Research Article

Dental Caries Status in the Kathmandu Valley, Nepal in 1997-1999

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ABSTRACT

This paper reports on the oral health status in a random sample of 1,027 subjects aged 12 to 74 years who received oral examination at 12 sites of Nepal including the urban areas of Kathmandu and Kirtipur, and the rural areas of surrounding villages in the Kathmandu valley in three years between 1997 to 1999. The subjects were selected and investigated for age cohorts according to the basic methods of W.H.O. In the 12-year-age group, the mean number of teeth present/person was 21.26 with 97.7% teeth intact, and the mean DMFT score was 0.90. In the 15-year-age group, the mean number of teeth present/person was 27.94 with 94.6 % teeth intact, and the mean DMFT score was 1.52. In the 35~44 years of age group, the mean number of teeth present/person was 30.14 with 90.4% teeth intact, and the mean DMFT score was 2.52. In the 65-74 years of age group, the mean number of teeth present/person was 24.6 with 80.9% teeth intact, and the mean DMFT score was 8.93. The results showed significantly greater scores of DMFT in the urban areas compared to those in the rural areas at the ages of 12 years and 15 years, which indicate the effect of urbanization on oral health in human life. In view of the fact that, majority of the population retained their teeth in a functional state in all age groups, motivation of self-care oral hygiene and community oral health education is recommended as the most appropriate dental health program in the country.

Keywords: Caries prevalence and experience; dental caries; epidemiology; intact teeth; Nepal; oral health.

INTRODUCTION

Nepal is a rectangular shaped landlocked country bordered between India in the south, east and west, and Chinese autonomous region of Tibet in the north. It is approximately 850 km long from the east to the west and 150 km wide from the north to the south. The population is estimated to be 22,740,000 (2001 census), and 90% of the popuation depend on agriculture in villages. Although, people in the urban areas are also engaged in tourism business and small-scale industries such as the production of carpets, handicrafts; Nepal, nonetheless, has been recognized as one of the poorest countries in the world.[1,2] Nepal has reduced many of its previous barriers to cultural, scientific and health-related interchange after the attainment of parliamentary democracy from the popular movement in 1990. However, it never extablished a sustainable national health system or administrative measures to deal with oral diseases and dental care.

In November 1994, a group of dental professionals belonging to an NGO, the VSOG from Osaka, Japan visited Kathmandu in an invitation of Public Health Concern Trust, Nepal (an NGO). During the visit, the Japanese members met officials of the Ministry of Health, social workers, doctors and dental professionals. The

discussions sought for the possibilities for future collaboration in oral health issues, including plans for oral health promotion and/or assistance of dental facilities for treatment and health education. As a result of these programs, a modern dental clinic with necessary equipment and facilities was established as VSOG Dental Clinic in Kathmandu and voluntary team of Japanese dental professionals was scheduled to visit Nepal every year to organize dental camps from the period of 1995 to 2000. A dental survey team was then established by the authors for the collection of data on oral health status to obtain a baseline data of the country.

Kathmandu is located in central Nepal, and it is the center of the Nepalese administration and economy. The population of the Kathmandu valley and its numerous surrounding villages is approximately 1,500,000; showing a marked concentration of population in these areas in recent years. The dental health survey was conducted in two cities; the capital Kathmandu and adjoining traditional city of Kirtipur, and 6 rural villages including Seti Devi and Sankhu in Kathmandu district, Lamatar and Tikathali in Lalitpur district, Dhulikhel in Kabhre district, and Daman in Makwanpur district. As the life style and food habits in rapidly urbanizing cities make a striking contrast to those in unchanged rural villages; the interesting infuences on changes in the social life and on oral health conditions is the interest of this study.

Regarding the epidemiological surveys on Nepalese oral health status, several short reports [3-9] by foreign researchers who visited Nepal exist; however, an evaluation of newly accumulated data is necessary to appropriately interpret the present conditions. The purpose of this study was to evaluate the dentition status of the people living in Kathmandu valley and surrounding villages, where both urban and rural lifestyle exist, and thus to obtain a guideline needed for dental health program for the Nepalese people.

MATERIALS AND METHOD

A total of 1,027 residents aged 12 to 74 years were subjected for oral investigation, selected from the people who received oral examinations and dental treatment through the organized dental camps in 12 different sites during 1997 to 1999. The study was done in the urban areas of Kathmandu and Kirtipur, and in the rural areas of farming hill villages, such as Seti Devi, Sankhu, Lamatar, Tikathali, Dhulikhel and Daman, (Figurel). The presence of developed infrastructures such as roads, central water supply and drainage, hospitals, schools, post office, municipality, hotels, and shops were considered to define the urban sites. Rural sites were the villages with no availability of such infrastructures. As shown in the Table 1, the subjects were classified in age groups and then subsequently classified into the groups of urban and rural population.

The oral examination was conducted according to the WHO's oral health survey methods,10 i.e. subjectssitting on outdoor chairs, and oral investigation was made using dental mirrors, probes and artificial lights for oral cavities. Four experienced Japanese dentists and school dentists examined the subjects. The calibration stability was confirmed as the modified reproducibility was 90.7 - 94.7 % [11] and a kappa statistics was 0.86 -0.90 among the four dentists, ensuring a highly reliable results.

Individual identification such as the name and age of the subjects and communication with the patients was difficult in the country, because of the language barrier and low literacy among the people. The name and age in the identification columns were confirmed through a Nepalese interpreter, and the results of oral examinations were recorded by the calibrated dentiston the simplified WHO Oral Health Assessment Form. The Nepalese calendar was used instead of a Western calendar throughout the sampling procedure in the country.

As for the fluoride concentration in drinking water, a recent report by Neil McDonald,[12] who collected the water sample from 682 locations covering almost entire Nepal was referred, which showed less than 0.3mg/l in more than 95% of the districts, and 0.39-06mg/l in the Kathmandu valley showing anextremely low level of fuoride concentration in all the sites studied in his investigation. Thus the community water supply as well as naturally occurring drinking water in both urban and rural areas of Nepal were not optimal for dental caries prevention.

The dentition status per person by age group and type of community was presented. The rates of "Intact/present teeth %" were calculated by number ofintact teeth per present teeth in the permanent dentition.Caries prevalence was measured as "Caries-free %", i.e. the rate of subjects

without decayed, missing and filled teeth. The "With untreated caries %" was measured as the rate of subjects with decayed teeth. The "Caries experience" was measured by using DMFT index according to the WHO criteria. The comparisons were made between the urban and rural population using Student's t-tests at the level of $p<0.05$.

RESULT

In the total sample of 12-year-age group, the mean number of teeth present per person was 21.26 and the rate of intact teeth per present teeth was 95.7%. The mean DMFT score was 0.90 and mean values for D, M, and F- components showed a very low caries experience and little treatment rendered. The "Caries-free %" was 60.8% and the "With untreated caries %" was 38.1%. Statistically significant differences were noted between the urban and the rural areas for the rate of intact/present teeth %, caries-free %, With untreated caries %, mean DMFT scores and the D-component.

In the total sample of 15-year-age group, similar trend as the 12-year-age group was noted. The mean number of teeth present per person was 27.94, which may reveal the completion of permanent dentition at this age. The rate of intact teeth per present teeth was 94.6 %. The mean DMFT score was 1.52 and the mean value for D-component was 1.36. The "Caries-free %" was 49.4 % and the "With untreated caries %" showed 45.3%. The urban areas showed significantly high values of the caries experience for the "With untreated caries %", mean DMFT score and D-component than the rural area.

In the total sample of 35-44 years of age group, the mean number of teeth present per person was 30.14, showing the dentition status with the presence of third molars. The rate of intact teeth per present teeth was 90.4%, and the mean DMFT score was 2.52. There was no significant difference between the urban and the rural areas in any of the parameters examined.

In the total sample of 65-74 years of age group, the mean number of teeth present per person was 24.60 and the rate of intact teeth per present teeth was 80.9%. The mean DMFT score was 8.93, the mean values for DT was 3.63 and the mean value for MT was 5.30. The "Caries-free %" showed 8.6 % and the "With untreated caries%" was 75.7 %. There was no significant difference between the urban and the rural population in the dentition

Table 1: Distribution of Subjects and Details of Caries Results by Type of Community.

			Number of teeth present		Intact / Present Teeth %		Caries-free %	With untreated caries %	DMFT		DT		MT		FT	
age		n	mean	sd	mean	sd			mean	sd	mean	sd	mean	sd	mean	sd
12	total	520	21.26	6.12	95.7	7.2	60.8	38.1	0.90	1.53	0.86	1.48	0.01	0.09	0.03	0.33
	urban	217	21.48	5.85	94.7	7.7 *	51.6 *	46.1 *	1.13	1.63 *	1.06	1.56 *	0.01	0.10	0.07	0.49
	rural	303	21.10	6.29	96.5	6.8	67.3	32.3	0.73	1.43	0.72	1.41	0.01	0.08	0.01	0.11
15	total	267	27.94	1.31	94.6	7.6	49.4	45.3	1.52	2.14	1.36	2.08	0.03	0.18	0.13	0.59
	urban	171	27.99	1.16	92.8	8.4 *	39.2 *	53.8 *	2.01	2.37 *	1.77	2.33 *	0.03	0.20	0.21	0.73
	rural	96	27.84	1.53	97.8	4.5	67.7	30.2	0.65	1.24	0.63	1.24	0.02	0.14	0.00	0.00
35-44	total	170	30.14	2.00	90.4	11.5	35.9	55.3	2.52	3.38	1.82	2.67	0.55	1.07	0.15	0.70
	urban	90	30.02	2.11	91.1	11.3	37.8	52.2	2.53	3.29	1.70	2.41	0.57	1.07	0.27	0.94
	rural	80	30.26	1.86	89.7	11.7	33.8	58.8	2.50	3.48	1.96	2.92	0.53	1.08	0.01	0.11
65-74	total	70	24.60	7.04	80.9	19.1	8.6	75.7	8.93	7.34	3.63	3.83	5.30	6.29	0.00	0.00
	urban	28	24.71	5.57	75.3	23.3	3.6	85.7	10.11	7.13	5.11	4.67 *	5.00	4.91	0.00	0.00
	rural	42	24.52	7.87	84.6	14.4	11.9	69.0	8.14	7.38	2.64	2.73	5.50	7.05	0.00	0.00

* $p < 0.05$

status except for the D-component where the urban areas showed higher values than that of the rural areas.

DISCUSSION

The present study revealed the mean number of teeth present per person at 12-year-age group was at least 21 in the permanent dentition. The corresponding figures for those groups aged 15 years, 3.5-44 years, and 65-74 years were atleast 27, 30, and 24 respectively. Inall age groups, the percentage of intact teeth per present teeth was more than 80 %, even at the older age group of 65-74 years. These findings show that the majority of the residents in the Kathmandu Valley retained most of their teeth in a functional state throughout the life. These results confirm previous report from African Countries Olsson[13] Manji et al (1988).[14] Baelum et al. (1986); Manji et al.[14] (1988)). The results have important timplications on the promotion of oral health prevention program, despite their having little access to dental care and treatment facilities in the country.

The study noted a gradual increase in caries experience as the age advanced. The DMFT score in 12-year-age group was 0.9, the 15-year-age group showed 1.52, 35-44 years of age group showed 2.52 and 65-74 years of age group showed 8.93 of DMFT score. These findings may also indicate that caries experience is relatively low in permanent dentition. The observations showed that, there were almost nointervention of the dental problem, thus most decayed teeth remained untreated. This trend is similar to theprevious observations reported in Nepal. The DMFT score at 12 years of age as reported by Milsom et al[3] (1977) was 0.91, which was similar to that of 0.5 - 0.9 reported by Westbacke[4] (1991) and that of 0.7reported by Robinson[5] (1982). However, all these DMFT scores were slightly higher than that of 0.1 -0.3 reported by Mira Malla[6] and markedly lower than that of 1.9 - 2.3 reported by Tewari.[7] Wim van Palestein Helderman et al[8] (1998) reviewed the past reports of caries experience in Nepal between 1980 and 1996,and reported that although there were differences in thecriteria of sampling and examination including year of rof investigation, the incidence of caries in children aged 12-19 years increased, the DMFT score at the age of 12 years was 0.6-1.9, and DMFT score at the age of 35-44 years was 2.5-4.0.

As for the difference between the urban and the rural population, the DMFT scores in the urban areas in 12- and 15-year-age group showed significantly greater than those in the rural areas, showing greater values for D-component. Since the rates of missing and filled teeth in both the urban and rural areas were also small, the rates of intact/present teeth % and caries-free % in the rural areas resulted in significantly greater than those in the urban areas. However, there were no significant differences in any of the parameters at the later ages studied between the urban and the rural areas. These findings showed a tendency to the increase of DMFT scores and D-components in the younger ages of urban areas, which is an important indication of the effect of urbanization on oral health.

Although the results of the present study showed both caries prevalence and caries experience were on the low level in Kathmandu Valley, Nepal; many of the local residents needed emergency dental care such as tooth extractions, abscess drainages or medications during the oral examinations. The patients in the rural areas where there were no dentists; needed much dental service and attention. Even in the urban areas, there were a considerable number of people who were deprived of dental services. Since the F–component in the urban and in the rural areas in particular, was markedly low, the rapid consideration for dental treatment facility is mandatory. Also, the trend of increasing prevalence of dental caries in the developing countries, because of the modernization and exposure to the westernized diets necessitates the national level oral health programs. The dental profession in Nepal not only necessitates engaging the dentists for the rural services, but also requires the involvement of qualified dental hygienists to deal with the common dental problems. This can maintain the oral hygiene of the people and extend oral health awareness in rural communities keeping the caries prevalence and experience at the low level.

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