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RESEARCH ARTICLE

"DENTAL" HEALTH ECONOMICS OF RURAL INDIA

***Mayur Mishra**

1583, 4thmain, e block, AECS layout, Bangalore 560037

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ABSTRACT

Health and healthcare require particular attention from economists in order to consider the use of resources devoted to producing healthcare and improving oral health. Health economics is the application of the principles of economics to healthcare sector. The extensive rural population and school children are denied of even the basic dental services though there is continuous advancement in the field of dentistry. The various studies have revealed an increasing trend in oral diseases in the recent times especially among this underserved population. The wide spread nature of dental disease in rural India means that the detrimental effects of dental diseases within individual will also have negative impact on the functioning population. This translate in to loss of man hours which significant negative impact on economic productivity. An individual may have dental needs as determined by health care professionals but fail to seek services because he/she either does not perceive reason for the same or lacks sufficient resources as time, money or transportation to receive treatment. Dentistry faces serious problems regarding accessibility of its services to all. Understanding the barriers that prevent people from seeking appropriate and timely dental care is important when designing out-reach activities. It would be useful to understand the factors which influence the underutilization of available dental health care services. This would help in designing suitable interventions to reduce dental neglect around the world. The present review article covers similar issues and provides some background of Indian dental care services that may help in augmenting the utilization of dental care services.

INTRODUCTION

Economics is concerned with maximizing benefits from the resources available to us (the constrained maximization problem) and is based on three fundamental principles; *Scarcity, choice* and *opportunity cost*. Health economics is concerned with applying these principles to problems of health and healthcare. However health and healthcare present particular challenges for the application of the economic principles because they have characteristics that make them different from standard goods and services that are bought and sold in private markets. This means problems of health and healthcare require particular attention from economists in order to consider the use of resources devoted to producing health care and improving oral health. (Birch and Listl, 2016) It is, thus, concerned with such matters as the allocation of resources between various health promoting activities, the quantity of resources used in health services delivery; the organization and funding of health service institutions, the efficiency with which resources are allocated and used for health purposes, and the effects of preventive, curative and rehabilitative health services on individuals and society. Thus, health economics is the application of the principles of economics to healthcare sector. (Health care economics-concept, 2015) India is the second most populous country in the world with an extensive rural population. The extensive rural population and school children are denied of even the basic dental services though there is continuous advancement in the field of dentistry. The dentist to population ratio has dramatically improved in the last one to two decades with no significant improvement in the oral health status of the general population. The various studies have revealed an increasing trend in oral diseases in the recent times especially among this underserved population. Statistics present a grim reality, that dentist: population ratio in rural areas to be dismally low with less than 2% dentists available for 72% of rural population. (Kaur *et al*., 2014)

Corresponding author:* **Mayur Mishra
1583, 4thmain, e block, AECS layout, Bangalore 560037.

The Market for Dental Services

Economists identify two major groups that comprise the market for oral health care services. The significant elements of these two groups include the following: 1) demand side—patients and patient demographics, financing of care, need for dental care, economic ability to purchase, travel, appointments and office waiting, payment of fees, and receipt of dental care; and 2) supply side—dentists and dentist demographics, office and treatment hours, practice staffing, practice organization and location, costs of operating practice, dental fees, and gross receipts (Nash and Brown, 2012).

The demand for dental care

Dental diseases are one of the most prevalent diseases in the community. Though, they are rarely life threatening, they have

impact on the person's quality of life. Dentistry, like medicine, is a traditional, science-based, highly regulated health care profession that serves increasingly sophisticated and demanding clients. (Rastogi *et al*., 2014) Dental diseases are significant public health burden in India, with tooth decay affecting 60-65% and gum disease affecting estimate 50-95% of general population with higher rates in rural India. (Dentistry in Rural India, 2016) Dentistry has evolved through society's attempt to meet the demands made by those suffering from dental pain from the ravages that dental disease has made to their functional ability to appearance. (Singh *et al*., 2015) Dental disease in rural India are primarily due to sociocultural factors, lack of knowledge about oral health and hygiene, and systemic infrastructure deficiencies that prevent proper screening and dental care of oral disease while there is deficiencies in dental care all for India, it can be posited that oral health in rural India is more dire condition than urban area because rural area in India are more susceptible to dental problems, in part because these areas have lower access to dental care. The wide spread nature of dental disease in rural India means that the detrimental effects of dental diseases within individual will also have negative impact on the functioning population. Oral diseases are identified as one of the priority health condition because in late stages dental cries and periodontal disease cause severe pain and expensive to treat. This translate in to loss of man hours which significant negative impact on economic productivity. (Dentistry in Rural India, 2016)

An individual may have dental needs as determined by health care professionals but fail to seek services because he/she either does not perceive reason for the same or lacks sufficient resources as time, money or transportation to receive treatment. It has been described as health differences which are avoidable, unnecessary, unjust and unfair. Inequalities have been observed between groups in a region and between geographic regions in the same country. There has been an oral health inequality associated with social class and place of residence. A high prevalence of dental caries has been found to be associated with low socioeconomic status. This variation in oral health has been found to exhibit national, regional and district variation. Many in need do not have access to oral health providers within their vicinity due to geographic disparity. Much of the oral health workforce is unprepared to render culturally competent care to diverse population, to people with complex medical and psychological conditions or developmental and other disabilities to the very young and the aged to tribal or rural areas. (Singh *et al*., 2015)

There is difference between the need for dental care and demand for dental care exhibited by any group. Programs should contain elements designed to narrow the gap between the need for care and the amount of care sought. Understanding the barriers that prevent people from seeking appropriate and timely dental care is important when designing out-reach activities. Culturally sensitive educational activities can be an effective tool as well. (Kaur *et al*., 2014) Dentistry faces serious problems regarding accessibility of its services to all. In many developing countries like India, oral health services are offered by dentists, who practice in the cities and treat the affluent parts of the urban population. It is often difficult for the poor urban and the rural population to get access to emergency care. Community-oriented oral health programs are seldom found. The major missing link causing this unfortunate situation is the absence of a primary health care approach in dentistry. (Nash and Brown, 2012) Utilization of oral health services among the rural population has been found to be influenced by socio-demographic factors. Improving access to oral health care is a critical and very important first step to improving oral health outcomes and reducing disparities. (Gupta *et al*., 2014) The Indian government's MoHFW reported that the dental treatment facilities available in rural areas are lacking the necessary infrastructure and there is an urgent need to enhance these services. These oral health disparities are further compounded by deleterious habits practiced by the Indian Diaspora, including smoking and chewing tobacco. Furthermore, there are obvious and growing unmet dental treatment needs and significant inequalities in health-care delivery systems, as well as a huge gap in terms of community-oriented prevention systems, particularly in rural India. Although, India is a country of over a billion individuals, allocation of funds towards public health care is low, with no specific separate allocation for oral health-care. Hence, there is a need for non-governmental organizations to use their taskforces to improve the current state of oral health. (Kakde *et al*., 2010)

Oral disease and the resulting need for information, therapy, and rehabilitation are the starting point for the demand for dental services. The basic premise is that the demand for oral health derives from an individual's need for dental services and realization of that need. Both need and awareness of need are required for a person to act. (Nash and Brown, 2012) In developing countries like India, the availability and accessibility of oral health services in rural areas are limited, and the provision of oral health care is also very limited. The continued separation of oral health care from overall health care contributes to limited access to oral health care among the rural population of India. Moreover, Water fluoridation, fluoride toothpaste and a growing awareness of dental hygiene have led to improvements in the dental health of Indians over the past 25 years further leading to greater demand for restorative dental treatment. (Gupta *et al*., 2014) The dental work force should be adequate to address the demand for dental care. Dental work force projections based on the need for dental care, absent an effective demand for care, will result in inefficiencies in dental system and economic dislocations, with no significant improvements in access. Work force deficiencies can occur as a result of an insufficient absolute number of dentists or an asynchronous needs demand distribution of dentists. (Kaur *et al*., 2014)

Supply of dental care

More than 70% of the people of India are residing in the villages. As, far as dentists and their availability is concerned to this huge population, the demand and supply ratio is far inadequate and insufficient. The dentists: population ratio of India, on date is 1: 10,000. However, the reality is that; in rural India 1 dentist is serving over a population of 2,50,000. (Mahajan *et al*., 2014) Though the country is producing more than 25,000 dentists per annum, the distribution of dentist to population requirement is still grossly uneven. More than 90% of doctors are available in urban settings and only 10% available to 72% of rural population. (Yadav, 2014) The Indian healthcare industry is experiencing quick transformation owing to the increasing demand for quality healthcare. With the increased standard of living in India people are becoming health conscious, shaping a new market which is giving increasing importance to healthy teeth and dental cosmetics.

(Jain and Agarwal, 2012) The traditional office and clinic-based oral health care delivery system is failing to reach a large segment of the population particularly in the developing nations. (Khemka *et al*., 2015) With so many patients to treat, dentist are overburdened (especially the ones who are working in the Government sector as majority of population consults them due to the expensive dental treatment in private sector), therefore episodes of negligence are bound to happen, although vary rarely reported due to lack of awareness among the rural patients. (Mahajan *et al*., 2014) Cost and fear are routinely cited as the largest barriers to care. Dental health neglect, particularly that of professional dental care is quite widespread in the entire world. (Jain and Agarwal, 2012)

There is a workforce of approximately 1,18,000 qualified dentists in the country at present, but the most basic oral health education and simple interventions are also not available to the vast majority of the population. The dentist to population ratio in India clearly indicates that there is a major rural and urban divide in the availability of dentists in India. (Khemka *et al*., 2015) WHO recommended dentist to population ratio is 1:7,500. (Dogra, 2015) To provide adequate, respectable, and attractive employment opportunities to the workforce while maintaining a balanced geographical distribution is the main challenge and the root of all the issues facing the dental profession in India. (Tandon, 2004) Routine oral health care examinations and services can help to prevent disease and also identify other conditions. Despite the importance of oral health and developments in knowledge and practice in this area, significant oral health disparities exist in rural communities related to access to care, utilization of services, and outcomes. These disparities result from a number of factors including provider shortages in rural areas, a lack of dentists who accept Medicaid or have discounted fee schedules, geographic isolation, a lack of public transportation, cultural norms, and poverty. In some rural communities, the only non-private sources of oral health care are a dental clinic within a federally qualified health center or an extraction clinic—both with long waiting lists. As a result, rural communities across the U.S. are developing oral health programs that build oral health infrastructure and capacity to reduce the prevalence and impact of oral disease, enhance access to care, and eliminate disparities. (Bayne *et al*., 2013)

Rural health infrastructure has been well designed to cover rural population through 136815 subcentres (SCs), 26952 Primary Health Centres (PHCs) and 3708 Community Health Centres (CHCs). But there are no dental surgeons posted at the level of CHC and PHC in most of the States. (Yadav, 2014) Health services in rural areas are administered through the primary health centers (PHC), one in each block. The PHC occupies a key position in the nation's health care system; it aims to provide comprehensive (preventive, promotive, curative) health care services to the people living in a defined geographical area of 100-200 square miles. When the primary health care systems were implemented in the 1980s, dentistry was not adequately included. This has left oral health far behind other health services. The costs of providing services are high compared to other areas of health care, and the workforce is very limited. A common way of thinking among local planners is to increase the number of dentists to meet the workforce problem. They ignore the primary health care approach for oral health services, which can be executed by dental auxiliaries. In 1986, there were a total of 1,043 dentists posted at the PHC level in different rural areas. Thus not even 20 percent of the existing primary health centers in India have the services of a dentist available for the population. Also, there are no set criteria for posting a dentist at the PHC level in rural areas around the country. With 32.7 percent of the Indian population in the age group of zero to fourteen years, there is a greater demand for pediatric dentists. On the contrary India trains only 9 percent of the total specialists in pediatric dentistry. Only 2 percent of the specialists are being trained in community dentistry, whereas in a country like India where the majority of the population resides in the rural areas, there is greater need for these specialists. (Bayne *et al*., 2013) Indian Oral Infrastructure has shown marked improvement in the past 4-5 years but still needs to be improved further not only in rural areas but in urban areas as well. (Industry Insight, 2016) There is an acute shortage of supply of services in rural areas. Not only is there non-availability of hospitals for simple surgeries, but several parts of the country have barely one or two hospitals with specialist services. (Gupta *et al*., 2014)

Rural Health care services suffer from a shortage in public sector infrastructure. The failure of the public delivery system today is an outcome of systemic breakdown of accountability relationships within the institutional framework. There is a shortfall not only in terms of physical infrastructure but also human resource, measured even against the minimal norms prescribed by the government. Even though the posts of health workers at various levels are sanctioned, many of them are lying vacant. The existing facilities are underutilized. Most health workers especially the 'doctors' do not want to serve in the rural areas due to overall infrastructural inadequacy and lack of incentives. This leads to widespread absenteeism from service and closure of facility. Moreover, there is no accountability in the public sector service. (Bhandari and Dutta, 2016) Dentists don't have a basic instruments to work in rural area. (Afsan Yasmin, 2016) The public doctors quite often provide private services instead of going to their designated centres. Even though a well-structured public health care system exists, the infrastructure as well as the staff that are required to provide the health care services is inadequate from many different perspectives. Many rural residents are not able to obtain treatment for basic ailments either due to the nonpresence of health care services in the vicinity, or due to lack of funds to access the same. (Bhandari and Dutta, 2016)

It is often difficult for poor urban and the rural population to get access to emergency care. Community oral health program are seldom in India. (Joshi *et al*., 2014) Hence, there is an urgent need to improve the access to dental care for the Indian population especially those belonging to the underserved parts of the country. (Khemka *et al*., 2015) Rural populations have lower dental care utilization, higher rates of dental caries, lower rates of insurance, higher rates of poverty, less water fluoridation, fewer dentists per population and greater distance to travel to access care than urban population. (Skillman *et al*., 2010) In light of the oral health disparities such as a poor dentist to population ratio serving the most disadvantaged population and an increased burden of disease, it is vital to assess and address the perceived issues and challenges faced by the dental health professionals in India while also providing some guidance on how the wider Indian Diaspora may be able to help solve them. (Kakde *et al*., 2010) The trends of oral diseases have changed significantly in the last 20 years. The two of the most common oral diseases that affect a majority of the population worldwide, namely dental caries and periodontitis, have been proved to be entirely preventable.

Even for life threatening oral diseases like oral cancer, the best possible available treatment is prevention. There is a growing consensus that appropriate skill mix can prove very beneficial in providing these preventive dental care services to the public and aid in achieving the goal of universal oral health coverage. Professions complementary to dentistry (PCD) have been found to be effective in reducing inequalities in oral health, improving access and spreading the messages of health promotion across entire spectrum of socio‑economic hierarchy in various studies conducted globally. (Mathur *et al*., 2015)

Evaluation

The lack of availability and affordability of oral health services not only results in aggravation of the disease but also enhances the cost of treatment and care. Poor oral health in childhood often continues into adulthood, affecting economic productivity and quality of life. The high prevalence of dental caries has also caused an increase in the absenteeism of school hours and loss of working hours and economy for the parents. The availability, affordability, and quality of fluoride toothpaste remain a major problem in many developing countries. Moreover because of high concentration of fluoride in drinking water in certain parts of India, also has a prohibiting effect as use of fluoride toothpaste. (Niranjan, 2015) There is intense interest almost everywhere to get the best healthcare service for the least cost. Diseases of the teeth and mouth are among the most common health problems and are capable of serious and costly disturbances to work and leisure in all age groups. For example, there is a growing if uncertain belief that periodontal disease is linked to cardiac diseases and diabetes and that successful management of periodontitis will lower medical costs substantially. The economic burden of oral diseases on society is high, although details on the burden are sketchy. (Shariati *et al*., 2013) Oral problems are known for their unique disposition of being progressive in nature leading to lack of remission or termination if left untreated, need for technically demanding, expensive and time consuming professional treatment. Further, these oral problems are significantly associated with pain, agony, functional and esthetic problems; also loss of working man-hours. These adverse features in a long run will have a substantial amount of negative impact on quality of life at biological, psychological and social levels. Hence, oral problems are considered to be one of the few categories of diseases emerging as a public health problem in India. This necessitates for a return to primary health care principle of focus on prevention. Application of various preventive measures could be one of most cost-effective tool in the prevention of oral problems in enhancing the individuals and the community to lead a socially and economically productive life. However, in India most common approach to combat these oral problems at the population level is of curative in nature which does not appear to be cost-effective as compared to preventive approach. There is an urgent need for an effective oral health program meant for the rural community. (Haloi *et al*., 2016)

DISCUSSION

Dentistry has always been an under resourced profession. There are three main issues that dentistry is facing in the modern era. Firstly, how to rectify the widely acknowledged geographical imbalance in the demand and supply of dental personnel, secondly, how to provide access to primary dental care to maximum number of people, and thirdly, how to achieve both of these aims within the financial restraints imposed by the central and state governments. (Mathur *et al*., 2015) A large number of systemic barriers exist within the oral health care delivery system of India. There is unequal distribution of health services with majority of dentists being located in urban areas and few of the dentists practice in rural areas where the majority of Indian population resides. There is a huge shortage of dentists in government services and the majority of health care services is provided by private practitioners and dental institution by trainees which raises the cost of quality oral health care services and hence becoming unaffordable to the majority of Indian rural masses. Even if whatever very small or negligible proportions of dentists are posted at government centres, there is a lack of infrastructure at Primary Health Centers and Community Health Centres which again becomes a major hindrance. The training of dental graduates is also not planned well with inadequate organization and management, poor or no planning and minimal exposure to Indian rural masses. Administration of oral health care services at government level or decision making body is centralized with nobody taking up the responsibility for any health problems. There is no or little evaluation of health programmes. Also, there is a lack of research on oral health care delivery system as well as utilization. There is a non availability of oral health records, statistics, dental treatment audit of that particular area served. (Singh *et al*., 2015) A Study was carried out for a period of 1 year in the rural areas of western Rajasthan, India. 26.22% stated that cost of dental treatment was the major factor, followed by 25.31% who believed in myths associated with dental treatment. Utilization of oral health services among the rural population has been found to be influenced by socio-demographic factors. Improving access to oral health care is a critical and very important first step to improving oral health outcomes and reducing disparities. (Gupta *et al*., 2014)

Rural population faces lot of challenges in utilizing oral health care such as lack of man power, knowledge and awareness about dental diseases and their prevention. In addition to this other challenges includes poverty, illiteracy & unaffordable dental care. (Yadav, 2014) Besides, ignorance about significance of oral health, lack of perceived needs, economic constraints, cultural and psychological barriers are few other constraints to utilization of these services by the masses. Though a fair proportion of urban Indians have recognized the importance of oral health care, a vast majority of rural population still lacks an insight to this core area. Measures such as proper Oral Health Insurances, Governmental implementation awareness programs and introduction of oral health policies could help overcome these barriers. Every dental surgeon should contribute to bring about this behavioral change among Indian population. (Mahajan *et al*., 2014) This situation strongly emphasizes the need to take the oral health care and preventive oral health education to the doorstep of common man in order for them to overcome the barriers to access dental care. (Yadav, 2014)

Conclusion

In spite of its tremendous, potential manpower resource and growing economy, India stands behind in terms of education, standard of living and in particular health. Over decades, health in India is gaining less importance and oral health, the least. Oral diseases remained still a public health problem for developed countries and a burden for developing countries like

India especially among the rural population. (Kothia *et al*., 2015) India continues to show a yearly increase in the number of dentists, and hence the trend towards an increase in dental manpower seems likely to continue, along with employment problems for dentists. At the same time, oral health care remains under-utilized and unavailable to large parts of the rural population. Solving all these problems will require both informed public policy makers and public policies based on the best available scientific data and proper manpower planning. (Vundavali, 2014)

Recommendation

The imbalance between the rural and urban dentists can be improved by increasing job opportunities in rural areas, thereby the rural areas will attract dental graduates and thus the concentration of dental graduates in the urban areas will diverge to underserved areas. The Government of India is taking an initiative to set up dental practices in rural areas by providing the subsidies, which is really essential. The Government of India should plan to create new posts for dental graduates in government hospitals and at the Primary Health Centers. Oral health programs should be planned to provide dental health education to increase oral health awareness especially among the rural population. The inadequacy in primary care services for oral health is also highlighted in Universal Health Coverage report of the Planning Commission of India, which may affect the India's ambition to have universal health coverage. (Yadav and Raval, 2016) Other than this, proper referrals from medical professionals, Compulsory rural postings or internships for the dental Students: Moreover, extra incentives for those serving in rural areas might help in attracting young dentists to opt for these places, thereby helping to balance the biased urban-rural skew, Use of tele-dentistry, Dental homes, Dental health in tribal children, Free dental aid for people in private services, Dental insurance, Make the mobile dental van mandatory for each and every dental college so that the maximum rural population can get the benefit of mobile dental services. (Yadav, 2014; Khemka *et al*., 2015)

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