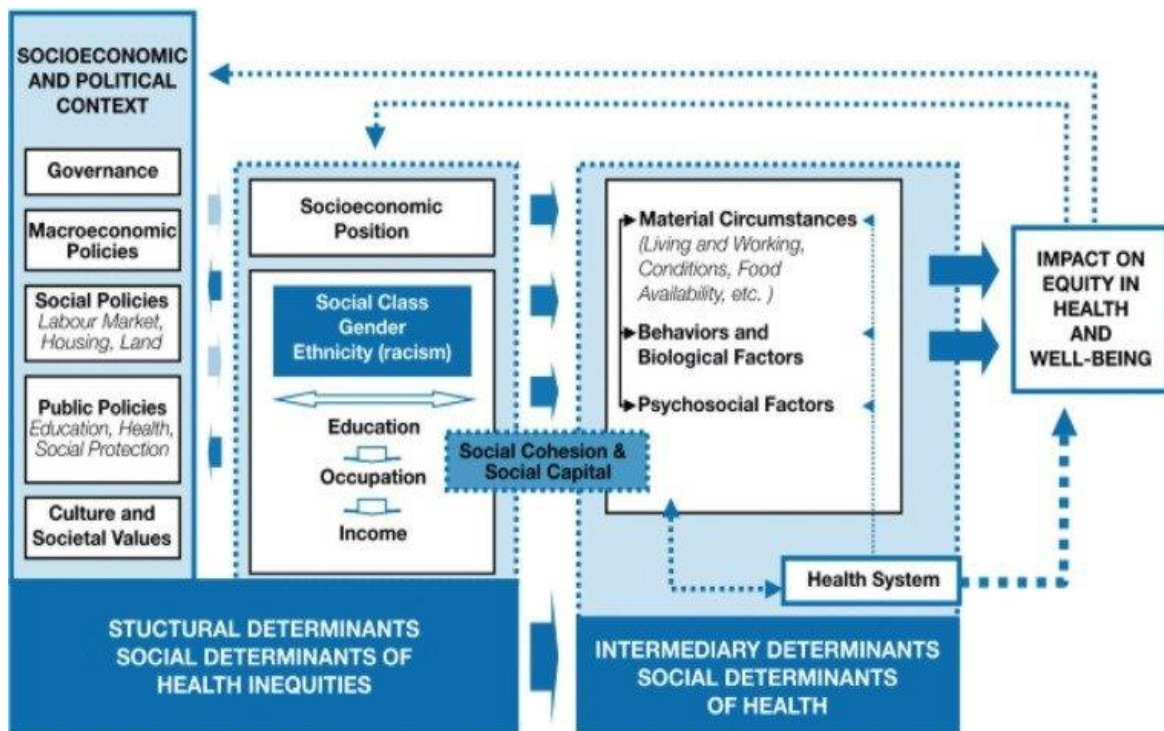

Fig. 1. Conceptual Framework of socioeconomic and political context

1.3 Dental Tourism and Public Health

"Dental Tourism" refers to as individuals who move from their locality to a different locality to obtain dental care. Dental tourism is gradually becoming more popular in India's dental sector. Dental tourism has the potential to aid and harm public wellbeing initiatives. Alongside, actions may turn out to be extra reachable to those who do not have enough money for them or inhabit areas where they are out of stock. In other way, dental tourism may be reducing provider's accessibility since they can charge extra for operations performed for suburban tourists. We don't know whether this is an optimistic or damaging part to the public due to a lack of empirical research. The data on dental tourism is limited, but with the expanding industry for dental tourism, the incentive to conduct study will presumably grow as well [10].

1.4 Tobacco Control Program

The Cabinet of India piloted the National Tobacco Control Programme (NTCP) in 2007–2008 to brace enforcement of the tobacco restrictions under COTPA and nicotine guiding policies stipulated in guidance of the World Health Organization Framework compact on Tobacco guidance. The programme is now being conducted in 21 of the country's 35 states and union territories. Just currently, the NTCP includes 42 districts in total. Just over half of the nation (52 %) have techniques for keeping an eye on facilities under the law, keeping an eye internally on COTPA administration in 21 states where the NTCP has been adopted. Only 11 states hoarded fines for noncompliance of nicotine restrictions in communal locations, regardless of the fact that 15 states have constructed tough systems for monitoring smoke-free regulations. Similarly, 21 states created a steering group to enforce section-5 (ban on nicotine ads, its encouragement, and its financing), but only three states collected penalty for violations of this law. In many states, though, enforcement of laws prohibiting the trading of nicotine by-products to youngsters and prohibiting the trading of nicotine by-products within 100 yards of educational organizations is generally useless [11].

1.5 Dental Public Health Research and Programs

In the discipline of dentistry, research is moving at a faster pace across the world. Despite the fact that India has about 300 dental colleges, highest among any other country, the state of dental research in the country is still in its infancy. [12] On the worldwide stage, however, India's contribution to DPH research is insignificant [13]. Epidemiological studies for the evolution of vaccines to stop oral diseases, salivary proteomics in the transmission of oral malignancies, epigenetic, oral wellbeing education, the role of dentists in calamity management, and problem-based learning are some of the more recent opportunities in DPH research. [14]. More schools of public health, DPH residencies, and dental hygiene programmes are also needed, as well as oral epidemiologists and health services researchers, health educators, and specialists in utilization review/outcomes assessment, dental informatics, nutrition, programme evaluation, and prevention [15].

1.6 Artificial Intelligence

Dentists are now using software to create insights in clinical higher cognitive abilities. These can strengthen by combining A.I. system that will help practitioners determine the newest therapeutic approaches for particular patients.

According to the authors of a 2019 research, medicine is going into a modern phase of transformation as a result of the exponential growth in health information and, as a result, the maturation of care A.I. Such effective algorithms may be amalgamated into the healthcare organizations to evaluate health information, investigatory detections, and treatment procedures in order to provide diagnostic and therapeutic suggestions for specific patients.

With the agglomeration of health data, particularly genomic knowledge, which will provide a deeper perseverance of personal system for individualized care, this will become more feasible. With access to this data, A.I. tools can quickly present doctors with the most effective treatment options and odds of success. A.I.-based algorithms will assist specialist's better care to oral problems on top of churning health - related information. In 2019, researchers created a machine learning approach for correctly quantifying immune cells in the vicinity of malignant cells. This provides more insight into the progression of cancer and resistance to it, therefore aiding in the determination of survival chances. Others are employing neural networks

to improve the detection of tooth decay and illness from radiographs. In the not-too-distant future, such techniques will become mainstream.

Despite the risk of misunderstanding and, as a result, the worry about patient privacy, AI may nevertheless link with medicine on a broad level, due to the need for accurate treatment processes and real-time data sharing. Furthermore, such advancements may influence professionals to exchange large amounts of health-related facts and provide perception that enhance patient care via hospitals, providers, researchers, and patients [16].

We developed an automated deep learning algorithm using cascaded convolutional neural networks to detect OCSCC from photographic images. A detection network firstly took an oral photograph. As input and generated one bounding box that located the suspected Lesion. The lesion area was cropped as a candidate patch according to the detection results returned by the first step. The candidate patch was then fed to a classification network which produced a list of two confidence scores in range of 01 for classification of patients with OCSCC and controls. The backbone networks of detection and classification were initialized with a pre-trained model that had been trained with tens of millions of images in the ImageNet dataset and further fine-tuned on the development dataset [17].

1.7 Tele Dentistry

"The provision of time-limited and offline assistance such as identification, treatment planning, consultation, and follow-up by electronic transmission from completely independent places," according to the definition of tele dentistry [18]. Tele dentistry is a subset of telehealth, which is a wide term used to describe professional services. Telehealth primarily seeks to provide patients with a wide range of options that they may access from a distance. Video conference calls, cell phones, tablets, and other innovations are being used to provide health solutions remotely.

Tele dentistry is also less expensive while still delivering high-quality service. Moreover, you and your family will pick a dentist based on considerations other than the practice's location. This makes it straightforward to obtain a second opinion from a dental expert in a United Nations

organization that may be geographically distant from you.

Tele dentistry will let dentists connect with numerous populations in the public health sector. Mobile hygiene initiatives at universities and hospitals are becoming more accessible and useful. Tele dentists will examine pictures taken by nurses to identify any problems in a more cost-effective manner.

1.7.1 Clinical models of teledentistry application

Torres-Pereira C et al. suggested that distant diagnosis is an effective alternative in the diagnosis of oral lesions using transmission of digital images by email [19]. Duka M et al. showed that diagnostic assessment of the clinical diagnosis of impacted or semi-impacted third molars assisted by the telemedicine approach was equal to the real-time assessment of clinical diagnosis [20]. Brickley M stated that there is a need and demand for change in the referral system for oral surgery specialist care. Telemedicine could conceivably be one way to improve access to specialist oral surgery care [21].

Brullmann D *et al.* reported that remote dentists can identify root canal orifices based on images of endodontically accessed teeth [22]. Mandall NA carried out a trial to assess the validity of a teledentistry system for screening orthodontic referrals. Patients were referred through a "store and forward" teledentistry link and were later evaluated clinically, to assess whether the same decision to accept the referral was made. It was seen that clinician agreement for screening and accepting orthodontic referrals based on clinical photographs was comparable to that reported for clinical decision making [23].

2. CONCLUSION

The growth of dental professionals has had little impact on the overall public health system. Furthermore, there is a substantial disparity in the allocation of public health dentists between states. There is a demand to extend the area of this specialty and make it more practical. Correct orientation on this odontology specialty from the undergraduate level is the demand of the hour. To raise awareness about oral health concerns, a large number of public health dentists should be hired by the government or the public sector. Although the use of MDV is required in treatment

camps, preventative programmes should also be prioritized. Doctoral degree teaching programmes should be implemented as soon as possible to educate people about the dangers of self-medication. The government should integrate oral health initiatives with family assistance programmes, as it does in other industrialized nations. Political, social, and structural (both governmental and nongovernmental) factors, as well as competent devotion and support, are necessary to make this country's oral health equal to its overall health.

Too frequently, dental public health is believed to be primarily concerned with "taking care of the poor." While ensuring that essential dental treatments are given to fulfill the oral health demands of the underserved is an important element of the basic duties of assessment, policy formulation, and assurance, it is just one aspect of dental public health's responsibility. Unfortunately, this profession's most prominent expectation falls short of meeting the requirements of people who rely on the dental safety net for basic dental treatment. The public has entrusted our profession with the responsibility of providing oral health services to all people. If we as a profession fail to meet that duty, we risk losing the public's trust and allowing those with less expertise and interest to make choices that harm the profession and the public. There are several innovative methods in which dental public health has evolved.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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