

A comparative study of oral health system between Japan and Bangladesh

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Abstract:

Objectives: To compare the oral health system between Japan and Bangladesh by the oral health condition and the factor related to it. **Methods:** Studies on the prevalence of dental caries and periodontal diseases reported during the period since 1981 of the two countries were collected. Data of Bangladesh were obtained from Bangladesh Dental Journal (BDJ), Journal of Oral Health (JOH), different international publication, data supplied by W.H.O. and statistical year book of Bangladesh. Data of Japan obtained from publication by ministry of health and welfare, Japan (report on the survey of dental diseases). From these report the prevalence of dental caries and the DMFT of the 12 years old children was abstracted and tabulated. The percentage changes for DMFT were calculated by comparing studies conducted between the year 1981 to 2000. Sugar consumption in Kilograms per capita was obtained from statistical year book (United Nations). The data was related graphically within the DMFT of the 12 years old children of each country. **Results:** caries reduction rate is near about 2 times higher in Japan than Bangladesh, in case of Japan it is 56% (5.4 to 2.4) in the period of 1981-1999. In case of Bangladesh it is 33% (1.5- 1.0) in the period of 1981-2000. In Bangladesh & Japan deep periodontal pockets in the age group of 30-44 is most prevalent. In Japan the causes of permanent teeth extraction are caries 55.4%, periodontal diseases 38.0% and others 6.6%. In Bangladesh, caries 60.6%, periodontal diseases 27.2% and others 12.2%. Caries incidence in 12 years old children are less prevalent in Bangladesh than in Japan. In Bangladesh it is 46.4% whereas in Japan it is 57.5%. **Conclusion:** Having a great socio and economical discrepancies between these two countries, Bangladesh should try to adopt the programs in their health policy that are available in Japanese dental services.

Key words: Dental caries, periodontal disease, DMFT, Fluoride.

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Introduction:

To assess the demands of advanced Dentistry all over the world and it's unique globalization and to evaluate the endemic & epidemic causes of different oral diseases a comparative study between region to region, developed country to developing country & with in the country is very essential. Bangladesh is one of developing countries of south Asia region. Day by day it runs and faces the distressing path of progress. On the other hand Japan is one of a few developed countries for a long time, representing the East Asia, by it's diligent and talented people. In case of Bangladesh total population 146,736000. GDP \$1734 per

capita. Life expectancy 63 years for both male and female. Health expenditure 3.1% of GDP. On the other hand in Japan total population 127,478000, GDP \$26652 life expectancy male 78.4 years and female 85.3 years. Health expenditure 8% of GDP¹.

According to the world health report 2001 and 2003 Dental caries is still a major oral health problem affecting 60-90% of school children and the majority of adults in most developed countries. Bangladesh and Japan belongs to the 20% countries of the world whose periodontal condition is the worst among all the countries.^{2,3}

Several comparative studies between Japan and other developed countries were performed for example, a comparison of national dental surveys between Japan and England and Wales, showed that below the age of 11 years caries experience was higher in Japan but above this age it was higher in England and wales.⁴ Another comparative study of the oral health status between Scottish and Japanese primary school children, Where it was observed that decay experience were higher in

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Motoyashi (Japan) than in Fife (Scotland) ⁵. Kawaguchi et,al compared the dental health condition and system in Japan and Australia. The study shows that Japan's ability to rapidly change its oral health outcomes rapidly, its dental educational system and its traditional workforce structure and service-mix, is more constrained than appears to be the case in the Australian dental system. It also shows that in Australia the low priority to financing public dental services due to its constraints are related to its federal system. The barriers to Japan ability is its traditional cultural decision making process and in a series of health and educational structures ⁶.

A few study were also done between Bangladesh and other south Asian countries. These study shows that periodontal diseases & caries is more prevalent in India & Srilanka than Bangladesh^{7,8}.

In Bangladesh the study of Undergraduate level in Medicine and Dentistry and the research work is in English. Whereas in Japan, all of study, research and most of publication are in Japanese language. It is a considerable barrier for the researcher to exchange the acquired knowledge. This paper is initiative to compare oral health system between Japan and Bangladesh by the oral health condition and the factor related to it.

Methodology:

Studies on the prevalence of dental caries and periodontal diseases reported during the period since 1981 of the two countries were collected. Data of Bangladesh were obtained from Bangladesh Dental Journal (BDJ), Journal of Oral Health (JOH), different international publication, data supplied by W.H.O. and statistical year book of Bangladesh. Data of Japan obtained from publication by ministry of health and welfare, Japan (report on the survey of dental diseases). From these report the prevalence of dental caries and the DMFT of the 12 years old children was abstracted and tabulated.

The percentage changes for DMFT were calculated by comparing studies conducted between the year 1981 to 2000. Sugar consumption in Kilograms per capita was obtained from statistical year book (united nations). The data was related graphically within the DMFT of the 12 years old children of each country.

Information referring to utilization of fluoride, organization of dental health services, dental manpower, dental education and preventive programs for dental diseases of Bangladesh were obtained from the BDJ, JOH and other

different source. Similar data of Japan were obtained from the publications and study of social medical services 2001 (sakai Iryo shinryo koi-betsu chosa, journal of health & welfare statistics 2003 and scientific journals).

Results:

Oral health situation:

Caries: table :1 shows the average DMFT level for 12 years old children in the two population in different time. It also shows the gradual change and percentage reduction in dental decay in Japanese & Bangladeshi children. In the two countries it showed that percentage of caries reduction rate is near about 2 times higher in Japan than Bangladesh. For example in case of Japan it is 56% (5.4 to 2.4) in the period of 1981-1999. In case of Bangladesh it is 33% (1.5- 1.0) .in the period of 1981-2000⁹⁻¹⁴.

Table-I

Evolution of DMFT index in 12 years old children & their percentage reduction

Country	1981	1984	1987	1993	1999	2000	% Reduction
Bangladesh	1.5	1.4	-	-	-	1.00	33% (1981-2000)
Japan	5.4	-	4.9	3.6	2.4	-	56% (1981-2000)

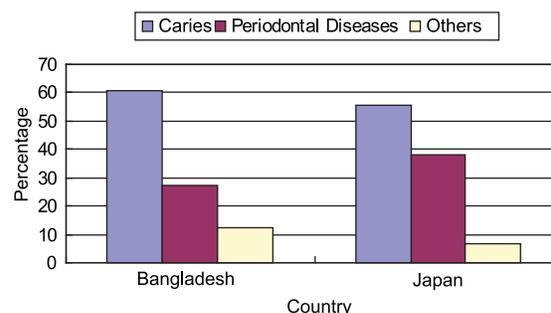


Fig.-1: Causes of permanent teeth extraction in Bangladesh and Japan.

Periodontal diseases:

Table-II & Figure 1 shows the severity of periodontal condition & the cause of permanent tooth extraction in both countries. It shows that Bangladesh & Japan would rank as 20 % of the countries in the world where deep periodontal pockets in the age group of 30-44 is most prevalent. In Japan the causes of permanent teeth extraction are caries 55.4%, periodontal diseases 38.0% and others 6.6%. In Bangladesh caries 60.6% periodontal diseases 27.2% and others 12.2%¹⁵⁻¹⁸.

Table-II
Periodontal condition measured by CPITN of the 30-44 years age group

Country	Year of Examination	Age Range	Number of Respondents (n)	Criteria of samples	Percentage of Pocketmore than 4 mm
Bangladesh	1990	35-44	163	Urban&Village	34%
Japan	1989	30-44	12832	Urban&Village	37%

Table-III
Percentage of caries prevalence & DMFT component in 12 years old children

Country	% of Caries Prevalence	Year of Examination	DMFT Index	D	M	F
Bangladesh	46.4%	2000	1.0	0.9	0.01	0.04
Japan	57.5%	1999	2.4	0.7	-	1.8

Table-III shows the Percentage of Caries incidence in 12 years old children are less prevalent in Bangladesh than in Japan. In Bangladesh it is 46.4% whereas in Japan it is 57.5%. In Japan there is notable percentage of filled teeth and having no incidence of tooth loss in 12 years of child (may be due to highly scope of restorative treatment). In

case of Bangladesh only a minimum percentage of restoration with case of extraction of teeth^{9 11 19}.

Sugar consumption and oral health:

Sugar consumption in Japan per capita is gradually declining. Since 1970 it was a pick amount 29-30 Kg. In 1991 it was 23 kg and then 19 kg in 2000. In case of Bangladesh it was 2.5 kg in 1991 and it was 2.7 kg in 2000. In Japan DMFT index is decreasing in relation to its sugar consumption. In Bangladesh DMFT index & sugar consumption is in a static level for a long time²⁰⁻²¹.

Oral Health and fluoride.

In Japan the fluoride level in surface water is very low (0.05-0.2 mg/l) than the optimum level for human health (1 mg/l). Besides that there is no area with water fluoridation or dietary fluoride supplement. The availability of fluoride toothpaste and mouth rinse at Japanese market started from 1980 and in 2002 fluoride toothpaste comprised 86% of the total market²²⁻²³.

In 1999, 163 tube well water samples were taken from 19 districts of Bangladesh and fluoride level was determined by using the proton induced gamma emission (PIGE) method. The samples contain the fluoride level with a mean range of 0.56±0.48 mg/l. There is no additional fluoride supplement in diet or water supply in Bangladesh. Recently fluoride containing toothpaste is manufactured and available in market²⁴.

Organization for Dental service providation:

In Bangladesh, Ministry of Health and Family welfare is responsible for making national health policies & strategies, observation, execution and recruitment. People

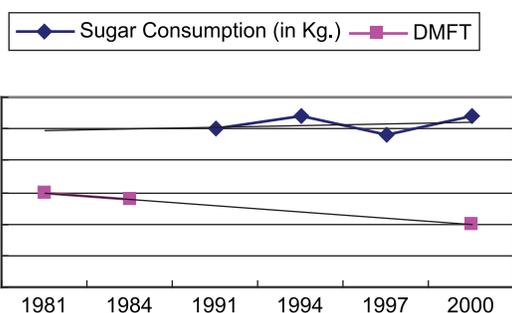


Fig.-2: DMFT index in relation to Sugar consumption in Japan

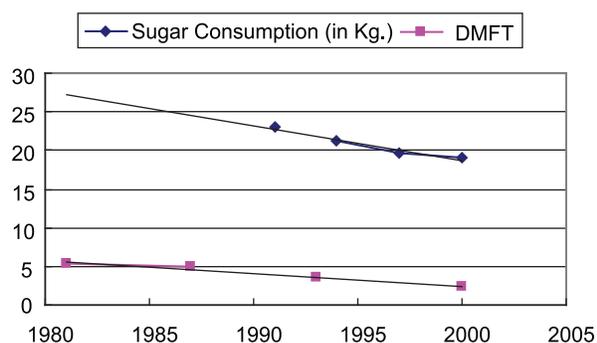


Fig.-3: DMFT index in relation to Sugar consumption in Bangladesh

get their dental services from public hospital as well as from private Dental clinic.

Public sector is the most effective for the network of the services all over the Bangladesh. Upa zilla health complex (UHC) and District hospital is the basic unit of health service system.(460 UHC and 64 district hospital). Each UHC and District hospital consists a post of Dental Surgeon and a Dental Technologist (auxiliary). They provide extraction, temporary restoration and preventive programs for the Dental patient. They also refer the patients to the Dental college hospital and Dental department of medical colleges (3 dental colleges, 13 Medical colleges) in where specialized position & treatment is available. Surgical treatment of Oro-facial field under general and local Anesthesia, endodontics, orthodontics, partial & complete denture except crown and bridgework treatment is available here. But due to lack of subsidy the facilities is for limited person.

The term of treatment in public level is free. Most of people get their dental services from here. The facilities of private dental clinics is available in town and city area. This type of treatment is costly but it consists specialized treatment for all purpose. Due to it's high cost it is out of reach of poor people. Besides that there are plenty of quack (illegal) dentist all over the country. Usually they provide treatment to the village and poor people. There is no facilities or coverage of health insurance system for dental treatment at the government or private level. All government employee get a negligible medical allowance every month with their salary. Few of private company provide medical allowance for their employee.

Health system in Japan is governed by the ministry of health and welfare which predominant policies, administration & evaluation. Japan's health insurance system, which covers medical and dental care, was made obligatory to all citizens in 1961 and is operated by either the national or local government. While there are several official for health insurance systems, all citizens must be covered by one of them. Peoples feel freedom to choose whether or not to take advantage of health insurance treatment.

Japan's health insurance system is broadly divided into two categories; employees and national. The employee covers the groups of workers and the national covers residents of the same area, who are insured by the local government.

The system operates with the insurer collecting insurance payments from the insured person. Under the present

health insurance system patients make partial payments of the actual medical charges to the hospital or clinic, and the Social Insurance Medical Care Fee Payment Fund reimburses the hospital or clinic for the medical treatment given. Thus, medical expenses are shared by the patient and the review/reimbursement organization.

All surgical and conservative treatments and certain prosthetic treatments are included in the scope of benefits under the health insurance program. Certain prosthetic, implants and orthodontic treatments are not covered. In such cases, dental fees are negotiated between the dentist and patient, with the patient paying the entire sum directly to the practitioner^{19, 25-26}.

Dental Manpower:

During the period of 2000 the total number of Dentist in Japan was 90,857 and the ratio of dentist/ people was 1:1397. Out of them 97.3% were engaged in private practice and rest were doing research work, education, administration and others work. Besides that three types of auxiliaries are engaged in dental services with their distinguished course and activities. They are Dental hygienist (shika-eiseishi), Dental assistant (shika-joshu) and Dental technician (shika-gikoshi). After completion of study to be a general practitioner Dentist have to pass the licensure examination but there is no mandatory internship training.

In Bangladesh the number of dentist were rising rapidly from the period of 1996, when the newly established 2 government Dental College and most of private Dental colleges (6 in number) started to provide dentists in the services with the increased number of Dentist from Dhaka Dental College.. For example in 1992, the number of Dentists were only 448, in 1997 near about 1000 and in the recent council of Bangladesh Dental Society in 2005 it was about 2500. Besides that Dental technician are working as a auxiliary in the service. In 1992 the number of dental technician were 450. Now the number is near about 1000. No dental assistant and dental hygienist is available . But the private practitioner dentist create their own assistant by teaching them by himself. After completion of study to be practitioner no need of licensure examination. Registration from Bangladesh Medical and Dental council and internship training certificate is needed²⁶⁻²⁹.

Dental Education:

In Bangladesh Graduate Dental education consists of 5 years education. Out of them 4 years is for Graduation program (Bachelor of Dental Surgery) and 1 year for internship training. 9 Dental colleges (3 public and 6

private). Every year about 500 students get admission in first year course by a nationwide competitive examination after completion of their 12 years higher secondary education. The facilities, syllabus and curriculum of all the Dental colleges are maintained and supervised by University Grant Commission, Bangladesh Medical and Dental Council. And Ministry of Health and Family welfare. respectively.

In Japan, Dental education is given through 29 dental colleges.. Out of them 11 national public, 17 are private and 1 is prefectural . Total academic year is 6 years including 2 years of pre Dentistry course (liberal arts and science) No internship training program is included. Every year 2647 students get admission in the course by a nationwide competitive examination after completion of high school education and must be at the age of 17. Dental schools of Japan follow according to the code of requirements stated in the university standards for Dental school issued by the Ministry of Education ²⁹.

Different Preventive program for enhancing oral health condition:

In Japan, preventive oral health program includes conducting oral health promotion campaigns, school based fluoride mouth rinse and professional topical application of fluoride for preschool children ^{26,30}.

It is sorry to say that like other developing countries primary oral health care(POHC) is not included in primary health care(PHC) policy in Bangladesh. Recently proposal to include it launching. Bangladesh Dental Society and few of social organization arrange community based preventive program routinely which includes Atraumatic Restorative Treatment (ART), promotion of oral hygiene instruction, distribution of fluoride containing toothpaste and even some curative treatment ³¹.

Discussion:

Bangladesh & Japan, though representing two corners of the world in different angle but in between them there is some similarities and at the same time dissimilarities also. We can consider several predisposing factors that worsen the condition of oral health such as Sugar consumption, food habits, use of fluoride, organization & utilization of dental services, dental manpower, dental education and preventive program.

Bangladesh and Japan, the DMFT index of these 2 countries is gradually declining. In case of Japan the favorable point is it's declining sugar consumption rate, use of fluorides in dentifrices, organization and utilization

of dental services, adequate dental manpower, time adapted dental education & modernized equipments.

Takeuchi (1960-1961) and Miyazaki (1996) showed that the close relationship of DMFT level with the sugar consumption rate in 12 years old Japanese children. Sugar consumption was assumed to have a direct influence on decreasing dental caries in Japan. In addition in take of fluoride in dentifrices has direct affect on caries declining. Now in Japan (2002) 86% of market available dentifrices are composed of fluoride.

Now Japan has a DMFT index of 2.4, which is considerable high compared to other industrialized and developing countries (USA 1.6, UK 0.9 Netherlands 0.8, Australia 0.8, France 1.9, Germany 1.2, Italy 1.2, China 1.03, Finland 1.2). This is possibly due to for a long time in past Japan had not no water fluoridation and no fluoride supplement in food. Besides that frequent use of soft and sticky foods, less intake of chewing and deterosive food and less maintaintainence of oral hygiene care are also factors for high DMFT index.

Bangladeshi people usually take increased amount of deterosive food in their meal and according to the WHO sugar consumption chart Bangladeshi people take the lowest amount of Sugar per year (though the report of the statistics is confused, might be they did not count the traditional Bangladeshi sugar products 'Gur' in the estimation). The fluoride level of Tube well drinking water is near at the optimum fluoride level for human being. The data of fluoride level in natural food source is not available. All of these make Bangladesh a lowest DMFT index country among the south Asian countries except India.

Bangladesh and Japan both countries belongs the 20% of the countries where periodontal condition is worst is in the world. Excessive intake of betel-nut, lime & betel leaf, poor scope of dental treatment are the predisposing factors for the Bangladesh. Data of any systemic diseases is not available. Poor oral hygiene care is also responsible for severe Periodontitis in Bangladesh. Village people use sort of powder s, wood stick to clean their mouth. All of these could hurt their gingival & causes ulceration.

The reasons for the poor periodontal condition in Japan is not clear. Recently '80—20 ' movement is running in Japan to preserve at least 20 teeth present at the age of 80 years. Excessive intake of sugar containing sticky foods, different type of alcohol, less intake of water & systemic diseases might be the responsible cause. Further study should be done in this field.

The analysis of contribution of each DMFT component reveals the type of treatment the population is receiving.

Population with access to restorative treatment showed high percentage of filled teeth and low percentage of untreated decayed or missing teeth. Table-III contrast the DMFT index between Japan & Bangladesh. The filled component (F-teeth) was higher in Japan than Bangladesh (1.8 vs 0.04) and decayed tooth is higher in Bangladesh (0.9 vs 0.7). Even Bangladesh has a experienced of extraction (0.01) against Japan where there was no extraction in case of 12 years of children. This is due to total unawareness and lack of treatment facilities in Bangladesh.

However, in Japan, the national insurance provides Japanese citizens with access to highly subsidized dental care, and the services are as much restorative as surgical. But they exclude the expensive items such as gold crowns, bridges, orthodontics care and also excludes cheap items such as sealants and fluoride application. The interesting is that the system of Japan (national health insurance) does not cover any type of preventive dental care.

In Bangladesh each Upa-zilla health & district hospital consists of a post of Dental Surgeon. In a district total population is more or less 2 million and in a upazilla near about 500000. So it is impossible to render total dental treatment for all the people with that minimum quantity of dental manpower in a public hospital. Moreover insufficiency of dental equipment & instruments make the treatment improper & incomplete So very often extraction of permanent teeth occur without trying for conservation.

The number of dentists in Bangladesh is increasing rapidly in number for a recent few years back. Dentistry is a choice of specialty for students but limited number of seats in public colleges & highly education cost in private institution make them to abandon their wish. Only students from higher class & higher middle class get the admission in private dental colleges with that high educational expenses. The education cost in public dental college is negligible. Students only have to pay negligible money as a monthly tuition fees.

There is same discrepancies between public and private schools in tuition fees in Japan. The average first year tuition & fees are USD 85000 (10,170,000 Japanese Yen) for private dental schools. Whereas USD 9200 (1,100,000) for public & local government dental school.

The distribution of dentists in both countries is uneven. For example, in Bangladesh only a few percentage of total dentists working in public sector. Majority are private practitioner and working in city and town areas. Recently ministry of health and family welfare made a decree that

the newly appointed dentists in public sector must work in Upazilla health complex at least 3 years from his joining date of service. Another considering matter that every year a countable portion of dentists go abroad and settle there permanently.

Same uneven distribution exists in Japan. Such as 118.6 dentists for 100000 people in Tokyo. Where as 43.3 dentists for 100000 people in Fukui.

A very important difference of the two countries is that the dentists engaged in public sector also work in their private practice in evening in Bangladesh. On the other hand in Japan dentists in the public sector are employed in education, research & administration and other activities. They are not engaged in providing dental treatment to patients.

In Japan the post of dental hygienist is predominantly from female person, provides dental health education services, dental assisting services and some direct preventive services such as prophylaxis, topical fluoride application & fissure sealant instructed by dentist.

In Bangladesh dental technologist provide assistant to the dentist in public hospital. In rural area or even in town area some person of dental technologists provide dental treatment for the patient in their private dental clinic.

Conclusion:

Having a great socio and economical discrepancies between these two countries, Bangladesh should try to adopt the following programs in their health policy that are available in Japanese dental services such as (1) the health insurance system for all the population including dental services (2) epidemiological studies of dental diseases of all ages for a regular & certain period of time, it's documentation and publication. This program should be financed and monitored by ministry of health and family welfare. (3) To incorporate the post and services of dental hygienist to improve the preventive care of oral diseases. (4) Control and record of fluoride containing products such as toothpaste, mouth rinse etc in the market. (5) Compare to other countries in the world the curriculum, syllabus & academic year should be revised such as at least 6 years education including internship training. In addition medical & health statistics, dietetics, clinical psychology, health economics, computer education and management of a office should be include in the course of dental education. (6) community based preventive program should be emphasized (7) establishment of facilities of dental instruments and equipments that dental personnel could serve the rural people.

Some consideration for Japan also that (1) Internship training program should include in their academic year (mandatory internship will start from coming 2006) (2) preventive dental treatment program should include in the coverage of health insurance program. (3) as per as possible research work & graduate education should be start in English media for communicating it with other nations.

In this study, we compared the organization of health care systems, dental manpower, dental education and some factors that influences the oral health in two countries. Further studies should be done regarding the factors such as the social level, economical, political, geographical, cultural and other factors related to the health and illness. Because these factors could be influencing the predominance of poor oral health.

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