

Topic of Research: Prevalence of caries and periodontal disease in operated non-syndromic cleft lip and palate children in the state of Kelantan

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1. Abstract

The oral health status of cleft lip and palate patients have not been studied widely particularly in Malaysia. The aim of this study is determine the oral health status of operated cleft lip and palate children in the state of Kelantan. This is a cross sectional study. A random sample of three hundred addresses (300) of operated cleft lip and palate children were randomly selected from the cleft lip and palate register of the Cleft Lip and Palate Association of Kelantan (CLAPAK). The patients were aged 2 years to 17 years and have had lip or lip and palate repair done. The method used was interview administered questionnaires of patients as well as parents, guardian or caregivers for young patients who are not able to provide the details on their own. This is followed by an oral examination to determine prevalence of caries and periodontal disease in the oral cavity. Interviews and oral examination were succesfully undertaken with one hundred and eighty three (183) subjects. The study showed that 50.9% of the subjects are caries free. 49.1% has caries experience with mean DMFT of 6.13 (SD 6.01). About fifty-nine percent (58.7%) of the subjects are found to have one or more sites of gingival inflammation. Therefore particular attention should be focused on the health of teeth and gums of these patients. Special emphasis must be given on oral health education to improve the oral health status of these children. These findings may have implications for all involved in oral health promotion and evaluating oral health care services.

2. Introduction

Oral health is an integral component of health throughout life. It is the freedom from the burden of oral diseases and conditions. Poor oral health, untreated oral diseases and conditions can have a significant impact on quality of life. Many people still experience oral diseases or disorders like dental caries, periodontal disease, cleft lip and palate leading to pain, suffering, decrease economic productivity through loss of working days, loss of self-esteem and increased cost of care. Oral health status studies have been extensively carried out globally and have showed varying results in various age groups of individuals. Although dental caries have declined dramatically among school children (GODB,1999) it is still a significant problem in certain pockets of the society namely the disadvantaged population, certain racial and ethnic groups. As for periodontal health, only 15% of the world population is free from periodontal disease (GODB, 1997).

The prevalence of oral diseases in children with cleft lip and palate patients have been reported by several group of workers. This distressing birth defect is undoubtedly a burden to patients, parents as well as caregivers because cleft lip and palate patients will inevitably face a wide range of problems which although treated in infancy stages, they may suffer from problems throughout life including speech, hearing, tooth development and occlusion, residual facial disfigurement and in some cases psychosocial balance. Many countries now realize that these groups of patients have somewhat been left behind in their oral health assessment and subsequently their oral health care. The evaluation of oral health status of these patients is invaluable to caregivers to promote efforts in improving the multidisciplinary management of this common congenital craniofacial anomaly. The proposed study will shed some light into the level of care that can be outlined for these patients and help healthcare providers plan a protocol for treatment and management with hopes to reduce disparities of care.

3. General objective:

1. To ascertain the oral health status of cleft lip and palate patients which include prevalence of caries, gum or gingival problems and oral hygiene habits.

3.1 Specific objectives:

1. To determine the maternal and paternal age when cleft child is born
2. To determine education level of head of household among cleft children
3. To determine employment status of head of household among cleft children.
4. To determine type of clefts.
5. To determine caries prevalence among cleft children.
6. To determine the periodontal status of cleft children.
7. To determine toothbrushing habits among study sample.
8. To determine the use of dental floss as aid to plaque control among study sample.
9. To determine the use of toothpicks for interproximal areas among study sample.
10. To determine the frequency of dental visits after cleft repair.

4. Literature review

4.1 Epidemiology of craniofacial anomalies

Epidemiology is a vital part of public health science and thus it plays the role as an important tool in medicine and dentistry. Great advances were made possible following the contribution of epidemiology. Epidemiologic information is important in the administration of health care at all levels such as detecting epidemics, planning health programs, making valid cost estimates, constructing and staffing health facilities, devising preventive measures and designing efficient research. Practitioners act as the major sources of epidemiologic information on disease and principal users, thereby playing a role to define the disease in groups of patients, determine what happens in these patients during the course of illness and seek ways to alter this course with the establishment of preventive or treatment measures.

4.2 Epidemiology and genetics

The increasing application of human genetics in epidemiology and preventive medicine has brought about an inevitable partnership in these fields. Thus the incorporation of genetic concepts in epidemiologic research and of epidemiologic techniques in genetic research has added a new dimension to medical demography. Knowledge of the presence of a gene, which in some way determines a disease condition, is only the first step toward the study of its natural history. Prevalence or prevalence rate of the condition is an indispensable tool to estimate the gene frequency by genetic methods. It is important to know the rate at which normal genes mutate in the population to be able to control or eliminate it effectively. Thus epidemiologic-genetic approach is pertinent to estimation of gene frequencies, mutation rates, detection of heterozygous carriers, relative role of heredity and exposure to some environmental stress and the practice of genetic

counseling. Therefore epidemiologist and geneticist must work very closely to benefit mankind.

4.3 Craniofacial malformations in live and stillbirths

Craniofacial malformations present a wide embryologic, anatomic, etiologic, and functional diversity and involve many organ systems. Even with good informative resources it is difficult to make comparisons of findings due to variability in data collection, study design, overlapping of major and minor malformations, period of observation, live births and fetal deaths. There also exist ethnic and geographical variations as well as sex differences in these malformations.

4.4 Cleft lip and palate

Cleft lip and/or palate is known to be associated with over 60 malformations and disease syndromes, many of which are genetically determined (Myrianthopoulos, 1982). It is among the most common human malformations. A combination of cleft lip and palate comprises about 50% of cases; cleft lip alone and cleft palate alone constitute 25% of cases each (Gorlin et al, 1976). Cleft lip with or without cleft palate, and isolated cleft palate appear to be separate entities as they exhibit different epidemiologic and familial characteristics. Cleft lip with or without cleft palate has a birth incidence of about 1 per 1,000 among whites but a much lower incidence 1 per 1,500 among American blacks. The incidence among Orientals is higher 1.7 per 1,000. The highest incidence has been found among American Indians, over 3.6 per 1,000 births. With the exception of blacks, males are more frequently affected in a ratio 2:1. Among blacks however, females are more frequently affected than males. Isolated cleft lip occurs unilaterally in 80% of cases and is more common in the left, and bilaterally in 20% of cases (Gorlin et al, 1976). The

Malaysian data revealed incidence of 1: 700 (CLAPAK, 1997) and 1:800 (HKL, 1980). Isolated cleft palate has a lower and approximately has the same incidence in whites and blacks, about 1:2,000-2,500 births. This condition is also reported to be more frequent among Orientals. Females are more frequently affected than males in a ratio of 1:2. Cleft uvula is considered to be an incomplete form of cleft palate, but its incidence is much higher in whites than in blacks. It is extremely common among American Indians (Schaumann et al, 1970a)

Despite 40 years of intensive research on cleft lip and/or palate in the West, relatively little is known about its etiology or pathogenesis. However three things appear to be certain with regard to clefting in man. First beginning with the study by Fogh-Andersen (1942), it has repeatedly been shown that cleft lip with or without cleft palate (CL \pm P) and isolated cleft palate (CP) are etiologically distinct. The siblings of patients with CL \pm P have an increased frequency of CL \pm P but not of CP. The siblings of patients with CP have an increased frequency of CP but not CL \pm P.

Second, the birth incidence of CL \pm P and CP exhibits notable geographic, racial and sex differences. The frequency of CL \pm P in whites is twice that of blacks (Myrianthopoulos & Chung, 1974) and the frequency in Orientals is 1.5 times that of whites (Tanaka et al, 1969). In addition the abnormal sex ratios are nearly reversed for the two disorders, CL \pm P and CP.

Thirdly, there is certainly both genetic and environmental component in the etiology of the two disorders.

4.5 Problems faced by cleft lip and palate patients

4.5.1 Feeding

Feeding is a very demanding task for mothers of cleft children. The lack of closure between the oral and nasal cavities causes difficulty to maintain enough negative pressure to suck from the breast or bottle. When there is an opening in the roof of the mouth, there is very little for the infant's tongue to press against to get milk from the breast or bottle. Therefore adaptations are sometimes made to facilitate feeding.

4.5.2 Lip closure and palate repair

Parents are usually anxious to begin corrective surgeries for the lip and palate. This is necessary to achieve adequate functioning for feeding and speech, improve facial appearance to allow optimal facial growth and development. Lip repair usually done after 3 months of life followed by palatal closure at 9 to 18 months of age. The goal is to close and lengthen palate to provide adequate seal for talking and eating.

4.5.3 Oral health status

There is a complex mix of both environmental and genetic factors in the etiology of dental caries and periodontal disease in these patients. Although results of studies showed a varying degree in design and analysis, many practicing dentists have recognized that these diseases seem to run in the families, some families being more susceptible and others being more resistant. The genetics of this susceptibility and resistance may hold the key to the etiology of dental caries and periodontal disease.

75% of children with clefts present with defects the part of the upper jaw that houses the teeth, many have missing or extra teeth, malformed or incorrectly positioned teeth or have problems of tooth eruption.

4.5.4 Hearing

Malformations of the head and neck including cleft lip and palate, was identified as one of the risk factors for hearing loss in infants. 94% of children with cleft lip and palate have continuous fluid in the middle ear causing conducting hearing loss. As these children grow older hearing difficulties caused by fluid often improve or sometimes may not completely resolve, therefore require frequent hearing assessment to ensure optimal hearing.

4.5.5 Speech-language

In addition to hearing sound distortion that can result from hearing impairment structural differences and lack of closure between the oral and nasal cavities may cause speech sounds to become distorted due to hypernasality. Speech sounds primarily affected are p, b, d, t, s, and ch because these sounds require velopharyngeal closure (closure between the oral and nasal cavities) in order to pronounce them correctly.

Articulation is often affected due to structural differences of the mouth such as a high arched palate or dental malocclusion due to lack of fusion between the two sides of the alveolar ridge and fusion of the upper jaw bone. When this fusion does not occur teeth are often malaligned or rotated causing oral structures to be different. Consequently a child often attempts to make a sound by changing the normal tongue position to accommodate the different oral cavity structure. Early repair can help child learn proper tongue placement and achieve normal resonance needed for intelligible speech.

4.5.6 Psychosocial needs

Few families are prepared for the birth of a child with disability. Overwhelming and often conflicting feelings of shock, guilt, embarrassment, disappointment, rejection, anger, and

sadness usually preoccupy parents. These feelings are normal, they need time to be expressed and worked through. First few days following birth of a cleft child are naturally difficult for parents, support from professional crucial. Parents of cleft children may have stressors including frequent physician appointments, surgeries, and hospitalization as well as financial burdens related to medical and dental care of child. The child may be at risk for development of psychological problems because of several factors such as question and teasing about visible facial differences, frequent hospitalization and separation from family and friends, noticeable difference in speech and the child's perception and coping skills. Child may begin to question why he or she looks different than others and be aware of the reactions of others to his or her appearance and speech.

5. Materials and method

5.1 Study design

This is a cross-sectional involving clinical examination of subjects as well as interview-administered questionnaires. The sample is obtained from the cleft lip and palate register of the Cleft Lip and Palate Association of Kelantan (CLAPAK). The interview administered questionnaire include consultation with parents, guardian or caregivers for young patients who are not able to give the information required. The questionnaires comprise of general information like socio-economic status, details of parents and family members, history of treatment obtained and so forth. Clinical examination include examination of teeth, gums, types of cleft and oral hygiene practices.

5.2 Sampling of study subjects

5.2.1 Sampling frame

The sampling frame is the local cleft lip and palate register of Kelantan (CLAPAK), which was started in 1996. It contains addresses of registered syndromic and non-syndromic cleft lip and/or palate patients from all over the state of Kelantan and some referral cases from Terengganu and Pahang. For the purpose of this study, only non-syndromic cleft lip and palate children were considered.

5.2.2 Sampling technique

A sample of three hundred (300) names was randomly selected from the register. Appointment letters were sent out to the addresses explaining the reason for attendance. Dates and time of appointments were carefully arranged to accommodate patient request and facilitate travel taking into consideration of other factors such as transportation, time available or time off from work and travel companion.

5.2.3 Diagnostic criteria and recording instructions

The criteria and recording instructions for dental caries followed those stated in the manual 'Oral Health Surveys: Basic Methods' Third Edition (WHO, 1997). Modifications were made to suit local needs with reference to the studies undertaken by the British Association for Study of Community Dentistry (BASCD). Research forms used are as attached in appendices.

5.2.4 Conduct of research

Addresses with telephone numbers were immediately identified. Appointments were arranged through telephone. Addresses without telephone numbers were given appointments by letters. Reminders by telephone and letters were done three times before considering as non response. When patients cannot make it to the dental clinic, Hospital Universiti Sains Malaysia, they were advised to go to the nearest clinic to their homes to encourage attendance. The examiner and team members will see the patient in the identified government dental clinics.

5.2.5 Face-to-face interviews

The first part of the appointment time is dedicated to explaining to the patient the relevance of the interviews, obtaining consent for participation and oral examination. When patient has understood the process, they were made to sign the consent form. Each patient, parent or guardian was interviewed to elicit all the required information such as details of sociodemography, parental background, history of pregnancy and so on as designed in the craniofacial anomaly form. If the information is not obtained at the particular appointment, subsequent telephone calls were made to obtain the necessary information. Patients were reminded to bring all details including appointment cards of

hospitalization or reviews prior to the appointment. This section required about half an hour or so of the appointment. A Kelantanese dental surgery assistant (DSA) was selected from the very start of the research to help whenever there is any difficulty in understanding the dialect of the Kelantanese patients in the process of obtaining necessary information. All the information was carefully noted by the researcher verbatim to ensure accuracy of recording.

5.2.6 Method of oral examination

The second part of the appointment was dedicated to oral examination of the cleft lip and palate patients. Patients were examined by the researcher on a dental chair with adequate fiber optic light using instruments used for the purpose of any normal oral examination such as probe, mouth mirror, tweezer, disposable tumblers. The researcher examine and read out the details of the oral findings while dental surgery assistant (DSA) record the information on the respective forms. Wherever necessary, pictures were taken using the digital intraoral camera to capture type or severity and complexity of craniofacial defects. Permission to take any picture were obtained prior to use of the digital camera.

5.2.7 Data processing and analysis

The completed interview questionnaire and the details of the oral examination were collated and entered in the SPSS program version 10. The researcher checked ten percent sample of responses to check conformity of entry. Agreement was achieved on all cases.

6. Results

Table 1: Response rates

	n	%
Selected addresses	300	100
Ineligible addresses	45	15.0
Eligible addresses	255	85.0
Refusal	38	12.7
Non contacts	34	11.3
Interview & examination achieved	183	61.0

The Cleft Lip And Palate Association of Kelantan (CLAPAK) maintains a detail address book of all the cleft lip and palate patients in the register. These addresses are regularly updated by the secretariat of the association. Three hundred (300) addresses was randomly selected from the Cleft Lip And Palate Register address book. Fifteen percent (n=45) of the addresses were ineligible due to incomplete house number, postal code, empty residents or business addresses. Thus the eligible sample size of the study was 255. Addresses were deemed non-contactable (n=34, 11.3%) if after three attempts of mailing there were no response. Thirty eight patients (n=38, 12.7%) patients refused to take part in the study. The overall response rate was 61% with 183 respondents taking part in the study.

Table 2: Profile of the study group

	n	%
Gender		
Male	103	56.3
Female	80	43.7
Age		
3-5 years	89	48.6
6-12 years	48	26.2
13-18 years	46	25.2
Ethnic		
Malay	182	99.5
Chinese	1	0.5
Total	183	100

Out of the total number of respondents, there were more males (n=103, 56.3%) than females (n=80, 43.7%). When divided into age groups, most of the study subjects were aged 3-5 years (n=89,48.7%), followed by 48 (26.2%) who were aged 6 –12 years and 46 (25.1%) who were aged 13 – 18 years. Majority of the subjects fall into the Malay ethnic group (n=182, 99.5%) except for one (n=1, 0.5%) who was of Chinese ethnic origin. This is because the Malays predominate in the northeastern part of the peninsula.

Table 3: Age of parent at delivery of cleft child

Age	Father n (%)	Mother n (%)
15 - 19 years	19 (10.4)	23 (12.6)
20 - 24 years	21 (11.4)	30 (16.4)
25 - 29 years	34 (18.6)	38 (20.8)
30 - 34 years	32 (17.5)	31 (16.9)
35 - 39 years	41 (22.4)	12 (6.6)
40 - 44 years	18 (9.8)	16 (8.7)
45 - 49 years	8 (4.4)	16 (8.7)
50 - 54 years	6 (3.3)	8 (4.4)
55 - 59 years	4 (2.2)	9 (4.9)
Total	183 (100)	183 (100)

About half of mothers (n=49.8%) were aged below thirty when their cleft child is born compared to fathers (n=40.4%). Most mothers (20.8%) are in the 25-29 years age bracket compared to fathers (n=22.4%) who fall into older age bracket that is 35-39 years. As age increases from 40 - 59 years, more mothers (n=26.7%) had a cleft child compared to fathers (19.7%).

Table 4: Education level of parent or guardian

Education level	Father (%)	Mother (%)	Guardian (%)
No schooling	6 (1.6)	28 (15.3)	39 (21.3)
Primary school	101 (55.2)	117 (63.9)	-
Secondary	74 (40.4)	36 (19.7)	-
Tertiary	2 (1.1)	2 (1.1)	-
Total	183	183	39

Most fathers (n=101, 55%) and mothers (n=117, 63.9%) of the study subjects had some form of primary education. About forty percent (n=74, 40.4%) of fathers and twenty percent (n=36, 19.7%) of mothers had secondary education. About one percent of mothers and fathers had tertiary education. There were about twenty one percent (n=39, 21.3%) of guardian who are either grandmother or aunts of the study subjects who took care of the patients and they had no formal education.

Table 5: Employment status of parent or guardian

Employment status	Father (%)	Mother (%)	Guardian (%)
Government employed	35 (19.1)	28 (15.3)	-
Privately employed	20 (10.9)	26 (14.2)	-
Self employed	125 (68.3)	79 (43.2)	1 (0.6)
Housewife/unemployed	-	49 (26.8)	38 (20.8)
Total	180	182	39

Majority of fathers (n=125, 68.3%) and mothers (n=79, 43.2%) of study subjects are self-employed. About eleven percent of fathers (n=20, 10.9%) and fourteen percent (n=26, 14.2%) of mothers are employed in private sectors. More fathers (35,19.1%) are employed in the government sector compared to mothers (n=28, 15.3%). Some twenty seven percent of mothers (n=49) are housewives or not working or earning regular income.

Table 6: Type of cleft

Type *	Male	Female	Male: Female Ratio
	n (%)	n (%)	
CL \pm CP	103 (100)	80 (100)	1.29:1
CL + CP	73 (70.9)	54 (67.5)	1.35:1
CL	30 (29.1)	26 (32.5)	1.15:1
B-CL \pm CP	27 (26.2)	25 (31.3)	1.08:1
U-CL \pm CP	76 (73.8)	55 (68.7)	1.38:1
Clefting subgroups			
B-CL + CP	16 (21.9)	24 (30.0)	0.67:1
U-CL + CP	57 (49.0)	30 (37.5)	1.90:1
B-CL	4 (3.9)	7 (8.8)	0.57:1
U-CL	26 (25.2)	19 (23.7)	1.37:1

* B = bilateral; U = unilateral; CL \pm CP = cleft lip with or without cleft palate, CL + CP = cleft lip with cleft palate; CL = cleft lip alone

More male children (n=73, 70.9%) and female children (n=54, 67.5%) in the study sample have cleft lip and palate compared to cleft lip alone (n=30, 29.1% and n=26, 32.5% respectively. Unilateral cleft lip and/or palate is more common compared to bilateral cleft lip and/or palate both in males (n=76, 73.8%) and female (n=55, 68.7%) subjects.

When subgroups of cleft were considered, there are more cases of unilateral cleft lip and palate compared to bilateral cleft lip and palate among male (n=57, 49%) and female (n=30, 37.5%) participants. For cleft lip only, there are more cases of unilateral cleft lip in male (n=26, 25.2%) and female (n=19, 23.7%) compared to bilateral cleft lip in male (n=4, 3.9%) and female (n=7, 8.8%).

Table 7: Caries experience

	Male	Female	Total
	n (%)	n (%)	n (%)
CF	62 (33.9)	31 (16.9)	93 (50.8)
DMFTor dft>0	41 (22.4)	49 (26.8)	90 (49.2)
Total	103 (56.3)	80 (43.7)	183 (100)

Overall, about 51% (93) of participants are found to be free from caries while 49.2% (90) have experienced some form of caries.

Table 8: Dental caries status of the cleft children

		Male	Female	Mean dft	Mean DMFT
Age group	n (%)	n (%)	n (%)	(SD)	(SD)
3 – 5 years	89 (48.6)	42 (23.0)	28 (15.3)	3.77 (3.56)	
6 –18 years	94 (51.4)	61 (33.3)	52 (28.4)		6.13 (6.01)
Total	183 (100)	103 (56.3)	80 (43.7)		

Children in the 3-5 year age group were found to have a mean dmft of 3.77 (3.56) and those older (6-18 years old) have a mean DMFT of 6.13 (6.01).

Table 9: Caries prevalence and education level of head of household (HHH)

Education level of HHH	n (%)	DMF or df >0	CF
		n (%)	n (%)
No schooling	46 (25.1)	25 (13.6)	21 (11.5)
Primary	45 (24.6)	21 (11.5)	24 (13.1)
Secondary	86 (47.0)	41 (22.4)	45 (24.6)
Tertiary	6 (3.3)	2 (1.1)	4 (2.2)

The table above shows that majority of head of household had secondary education (n=86, 47%). About the same percentage of HHH had no schooling (n=46, 25.1%) and primary school education (n=45, 24.6%) respectively. When caries experience and caries free proportion among different education level of HHH were considered, it does not show significant variation. The number of HHH with tertiary education is too small to enable significant comparison between children with caries experience and those with no caries.

Table 10: Caries prevalence and employment status of HHH

Employment status	Father	Mother	Guardian	DMF or df>0	CF
HHH	n (%)	n (%)	n (%)	n (%)	n (%)
Government employed	35 (19.1)	-	-	17 (9.3)	18 (9.8)
Privately employed	20 (10.9)	-	-	12 (6.6)	11 (6.0)
Self employed	125 (68.3)	-	-	58 (31.7)	64 (35.0)
Housewife/unemployed	-	2 (1.2)	1 (0.6)	3 (1.7)	-
Total	180 (98.3)	2 (1.2)	1 (0.6)	90 (49.2)	93 (50.8)

The above table illustrates that majority of cleft children in the study sample has self-employed fathers as head of household. Government and privately employed head of household does not clearly indicate sizable difference in caries prevalence and caries free status. Among children with self-employed father as head of household, slightly more (n=64, 35.0%) are caries free compared to those with caries (n=58, 31.7%). It was found that 1.7% (n=3) cleft children whose mother or guardian is unemployed head of household have caries compared to none at all being caries free.

Table 11: Plaque score and periodontal treatment need

	Male	Female	Plaque Score			CPITN 0	CPITN 1
	n (%)	n (%)	Good	Fair	Poor	n (%)	n (%)
			n (%)	n (%)	n (%)		
Subjects examined	69	61	57	73		130	
	(37.7)	(33.3)	(31.1)	(39.9)		(71)	
	34	19			53		53
	(18.6)	(10.4)			(29)		(29)
Total	103	80	57	73	53	130	53
	(56.3)	(43.7)	(31.1)	(39.9)	(29)	(71)	(29)

About 31.1% (n=57) of the cleft children were rated as having good and 39.9% (n=73) had fair oral hygiene with CPITN score 0 or does not require any periodontal treatment. About 29% (n=53) of the children were rated as having poor oral hygiene and CPITN score of 1 with more than one site of gingival inflammation requiring treatment.

Table 12: Education level HHH and periodontal treatment need of cleft patients

Education level of HHH		CPITN SCORE	
		0 (Healthy)	1 (Bleeding)
	n (%)	n (%)	n (%)
No schooling	46 (25.2)	23 (12.6)	23 (12.6)
Primary	45 (24.6)	25 (13.7)	20 (10.9)
Secondary	86 (47.0)	79 (43.2)	7 (3.8)
Tertiary	6 (3.2)	3 (1.6)	3 (1.6)
	183 (100)	130 (71.1)	53 (28.9)

The table above illustrates that 71.1% (130) or about two thirds of the cleft children in the study sample have healthy gingiva and 28.9% (53) or about a third of sample have bleeding gums requiring treatment. It is also shown that almost half of cleft children (n=91, 49.8%) whose head of household has lower education level (primary and no schooling) are affected by bleeding (n=43, 23.5%) and require treatment.

Seventy-nine or 43.3% of cleft children whose head of household have secondary education has healthy gums.

The number of children with CPITN score 0 and 1 was found to be the same among cleft children whose father had tertiary education

Table 13: Employment status HHH and periodontal treatment need of children

Employment status of HHH	n (%)	CPITN 0	CPITN 1
		n (%)	n (%)
Government employed	35 (19.1)	24 (13.1)	11 (6.0)
Privately employed	20 (10.9)	11 (6.0)	9 (4.9)
Self employed	125 (68.3)	93 (50.7)	32 (17.5)
Housewife/unemployed	3 (1.7)	2 (1.2)	1 (0.6)
Total	183 (100)	130 (71.0)	53 (29.0)

Most HHH of the study sample are self-employed (n=125, 68.3%) followed by government employed (n=35, 19.1%) and privately employed (n=20, 10.9%) and a small proportion of head of household are unemployed (n=3, 1.7%).

When the periodontal treatment need of cleft children was considered, it was found that about half (n=93, 50.7%) have CPITN 0 or not requiring treatment and head of household are self-employed.

More cleft children among government-employed head of household (n=24,13.1%) have CPITN 0 compared to those with CPITN 1 (n=11, 6%). The same also applies to cleft children whose head of household who are privately employed (CPITN 0=11, 6% and CPITN 1=9, 4.9%).

However the number of cleft children among unemployed head of household is too small to enable comparison.

Table 14: Toothbrushing habits of cleft children

	Male n (%)	Female n (%)	Frequency of toothbrushing	
			1-2X per day	Irregular
Subjects examined	51 (27.8)	75 (41.1)	126 (68.9)	
	19 (10.4)	38 (20.7)		57 (31.1)
Total	103 (56.3)	80 (43.7)		

When toothbrushing habits were explored, it was found that about two-third (n=126, 68.9%) of cleft children in the study sample brushed regularly once or twice per day whereas the other one-third (n=57, 31.1%) admitted brushing irregularly.

Table 15: Use of dental floss

	Male n (%)	Female n (%)	Frequency flossing		
			1-2X per day n (%)	Irregular n (%)	Not at all n (%)
Subjects examined	3 (1.7)	4 (2.2)	7 (3.8)		
	10 (5.5)	17 (9.3)		27 (14.8)	
	90 (49.1)	59 (32.2)			149 (81.4)
Total	103 (56.3)	80 (43.7)			

When flossing habits were further explored it was found that 81.4% (n=149) of children did not use dental floss to clean interproximal areas. About 14.8% (n=27) use the floss irregularly and a small percentage (n=7, 3.8%) claimed to have use dental floss once or twice per day.

Table 16: Use of toothpicks

	Male n (%)	Female n (%)	Frequency flossing		
			1-2X per day n (%)	Irregular n (%)	Not at all n (%)
Subjects examined	2 (1.1)	2 (1.1)	4 (2.2)		
	3 (1.6)	5 (2.8)		8 (4.4)	
	98 (53.6)	73 (39.8)			171 (93.4)
Total	103 (56.3)	80 (43.7)			

It was also found that 93.4% (n=171) did not use toothpicks to clean hard to reach areas. About 4.4% (n=8) claimed to have use toothpicks irregularly when foods get stuck in between teeth and a small proportion of children (n=4, 2.2%) claimed to have use it once or twice per day.

Table 17: Dental visits after cleft repair

	Male n (%)	Female n (%)	Frequency of dental visit		
			1X per year n (%)	2X per year n (%)	Only when in pain n (%)
Subjects examined	33 (18.0)	31 (16.9)	64 (34.9)		
	52 (28.4.)	46 (25.2)		98 (53.6)	
	18 (9.9)	3 (1.6)			21 (11.5)
Total	103 (56.3)	80 (43.7)			

When the regularity of dental visits after cleft repair were explored, it was found that 34.9% (n=64) went to the dental clinic once a year followed by 53.6% (n=98) visited the dental clinic twice a year and 11.5% (n=21) came to the dental clinic only when in pain.

7. Discussion

7.1 Cleft lip and palate register by CLAPAK

This study represents one of the many efforts taken by the local dental team to quantify dental caries and periodontal disease among cleft lip and palate patients in the North East region of Peninsula Malaysia. The development of the cleft lip and palate register in 1999 by the Cleft Lip and Palate Association of Kelantan (CLAPAK) has made this study possible. The register has enabled collection of data within 3-6 months. The response rate of participants in the study was 61% and this is considered acceptable. The findings from this study indicate that the cleft lip and palate register provide a relatively easy and effective way of data collection including basic demographic key characteristics such as age, gender, type of cleft, past medical and dental history and family background which are valuable in data analysis.

7.2 Study design and conduct

The study design, which involves both clinical examination and interview-administered questionnaires have enabled comprehensive data collection. The sampling technique employed has ensured randomization issues usually required by reviewers. The diagnostic criteria and recording instructions have been designed to adhere closely with the requirements of the Oral Health Surveys – Basic Methods (WHO, 1997) and the British Association of Community Dentistry (BASCD) with minor modifications made to suit local needs.

The conduct of the study was satisfactory whereby appointment letters were sent to addresses without telephone numbers to ensure participants have a fair chance of being included in the study. The ability to arrange conduct of study to be carried out at any nearby government dental clinic whenever patients cannot make it to the university dental

clinic is perhaps an encouraging factor for the rural participants. This is because the Kelantan state is among the least developed compared to other states on the west coast of Peninsula Malaysia and poverty rate is high. This arrangement is possible due to commitment of the higher authority of the dental school and campus director who have pledge to serve the community in any possible way. The efficiency of support staffs has played a significant role in making this study a reality. The preliminary preparation of the researcher and her team in obtaining details of the face-to-face interviews was done well ahead of data collection such as selection of staff speaking the local dialect and sufficient training in data entry of information into the required format. The use of a digital camera has enabled documentation of several complex features of craniofacial defects both for the purpose of teaching and research in the university.

7.3 Profile of study group

The sample of cleft children consists of more male (56.3%) than female (43.7%). This is similarly seen in Southern Thailand (Ritthagol et al., 2002), United States (Edmondson & Reinhartsen, 1998), Shanghai (Cooper et al., 2000) and Russia (Turner et al., 1998). These children were grouped into three categories according to age (Table 2). About 49% of children were aged 3-5 years followed by about the same proportion being 6-12 years and 13-18 years respectively (26.2% and 25.1%). Most participants are Malays as this ethnic group predominates in the northeastern part of the peninsula.

7.4 Maternal and paternal age

From the data in table 3, it was found that 22.4% (n=41) of fathers or commonly referred to as head of household in the Malay culture were aged between 35-39 years when their cleft child is born whereas about 18.6% (n=34) and 17.5% (n=32) of fathers were aged

25-29 years and 30-34 years respectively. There are no available data to compare paternal age among cleft children. About 20.8% (n=38) mothers in the sample fall were aged 25-29 years when their cleft child was born whereas 16.9% (n=31) and 16.4% (n=30) of mothers fall into the 30-34 years and 20-24 years respectively. Therefore in this sample, although at a glance more mothers were aged 25-29 years (n=38, 20.8%), the number of mothers aged 20-24 years (n=30) and mothers aged 30-34 years (n=31) were very close to reveal any significant difference in age group. Therefore this finding is not conclusive to support the view that older mothers are less likely to give birth to cleft children than their young counterparts (West Virginia, 2002). It is also perhaps important to highlight that the West Virginia study only compared mothers older than 35 years and those aged 20-24 years not taking into account the number of mothers aged 25-29 years and 30-34 years.

7.5 Education level of parents

Table 4 illustrates the education level of parents of the cleft child. It was found that most fathers (n=102, 55.2%) and mothers (n=117, 63.9%) had primary education. About 40.4% (n=74) of fathers and 19.7% (n=36) of mothers had secondary education and about 1% of mothers and fathers had tertiary education. The data collected in this study seemed to reflect that as education level of mothers and fathers increases, the prevalence of cleft children is reduced. At a glance this might appear so but it must be cautioned that the sample size is too small to enable such conclusion. The findings from the West Virginia study also revealed that the prevalence of cleft lip and/or palate defects declines as the education levels of mothers increase (West Virginia, 2002).

7.6 Employment status of parents

In the Malay culture and most eastern cultures, the father represents the head of the household. When employment status of fathers was enquired, it was found that about 68.3% (n=125) of fathers were self-employed, 19.1% (n=35) were government employed and 10.9% (n=20) were privately employed (Table 5). Most fathers in this sample were self-employed. However it was not possible to relate employment with economic status due to incomplete data. Many parents are reluctant to fill the amount of monthly income in the registration form. Most mothers (n=79, 43.2%) were self-employed followed by about the same proportion being government employed (n=28, 15.3%) and privately employed (n=26, 14.2%) respectively. Therefore the above data does not show any trend of employment status in relation with economic status of parents affecting the prevalence of cleft children.

7.7 Type of cleft

It was found that the proportion of males with cleft lip and/or palate (CL+CP) is slightly higher (n=103) than females (n=80) in this sample giving a ratio of 1.29:1. However when cleft lip and cleft palate alone (CL+CP) is considered, the prevalence is still more in males (n=73) compared to females (n=54) with a ratio of 1.35:1. This finding is also seen among Caucasians, Native American and African American (Edmondson & Reinhartsen, 1998), among Latin American countries (Menegotto and Salzano, 1991) and Southern Thailand (Ritthagol, 2001).

When cleft lip alone (CL) is considered, slightly more males (n=30) than females (n=26) are affected with a ratio of 1.15:1. This is also consistent with the findings of Rotthagol in Southern Thailand.

When the type of CL is explored, it was found that more males have unilateral cleft lip with or without CP (U-CL±CP) with a ratio of 1.38:1 compared to bilateral cleft lip with or without CP (B-CL±CP) with a ratio of 1.08:1.

When clefting subgroups are considered, more males have U-CL+CP with a ratio of 1.9:1 but the ratio is reversed for B-CL+CP whereby more females are affected compared to males with a ratio of 0.67:1. When cleft lip alone (CL) is considered, more females have bilateral cleft lip (B-CL) compared to males with a ratio of 0.57: 1 and more males have unilateral cleft lip (U-CL) with a ratio of 1.37:1.

The above study does not show the prevalence of cleft palate alone because CP alone is considered embryologically distinct from CL±CP. Several studies such as United States (Edmondson & Reinhartsen, 1998) and Latin America revealed more females appear to have CP only.

7.8 Dental caries status of cleft children

The prevalence of dental diseases in cleft children has been reported by several groups of authors. Cleft children are at a significant risk for caries of primary incisors (Johnsen and Dickson, 1984). In the above study, it was found that 50.8% of participants were caries free (CF) and 49.2% of the study sample had experienced caries (Table 7). When age of participants was probed (Table 8), it was found that those aged 3-5 years had a mean dft value of 3.77 (SD=3.56). This figure is considered high when compared to a study done among cleft Dutch children aged 2.5 years revealed prevalence 26.3% with dft 0.59 (SD=1.35) (Bokhout et al., 1996). These figures are higher compared to normal children in Malaysia and most other countries (NOHSS Malaysia, 1997; Child Dental Health Survey UK, 1993) In another study, which compared mean dental caries among children with CLP and normal children found no significant difference (Lucas et al., 2000).

Further exploration of the decay, missing and filled elements of both sample of cases and control revealed that there were greater number of filled surfaces among control or non-cleft children. The authors concluded that this could be due to their families being more concerned with other aspects of care (such as surgery and speech development so that dental restorative care is not a priority unless the child has discomfort). Other investigators have found that there are an increased risk and prevalence of dental caries in cleft children (Johnsen and Dixon, 1984; Dahllof et al., 1989; Bokhout et al., 1997).

Older participants aged 6-18 years in this sample had mean DMFT of 6.13 (SD=6.01). However our data supports the finding of another study carried out in the UK among CLP children aged 3-18 years whereby the percentage of CF was 53.5% compared to 50.8% in the above study sample. The percentage of active caries in that particular UK study was 20%, which is lower than our value of 49.2% (Paul and Brandt, 1998). This means that a higher proportion of cleft children in this study sample have active caries compared to cleft children in the UK sample. It was also found that there were more decayed interproximal surfaces of Swedish 5-6-year-olds with CL±CP when compared with normal children.

7.9 Caries prevalence and education level of head of household (HHH)

When caries prevalence was related to education level of head of household, it was found that, among CF children, most head of household had secondary education (n=45, 24.6%) followed by primary education (n=24, 13.1%) and no formal education (n=21, 11.5%). Among children who have caries (DMF or df>0), it was found that 22.4% (n=41) of HHH had secondary education. About 11.5% of HHH (n=21) had primary education and 13.6% (n=25) HHH had no formal education. Comparing cleft children from groups with caries and group with no caries, it was found that the trend of education level of HHH was quite

similar with minor differences in number and percentage. The number of cleft children whose HHH had had tertiary education was too small to detect any possible trend. Due to these minor differences and small number, it is not possible to conclude that education level of HHH has any influence on caries prevalence of the cleft child.

7.10 Caries prevalence and employment status of head of household

Employment status of HHH, which is often referred as “bread winner” of the family may to a certain extent reflect economic status. Table 10 illustrates the percentage of children with and without caries and relates it to the employment status of HHH. It is seen that most fathers are employed or have a job. They were employed either in the government sector, private sector or self-employed. In both groups of children, the percentage of HHH as to type of employment does not differ significantly to enable comparison.

7.11 Plaque score and Community Periodontal Treatment Need (CPITN)

Table 11 illustrates plaque score grades of cleft children in relation with periodontal treatment need (CPITN). About 31.1% (n=57) of cleft children in this sample had good oral hygiene compared to 39.9% (n=73) who had fair oral hygiene. This indicates that about 71% (n=130) does not require periodontal treatment. This figure reflects that the periodontal condition among these children is acceptable. However 29% (n=53) of cleft children in this sample have poor plaque scores indicating CPITN 1, therefore require scaling and prophylaxis as well as appropriate oral hygiene instructions. However results from other studies vary widely. Lucas et al. (2000) compared plaque scores among unilateral and bilateral cleft children and found no difference in plaque score and gingivitis among cleft children in their study sample.

7.12 Education level of HHH and Community Periodontal Treatment Need (CPITN)

Table 12 attempts to illustrate the relationship of education level of HHH and the periodontal treatment need of the cleft children in the above study. It can be seen that as education level increases from no formal education to primary and secondary level of education, more children have healthy gums or gingival. It is also obvious that as education level of HHH increases, there are less children having bleeding gums with CPITN score of 1. However the number of cleft children with HHH having tertiary education was similar for both groups and the number is too small to enable deduction. The result of the above study indicates that the education level of HHH may play a role in determining the gingival health of cleft patients. It is possible that as education level of fathers increase and fathers are often seen as HHH who may have some control at home, may influence oral habits of their cleft children such as regular tooth cleaning, thus preventing plaque accumulation which often lead to gum problems. So far there are no available data from other studies to enable comparison.

7.13 Employment status of HHH and Community Periodontal Treatment Need (CPITN)

When employment status of HHH and CPITN score were considered (Table 13), it is clearly shown that most HHH are employed or have a job. There seem to be no particular trend observed. Employment status most often reflects socio-economic status of the family. Assessing the periodontal treatment need using the CPITN index is determined by professionals. Since periodontal disease or gum problems in the initial stage are not painful, many people seem to think that there is nothing wrong with their gums. More often than not, this may be where by the way for gingival condition is not totally dependent

7.14 Toothbrushing habits of cleft children

When oral hygiene habits were further explored, it was found that 68.9% (n=126) claimed of brushing their teeth once or twice daily compared to 31.1% (n=57) who brushed irregularly (Table 14). However these are reported responses, which may not reflect true oral hygiene habits. Although a higher percentage of study participants claimed of regular brushing, the efficiency of cleaning may vary between individuals of varying age. Older children may have better dexterity compared to younger ones. Usually children aged five years and above can brush their teeth adequately provided they get to learn the techniques of efficient brushing or tooth cleaning effectively (Osagawara, 1992). Therefore it is reasonable to remember that reported frequency does not necessarily coincide with effective cleaning. The frequency of toothbrushing is also affected by gender and socio-economic status. More females tend to brush more frequently compared to males (Sheiham, 1970). He also found the frequency of brushing increases with socio-economic status.

7.15 Reported use of dental floss among cleft children

Table 15 illustrates that only 3.8% (n=7) floss their teeth 1-2 times daily. About 14.8% (n=27) claimed to have use the floss irregularly while 81.4% (n=149) did not use the floss at all to clean interproximal areas that cannot be cleaned by the toothbrush. It is possible that those who use dental floss were older children who are regular attenders compared to the younger individuals. It is a well-known fact that the art of flossing requires a certain dexterity of the fingers and obviously younger children may not be able to carry out dental flossing.

7.16 The reported use of toothpicks among cleft children

Table 16 shows that about 2.2% (n=4) of cleft children use toothpicks once or twice daily and 4.4% (n=8) use them irregularly while 93.4% (n=171) did not use toothpick at all to remove food particles that are stuck in between their teeth. The use of toothpick is not a common adjunct to toothbrushing because improper use can lead to harmful effects to the gums. The use of toothpick is more appropriate for older individuals who have developed good hand dexterity and understand the basic anatomy of the gingiva.

7.17 Dental visits after cleft repair

Regular dental visits have been identified as an important step in establishing positive oral habits (Dept of Health UK, 1996). It was recommended that every individual visit the dentist at least once a year. When dental visits after cleft repair were further explored, it was found that 34.9% (n=64) claimed to have visited the dentist once a year while 53.6% (n=98) said that they visited the dentist twice a year. These figures are quite convincing which indicates that these children are getting the appropriate dental care by the dental team. However about 11.5% (n=21) of the participants reported that they only visited the dentist when they have pain. These individuals will need more reinforcement about the importance of regular dental visits to maintain optimal dental health.

8. Principal findings

- The cleft lip and palate register of Kelantan provide a relatively easy and effective way of data collection including basic demographic key characteristics such as age, gender, type of cleft, past medical and dental history and family background which are valuable in data analysis.

- The findings of the above study is not conclusive to support the view that older mothers are less likely to give birth to cleft children than younger mothers.
- The data collected seemed to reflect that as education level of mothers and fathers increases, the prevalence of cleft children is reduced. At a glance this might appear so but it must be cautioned that the sample size is insufficient to enable such conclusion.
- The data does not show any trend of employment status in relation with economic status of parents affecting the prevalence of cleft children.
- The proportion of males with CL+CP is slightly higher than females in this sample giving a ratio of 1.29:1.
- The prevalence of CL+CP is higher in males compared to females with a ratio of 1.35:1.
- Slightly more males than females are affected with cleft lip (CL) alone giving a ratio of 1.15:1.
- When the type of CL is explored, it was found that more males have U-CL+CP with a ratio of 1.38:1 compared to B-CL+CP with a ratio of 1.08:1.
- When clefting subgroups are considered, more males have U-CL+CP with a ratio of 1.9:1 but the ratio is reversed for B-CL+CP whereby more females are affected compared to males with a ratio of 0.67:1. When cleft lip alone (CL) is considered, more females have bilateral cleft lip (B-CL) compared to males with a ratio of 0.57: 1 and more males have unilateral cleft lip (U-CL) with a ratio of 1.37:1.
- The above study does not show the prevalence of cleft palate alone because CP alone is considered embryologically distinct from CL+CP.
- About 50.8% of participants were caries free (CF) and 49.2% of the study sample had experienced caries. When age of participants was probed, it was found that

those aged 3-5 years had a mean dft value of 3.77 (SD=3.56). Older participants aged 6-18 years in this sample had mean DMFT of 6.13 (SD=6.01).

- Comparing cleft children from groups with caries and group with no caries, it was found that the trend of education level of HHH was quite similar with minor differences in number and percentage. Due to these minor differences and small number, it is not possible to conclude that education level of HHH has any influence on caries prevalence of the cleft child.
- In both groups of cleft children with and without caries, the percentage of HHH as to type of employment does not differ significantly to enable comparison
- About 71% of cleft children in this sample had fair to good or acceptable oral hygiene, thereby do not require periodontal treatment. However 29% of cleft children in this sample have poor plaque scores indicating CPITN 1, therefore require scaling and prophylaxis as well as appropriate oral hygiene instructions to maintain optimal oral health.
- The results obtained indicate that education level of HHH may play a role in determining the gingival health of cleft patients. It is possible that as education level of fathers increase, and fathers are often seen as HHH who may have some control at home, may influence oral habits of their cleft children such as regular tooth cleaning, thus preventing plaque accumulation which may lead to gum problems.
- When employment status of HHH and CPITN scores is considered, there seem to be no particular trend observed among the study sample.
- Although a higher percentage (68.9%) of study participants claimed of regular brushing, the efficiency of cleaning may vary between individuals of varying age.

Older children may have better dexterity compared to younger ones. Therefore reported frequency does not necessarily coincide with effective cleaning.

- Majority of study subjects (81.4%) did not use the floss at all to clean interproximal areas that cannot be cleaned by the toothbrush
- Majority of patients (93.4%) did not use toothpick at all to remove food particles that are stuck in between their teeth.
- 34.9% of participants claimed to have visited the dentist once a year while 53.6% said that they visited the dentist twice a year. However 11.5% of the participants reported that they only visited the dentist when they have pain. These individuals will need more reinforcement about the importance of regular dental visits to maintain optimal dental health.

9. Limitation of study

- The above study is cross-sectional in nature, thus does not allow causal inferences because the exposures and the outcomes were measured simultaneously.
- In this study the age of cleft repair were not taken into account. It was assumed that all subjects selected from the sampling frame had undergone repair.
- The local national data of caries prevalence was done using index ages of 6-, 12- and 16-years. The national data for periodontal disease has also chosen the index age of 12- and 16-years. The findings of the above study cannot be compared with national data due to small number of patients available for the chosen index age. However these values are comparable to other studies done on small groups of patients in other countries.
- Reported oral hygiene habits may not necessarily reflect true habits, therefore may need to be interpreted with caution.

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