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Dental Health Status of the Residents in the Korunalaya Leprosy Care Center in Puri (Orissa, India)

Stan zdrowia uzębienia mieszkańców Ośrodka Rehabilitacji i Leczenia Trądu w Puri (Orissa, Indie)

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A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation;
D – writing the article; E – critical revision of the article; F – final approval of article

Abstract

Background. The epidemiological data shows considerable differences in the incidence of dental caries dependent upon geographical, social and cultural factors. Most people in third world countries have little or no access to organized oral health care or to basic emergency dental treatment. Lack of permanent dental health care is particularly pronounced in isolated groups, such as leper colonies.

Objectives. To assess the dental health status of the residents in the Korunalaya Leprosy Care Center (Orissa, India).

Material and Methods. The examinations were carried out on 136 patients (44.85% females and 55.15% males), aged 19–95 years. The teeth assessments were carried out in artificial light by means of an explorer and mirror, and included the number of teeth with active caries, missing and filled teeth. The data obtained was used in calculating caries frequency and DMFT index and categorized according to patients' sex and age. For a statistical analysis relating to the differences in caries frequency and DT, MT, FT and DMFT indices between females and males as well as between different age groups the difference test between two proportions was used.

Results. Caries frequency was the highest in males aged 19–44 years (66.67%) whereas the lowest in males aged 45–64 years (45.16%), and those differences were statistically significant ($p < 0.001$). In 19–44 years old patients DMF index was largely dependent on the amount of teeth with untreated carious cavities and then on missing and filled teeth. The DMFT number was the highest in females above 65 years (10.50); in this group MT number was 7.68. Statistical significance was observed between females and males in DMFT index in 45–64-year-olds ($p = 0.003$) and above 65 years ($p < 0.001$).

Conclusions. The dental health status of the residents of the Korunalaya Leprosy Care Center is unsatisfactory but similar to non-leper communities in Indian subcontinent. Constant professional dental supervision is needed in leprosy centers (**Dent. Med. Probl. 2015, 52, 3, 304–308**).

Key words: India, caries frequency, DMFT index, Leprosy Center.

Słowa kluczowe: Indie, frekwencja próchnicy, wskaźnik PUWz, ośrodek dla trędowatych.

The epidemiological data shows considerable differences in the incidence of dental caries dependent upon geographical, social and cultural factors. Most people in third world countries have little or no access to organized oral health care or to basic emergency dental treatment. The main reasons are the lack of dentists and poor socio-economical status [1].

Pack has noticed that most of the world's population lives in developing countries, thus oral health promotion program should be directed particularly towards those communities. In the world, greater oral health problems are seen in disadvantaged populations both in developed and developing countries. However, in developing countries, a higher percentage of the population is con-

sidered as “disadvantaged” due to overcrowding, poverty, poor educational opportunities and malnutrition [2]. Lack of permanent dental health care is particularly pronounced in isolated groups, such as leper colonies.

Leprosy is a chronic infectious disease, caused by *Mycobacterium leprae* and mainly affects the skin and peripheral nerves [3, 4]. It has several clinical manifestations, depending on the immune response to infection, from tuberculoid leprosy with a more benign course to lepromatous leprosy where symptoms are more severe [3]. In some communities lepers are victims of social prejudice, discrimination and stigma. The disease is terrifying because even though the patient recovers clinically, crippling deformities remain lifelong [5].

The geographical distribution of leprosy has varied greatly over the centuries. Once the disease was prevalent in Europe, while presently it occurs mainly in tropical and subtropical areas [4]. India is one of 14 countries where leprosy is still considered as endemic [5]. The World Health Organization Leprosy Elimination Project Status Report 2003 showed that 64% of the cases worldwide are reported in this country [6].

This study assesses the dental health status of the residents in the Korunalaya Leprosy Care Center (Orissa, India).

Material and Methods

The material was collected during two humanitarian aid expeditions to the Korunalaya Leprosy Care Center in Puri (Orissa, India). The main purpose of the stay at the Center was to carry out dental examination and treatment on the residents. The dental examinations were performed by one dentist on 136 patients (44.85% females and 55.15% males), aged 19–95 years (Table 1). The subjects of the study were patients who gave their consent to be dentally examined and who reported to the local dental surgery. The teeth assessments

were carried out in artificial light by means of an explorer and mirror, at the Center’s dental surgery. The assessment included the number of teeth with active caries (DT) as well as missing (MT) and filled (FT) teeth.

The data obtained was helpful in calculating caries frequency and the mean DMFT index. The results were categorized by patients’ sex and age.

For a statistical analysis relating to the differences in caries frequency and DT, MT, FT and DMFT indices between females and males as well as between different age groups the difference test between two proportions and Statistica v 10 (StatSoft company) were used. The assumed level of statistical significance was $p < 0.05$.

Results

The results showed that caries frequency was the highest in males aged 19–44 years (66.67%) whereas the lowest in males aged 45–64 years (45.16%), and those differences were statistically significant ($p < 0.001$) (Table 1). Statistical significance was also observed between females aged 19–44 and 45–64 years ($p = 0.01$) as well as males aged 19–44 and above 65 years ($p < 0.001$).

In 19–44 years old patients DMFT index was largely dependent on the amount of teeth with untreated carious cavities and then on missing and filled teeth in a descending order (Table 2). In the other two groups of patients (aged 45–64 years and above 65 years) DMFT index was largely dependent on the amount of missing and carious teeth. The DMFT index was the highest in females above the age of 65 years (10.50) and the lowest in 19–44 years old males (3.00). Statistical significance was observed between females and males in patients aged 45–64 years ($p = 0.003$) and above 65 years ($p < 0.001$).

The mean number of missing teeth was the highest in females and males above the age of 65 years (7.68 and 5.06) while in those between 19

Table 1. Characteristics of dental caries in the leprosy subjects

Patient’s sex	Total number of patients						Caries frequency					
	patients’ age						patients’ age			p value		
	19–44 years		45–64 years		≥ 65 years		19–44 years	45–64 years	≥ 65 years	19–44 vs 45–64 yrs.	45–64 vs ≥ 65 yrs.	19–44 vs ≥ 65 yrs.
	N	%	N	%	N	%						
Females (F)	16	11.76	17	12.50	28	20.59	62.50	47.06	57.14	0.01	ns	ns
Males (M)	27	19.85	31	22.79	17	12.50	66.67	45.16	47.05	< 0.001	ns	< 0.001
p value (F vs M)	ns		0.02		ns		ns	ns	ns			

ns – non significant.

Table 2. DMFT index of the leprosy subjects

DMFT index	Patient's sex	Patients' age			p value		
		19–44 years	45–64 years	≥ 65 years	19–44 vs 45–64 yrs.	45–64 vs ≥ 65 yrs.	19–44 vs ≥ 65 yrs.
DMFT	females	4.12	6.12	10.50	ns	ns	ns
	males	3.00	4.39	7.47	ns	ns	ns
	p value (F vs M)	ns	0.003	< 0.001			
DT	females	2.19	1.76	2.82	ns	ns	ns
	males	2.11	1.71	2.41	ns	ns	ns
	p value (F vs M)	ns	ns	ns			
MT	females	1.81	4.35	7.68	ns	ns	0.02
	males	0.85	2.61	5.06	ns	ns	0.04
	p value (F vs M)	0.01	0.003	< 0.001			
FT	females	0.12	0.00	0.00	ns	ns	ns
	males	0.04	0.06	0.00	ns	ns	ns
	p value (F vs M)	ns	ns	ns			

ns – non significant.

and 44 years the lowest (1.81 and 0.85), and the differences were statistically significant, $p = 0.02$ and $p = 0.04$, respectively). Furthermore, statistical significance was found between females and males in all age groups, i.e. 19–44-year-olds, 45–64-year-olds, and above the age of 65 years ($p = 0.01$, $p = 0.003$ and $p < 0.001$).

Only few fillings could be found in the teeth of the examined population, and DT index was the highest in 19–44 years old females (0.12); whereas in 19–44 and 45–64 years old males it amounted 0.04 and 0.06, respectively (Table 2).

Cervical lesions could be seen in older patients. The changes occurred in the cervical area of the particular maxillary teeth groups (i.e. incisors, canines, premolars and molars).

Discussion

The present study included only the group of adult residents of the Center. Dental health status of children who attended the Beatrix School, an institution founded for children from leprosy families, were presented in other paper on the use of ART method in the treatment of caries in the Korunalaya Leprosy Care Center population [7].

The DMFT index in examined patients is suggestive of extensive treatment needs. The results may be also compared to those concerning other populations. Van Palenstein Helderma et al. [8] analysed the results of epidemiological studies on oral diseases among the population of Nepal. The authors observed that DMFT number increased with age. The mean DMFT number in children

aged 12–19 years was largely dependent on decayed teeth, whereas in the 35–44 years group one third of the DMFT number, on average, comprised MT component. This figure falls within the range reported in the present study, where in younger patients caries severity value was largely dependent on the amount of carious teeth, whereas in older individuals on missing teeth. The highest MT number was in females above the age of 65 years. In the total population above 65 years, caries frequency averaged 53.33%. The results are similar to those of Shah's study who examined inhabitants, above 60 years, of an urban area of South Delhi and its adjoining four villages [9]. The author observed carious teeth in 54.5% of patients.

In regard to the number of fillings, they were mainly present in younger patients and in the elderly they occurred only sporadically. In females and males aged 19–44 years FT number amounted to 0.12 and 0.04, respectively, and in males aged 45–64 years to 0.06.

In the present population the highest amount of missing teeth were observed in patients above the age of 65 years, especially females (MT = 7.68). One can assume that numerous teeth were lost due to caries as well as periodontal diseases. Ling et al. [10] and Amarasena et al. [11] found out a higher prevalence of periodontal disease in habitual betel chewers than in non-betel chewers. Hence, the high percentage of lost teeth seems to be concerned with permanent betel chewing which is very popular in India as well as in the examined population. The data presented previously confirms this phenomenon in 71.76% of residents, out of 85 other examined individuals, of the Ko-

runalaya Leprosy Care Center, aged 35–95 years. Also, extensive abrasion and teeth discoloration could be seen [12]. The changes escalated with the patients' age and were caused by habitual betel chewing as well as vegetarian diet as most of the food consumed by the examined Hindus are plants. A study by Sherfudhin et al. [13] on dental health in young adult southeast Indian vegetarians also confirms this fact. The authors have observed that the tooth wear in vegetarians was significantly higher than that in non-vegetarians. Numerous literature data also confirm the negative effect of betel chewing on dental status [14–16].

Jaleel et al. [17] carried out the study on tooth loss in 1200 adult subjects, aged 35–74 years, from urban (47.1%) and rural (52.9%) areas of Davangere taluk (India). The authors showed that the mean number of missing teeth in the population averaged 4.2 ± 7.4 , and significant differences could be observed for urban (3.5 ± 6.8) and rural (4.7 ± 7.8) residents. Moreover, tooth loss increased with the individual's age (from 1.2 teeth in patients of the age of 35–44 years to 11.5 teeth in those aged 65–74 years), which is in accordance with the present study.

Since in the Korunalay Leprosy Care Center treatment is carried out sporadically by dentists who arrive with humanitarian aid missions, there is no constant dental supervision. In addition, poor socio-economic status and limited access to information (often due to illiteracy) influence poor educational level.

Furthermore, the majority of Hindus inhabiting rural areas live without professional dental care. The published reports show that the main reason for such a situation is lack of dental professionals because 90% of dental surgeons practice in cities, whereas 75% of total Indian population reside in rural areas [18]. Jaleel et al. [17] explained that the difference in tooth loss between urban

and rural residents is also caused by disparity in oral health care provision. Accessibility, availability, affordability and acceptability of dental services may be a potential barrier to dental treatment for rural people.

The highest percentages of missing teeth in the Center's population were mandibular incisors and then maxillary incisors and molars, that is, the teeth within alveolar bone segments where progression of periodontal disease is the most advanced. Núñez-Martí et al. [19] in the study concerning dental and periodontal changes in lepers also found that in a large proportion of leprotic patients missing maxillary incisors and canines or carious teeth may be observed. The examined group had greater plaque indices and probing depth than in patients from control group, and the authors considered these changes as implications of poorer oral hygiene due to improper prophylaxis following mutilated fingers, gingival sensitivity problems, masticatory defects as well as altered tongue and masticatory muscles [19]. Other authors also describe alveolar bone changes as a result of untreated disease [20].

On the other hand, masticatory forces during chewing movements as well as mechanical injury appearing during teeth cleaning with chewing sticks obtained from the *Azadirachta indica* tree may be recognized as an aetiological factor of V-shaped lesions in the cervical portion of teeth in elderly. A considerable percentage of rural India residents practice such form of hygienic measures [21].

In conclusion, the dental health status of the Korunalaya Leprosy Care Center inhabitants is unsatisfactory but similar to non-leprosy communities in Indian subcontinent and confirms lack of regular dental care. However, constant dental supervision is needed in leprosy centers as well.

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References

- [1] VAN PALENSTEIN HELDERMAN W., MIKX F.: Priorities in oral health care in non-EME countries. *Int. Dent. J.* 2002, 52, 30–34.
- [2] PACK A.R.C.: Dental services and needs in developing countries. *Int. Dent. J.* 1998, 48, (suppl 1), 239–247.
- [3] FRANCO-PAREDES C., GUARNER J., MEHRABI D., MCCALL C., DEL RIO C.: Clinical and pathological recognition of leprosy. *Am. J. Med.* 2003, 114, 246–247.
- [4] RAMOS-E-SILVA M., REBELLO P.F.B.: Leprosy. Recognition and treatment. *Am. J. Clin. Dermatol.* 2001 2, 203–211.
- [5] GUPTA A.K.: Integrated approach for leprosy elimination in India. *J. Devel. Soc. Transf.* 2004, 1, 31–36.
- [6] World Health Organization (2004): World Health Organization Leprosy Elimination Project, Status Report 2003 (www.who.int/lep)
- [7] GERRETH K.: The use of ART technique in treatment of caries in leprosy victims in Puri. *Stomat. Współ.* 2003, 10, 4, 25–29 [in Polish].

- [8] VAN PALENSTEIN HELDERMAN W., GROENEVELD A., TRUIN G.J., SHRESTHA K.B., BAJRACHARAYA M., STRINGER R.: Analysis of epidemiological data on oral diseases in Nepal and the need for a national oral health survey. *Int. Dent. J.* 1998, 48, 56–61.
- [9] SHAH N.: Gender issues and oral health in elderly Indians. *Int. Dent. J.* 2003, 53, 475–484.
- [10] LING L.J., HUNG S.L., TSENG S.C., CHEN Y.T., CHI L.Y., WU K.M., LAI Y.L.: Association between betel quid chewing, periodontal status and periodontal pathogens. *Oral Microbiol. Immunol.* 2001, 16, 364–369.
- [11] AMARASENA N., EKANAYAKA A.N., HERATH L., MIYAZAKI H.: Tobacco use and oral hygiene as risk indicators for periodontitis. *Community Dent. Oral Epidemiol.* 2002, 30, 115–123.
- [12] GERRETH K., BORYSEWICZ-LEWICKA M.: Dental status of habitual Hindu betel chewers in a Leprosy Care Center. *Polish J. Environ. Stud.* 2007, 16, 2C, 307–312.
- [13] SHERFUDHIN H., ABDULLAH A., SHAIK H., JOHANSSON A.: Some aspects of dental health in young adult Indian vegetarians. A pilot study. *Acta Odontol. Scand.* 1996, 54, 44–48.
- [14] CHUAJEDONG P., KEDJARUNE-LEGGAT U., KERTPON D., CHONGSUWIVATWONG V., BENJAKUL P.: Associated factors of tooth wear in southern Thailand. *J. Oral Rehabil.* 2002, 29, 997–1002.
- [15] ESWAR N.: Oral health status among the tobacco and betel nut chewers in the Kishore Ganj District of Bangladesh. A statistical study. *Indian J. Dent. Res.* 2002, 13, 167–171.
- [16] TRIVEDY C.R., CRAIG G., WARNAKULASURIYA S.: The oral health consequences of chewing areca nut. *Addict Biol.* 2002, 7, 115–125.
- [17] JALEEL B.F., NAGARAJAPPA R., MOHAPATRA A.K., RAMESH G.: Risk indicators associated with tooth loss among Indian adults. *Oral Health Dent. Manag.* 2014, 13, 170–178.
- [18] SHAH N.: Geriatric oral health issues in India. *Int. Dent. J.* 2001, 51, 212–218.
- [19] NÚÑEZ-MARTI J.M., BAGÁN J.V., SCULLY C., PEÑARROCHA M.: Leprosy: dental and periodontal status of the anterior maxilla in 76 patients. *Oral Dis.* 2004, 10, 19–21.
- [20] COSTA A., NERY J., OLIVEIRA M., CUZZI T., SILVA M.: Oral lesions in leprosy. *Indian J. Dermatol. Venereol. Leprol.* 2003, 69, 381–385.
- [21] GERRETH K.: Oral hygiene habits in the Indian population. *Magazyn Stomatol.* 2005, 15, 6, 74–76 [in Polish].

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