3) **Abstrak untuk penyelidikan anda**

(Perlu disediakan di antara 100 – 200 perkataan di dalam **Bahasa Malaysia dan Bahasa Inggeris**. Ini kemudiannya akan dimuatkan ke dalam Laporan Tahunan Bahagian Penyelidikan & Inovasi sebagai satu cara untuk menyampaikan dapatan projek tuan/puan kepada pihak Universiti & luar).

Abstract of Research

(Must be prepared in 100 – 200 words in Bahasa Malaysia as well as in English. This abstract will later be included in the Annual Report of the Research and Innovation Section as a means of presenting the project findings of the researcher/s to the university and the outside community)

Abstrak Bahasa Malaysia

Latarbelakang Kajian terkini telah mencadangkan jangkitan periodontium ibu semasa hamil sebagai faktor risiko bagi bayi kurang berat semasa lahir. Objektif kajian ini adalah untuk menentukan perkaitan di antara periodontitis ibu dan LBW dalam kalangan wanita Melayu di Kota Bharu, Kelantan.

Kaedah Pemeriksaan saringan tisu periodontium dijalankan ke atas semua wanita hamil yang telah menepati kelayakan penyertaan dan pengecualian kajian di dua buah Klinik Kesihatan Ibu dan Anak yang dipilih secara rawak. Kaedah persampelan rawak bersistem digunakan untuk memilih 250 subjek bagi setiap kumpulan kajian. Daripada 500 wanita yang didaftarkan di dalam kajian, 28 orang (5.6%) telah digugurkan daripada analisa atas pelbagai sebab. Daripada baki subjek, 240 mempunyai tisu periodontium yang sihat, manakala lebihan 232 mempunyai periodontitis.

Keputusan Insidens kurang berat semasa lahir adalah 14.2% (95% CI: 9.7-18.8) dalam kalangan wanita yang mempunyai periodontitis, dan 3.3% (95% CI: 1.1-5.6) dalam kalangan wanita tanpa periodontitis. Risiko relatif untuk mendapat bayi yang kurang berat semasa lahir dalam kalangan ibu yang mempunyai periodontitis ialah 4.27 kali lebih tinggi berbanding dengan mereka yang tiada periodontitis (RR=4.27, 95% CI: 2.01-9.04). Setelah mengawal lain-lain faktor ibu yang bererti, periodontitis masih mempunyai perkaitan bererti dengan kurang berat semasa lahir (OR=3.84, 95% CI: 1.34-11.05).

Kesimpulan Hasil keputusan kajian ini menyumbang kepada bukti sedia ada bahawa wanita hamil yang mempunyai periodontitis mempunyai risiko lebih tinggi yang bererti untuk melahirkan bayi kurang berat semasa lahir.

English Abstract

Background Maternal periodontitis has been suggested as one of the risk factors for low birth weight (LBW) infants. The objective of this study was to determine the association between maternal periodontitis and LBW among Malay women in Kota Bharu, Kelantan.

Methods Screening periodontal examinations were done on all eligible Malay pregnant women attending two randomly selected community maternal and child health clinics in Kota Bharu, Kelantan during the study period. Systematic random sampling was utilized for selection of 250 subjects for each exposed and non-exposed group. Of 500 subjects enrolled in the study, 28 (5.6%) were either dropped or lost to follow-up. Of the remaining 472 subjects, 232 with periodontitis were in the exposed group and 240 with healthy periodontium were in the non-exposed group.

Results The incidence of LBW was 14.2% (95% CI, 9.70-18.75) in women with periodontitis, and 3.3% (95% CI, 1.05-5.62) in women without periodontitis. The relative risk (RR) of having LBW infants was 4.27 times higher for women with periodontitis compared with those without periodontitis (95% CI, 2.01-9.04). After adjustment for potential confounders using multiple logistic regression analysis, significant association was found between maternal periodontitis and LBW (OR=3.84; 95% CI, 1.34-11.05).

Conclusion The results of this study provide additional evidence that pregnant women with periodontitis are at a significantly higher odds of delivering LBW infants.

4) Sila sediakan laporan teknikal lengkap yang menerangkan keseluruhan projek ini. [Sila gunakan kertas berasingan]
Kindly prepare a comprehensive technical report explaining the project (Prepare report separately as attachment)

As attached.

Senaraikan Kata Kunci yang boleh menggambarkan penyelidikan anda :
List a glosssary that explains or reflects your research:

Bahasa Malaysia	Bahasa Inggeris
periodontitis	periodontitis
bayi kurang berat semasa lahir	low birth weight
hamil	pregnant
Melayu	Malay

5) **Output Dan Faedah Projek**
Output and Benefits of Project

(a) * Penerbitan *(termasuk laporan/kertas seminar)*
Publications (including reports/seminar papers)
(Sila nyatakan jenis, tajuk, pengarang, tahun terbitan dan di mana telah diterbit/dibentangkan).
(Kindly state each type, title, author/editor, publication year and journal/s containing publication)

* Sila berikan salinan
* *Kindly provide copies*

Presentation of study outcomes:

Date	*Particular*	*Venue*	*Status*
25-28 August 2004	5th Ministry of Health Malaysia- Academy of Medicine Malaysia Scientific Meeting 2004	Sunway Lagoon Resort Hotel, Subang Jaya	Presenter
21-22 Sept 2004	11th National Public Health Colloquium	The Summit Hotel, Subang Jaya	Presenter
25-27 February 2005	3rd Safe Motherhood Congress 2005	Crown Princess Hotel, Kuala Lumpur	Paper presented by co-researcher
15-17 Mac 2005	4th National Public Health Conference 2005	Marriott Hotel, Putrajaya	Presenter
25-29 May 2005	27th Asia Pacific Dental Congress	Kuala Lumpur	Presenter

Abstracts in proceedings of meetings:

Publication	*Title*
The Medical Journal of Malaysia, Vol. 59, (Supplement D), August 2004, p. 121	Higher risk of low birth weight infants in women with periodontitis
Malaysian Journal of Public Health Medicine, Vol. 4 (Supplement 1), 2004, p. 37	Higher risk of low birth weight infants in women with periodontitis
Malaysian Journal of Public Health Medicine, Vol. 5 (Supplement 1), 2005, p. 41	Association between maternal periodontitis and low birth weight infants among Malay women in Kota Bharu, Kelantan.
Malaysia Journal of Public Health Medicine, Vol. 5 (Supplement 1), 2005, p. 41	Distribution of low birth weight determinants among pregnant women in Kota Bharu, Kelantan.

Reports:

Type	*Title*
Dissertation report - Submitted in partial fulfillment of the requirement for the degree of Master of Community Medicine (Oral Health), USM, 2005	A study of association between maternal periodontitis and low birth weight infants among Malay women in Kota Bharu, Kelantan

Publication of study outcomes:

Journal	*Title*
Jurnal Kesihatan Masyarakat Isu Khas 2004, pg 10-12	Higher incidence of low birth weight infants among Malay women with periodontitis in Kota Bharu, Kelantan

Manuscripts being reviewed for publication:

Journal	*Title*	*Status*
Community Dentistry and Oral Epidemiology	The association between maternal periodontitis and low birth weight infants among Malay women in the East Coast of Malaysia	First revision done - Awaiting reviewer scores

(b) **Faedah-Faedah Lain Seperti Perkembangan Produk, Prospek Komersialisasi Dan Pendaftaran Paten atau impak kepada dasar dan masyakarat.**
Other benefits such as product development, product commercialisation/patent registration or impact on source and society

It is hoped that this study would stimulate and motivate further research that explores the role of oral diseases in human health. Ultimately, it should help to establish the groundwork for better communication between the medical and dental colleagues to improve the quality of antenatal health care in Malaysia.

(c) **Latihan Gunatenaga Manusia**
Training in Human Resources

i) Pelajar Siswazah :
Postgraduate students:
(perincikan nama, ijazah dan status)
(Provide names, degrees and status)

Not applicable

ii) Pelajar Prasiswazah :
Undergraduate students:
(Nyatakan bilangan)
(Provide number)

Not applicable

iii) Lain-Lain :
Others:

Not applicable

Introduction

Low birth weight (LBW), which is defined by the World Health Organization as a birth weight of less than 2500gm,[1] is a well-documented risk factor for neonatal and infant morbidity, as well as mortality. More than 20 million LBW infants are born each year, affecting 16.8% of all newborns in developing countries, and contribute to 75% or more of neonatal and infant deaths.[1] In Malaysia, LBW incidence is estimated at 10%[2] and contributed to 66.2% of 6,038 perinatal death cases in 1999.[3]

LBW is an outcome of either a short gestational period leading to preterm birth, or a retarded intrauterine growth or a combination of both. The complex and multifactorial causes of LBW, comprising of a variety of factors that may have impacts on either of the events, have been the focus of a vast number of investigations over the last few decades. Nevertheless, a significant proportion of LBW is still of unknown aetiology that occur without even a suspected risk factor. Thus, despite significant advances in perinatal medicine and better understanding of reproductive physiology over the past 25 years, the global incidence of LBW remains high.[4]

The association between infections of the uterine, genital and urinary systems and the risks of preterm LBW (PLBW) deliveries has been demonstrated by a considerable number of studies.[5-7] However, it was noted that a consistent and reproducible feature of LBW cases, which is an increased level of maternal inflammatory mediators and cytokines such as prostaglandin E_2 (PGE_2) and tumour necrosis factor alpha (TNF-α), may occur even in the absence of infections of the amniotic cavity or the genitourinary tract.[8] This has led to a conclusion that PLBW cases are probably caused by extra-uterine infections of unknown origin.

The theory that periodontal infection might contribute to LBW was first tested by Collins *et al.*[9] who demonstrated significant dose-response relationship between levels of both PGE_2 and TNF-α and embryo lethality and foetal growth retardation in pregnant hamsters challenged with periodontal pathogen, *P.gingivalis*, inoculated within subcutaneously implanted tissue chamber. These observations prompted Offenbacher *et al.*[10] to investigate the possible link between periodontitis and PLBW in human. Multiple logistic regression models detected a significant, strong association between periodontal disease and PLBW (OR=7.5, 95% CI: 6.27-9.58). Further study indicated that PGE_2 levels in gingival crevicular fluid (GCF) were significantly higher in mothers of PLBW infants than in mothers of infants with NBW.[11] They hypothesized that periodontal infections, which serve as reservoirs for gram-negative anaerobic organisms and its products, as well as inflammatory mediators like PGE_2 and TNF-α may pose a potential threat to the foetal-placental unit. Their study was a milestone in this new, very important field of periodontal medicine, and it was further supported by numerous epidemiological data, experimental animal studies, and documentation of maternal and foetal responses to periodontal bacteria.[9-17]

This prospective cohort study aimed to determine the association between maternal periodontitis and LBW among Malay women in Kota Bharu, Kelantan. Findings of this study would undoubtedly provide additional facts on the health and well-being of pregnant women and infants in this country and thus contribute to a much better knowledge and understanding of LBW than we have at present.

Methods

Population and Sample

The study population consisted of Malay pregnant women who received antenatal health care from two randomly selected maternal and child health clinics in Kota Bharu, Kelantan between December, 2003, and June, 2004. Screening periodontal examinations were performed on all pregnant women attending the selected clinics during the study period to determine their exposure status. The inclusion criteria for screening were all women in the second trimester of pregnancy (14 to 27 weeks' gestation), while exclusion criteria were women with potential confounders such as active smoking or diabetes. Women with known risk factors for LBW such as alcohol consumption during pregnancy, suffering from chronic hypertension, and having multiple foetuses as confirmed by ultrasound examinations were also excluded. Women with history of periodontal treatment during the current pregnancy, or had fewer than 20 teeth and those who were taking antibiotics for any reason at any time during the pregnancy were excluded as these might lead to misclassification of exposure status. For safety reason, women who require prophylactic antibiotics for any periodontal procedures were also excluded from being screened for the study.

Of all eligible women screened during the study period, 476 women were diagnosed as having periodontitis while another 698 were not. Systematic random sampling was applied for selection of study subjects to get the prior determined sample size of 500 subjects, 250 for each exposed and non-exposed group. Thus, exposed group comprised of pregnant women with periodontitis while non-exposed group comprised of those without periodontitis.

Measurement of Maternal Periodontitis and Criteria of Diagnosis

All clinical periodontal examinations in this study were performed by the main researcher using standardised clinical equipments and instruments. Subjects were examined while seated on a mobile dental chair under good lighting using a mouth mirror and a periodontal probe. The Hu-Friedy CP 11.5B periodontal probe by Hu-Friedy Manufacturing Company, Inc., Chicago was used to determine the following variables: clinical attachment loss (CAL) in millimetre (mm), pocket depth (PD) in millimetre (mm), and presence of gingival bleeding on probing (BOP). CAL and PD were assessed at 6 sites (mesial, mid and distal surfaces on both palatal/lingual and buccal sides) on each tooth present (excluding the wisdom teeth), while BOP was assessed on 4 sites (mesial and distal surfaces on both palatal/lingual and buccal sides) of the respective tooth. The presence of 4 or more sites with PD 4mm or higher, and CAL 3mm or higher at the same site with presence of BOP were diagnosed as periodontitis in this study.

Periodontal examinations were repeated at 2 to 4 weeks interval during the follow-up period to assure their exposure status. Subjects in the non-exposed group who developed periodontitis, and those in the exposed group who showed significant worsening of their periodontal conditions, were dropped from the study and referred for treatment accordingly. In addition, antenatal health records of all subjects were reviewed for any risk of developing medical illnesses associated with pregnancy that might influence the outcomes such as genito-urinary tract infection, poorly controlled gestational diabetes, or hypertension. Otherwise, subjects remained in study and were followed till parturition. All subjects in the exposed group were referred for the necessary periodontal therapy after delivery.

Recording of Maternal Characteristics

Other risk factors for LBW such as past and present obstetric profile were obtained from the subjects' antenatal health records. Results of anthropometric measurements, clinical and laboratory examinations and diagnoses as recorded by the attending nurses or medical physicians were noted.

Subject interviews were utilized to gain information on passive exposure to cigarette smoke as well as socio-economic background. Passive smoking was defined as being exposed to someone else's cigarette smoke for at least two hours per day at home, at work, in vehicles or indoor public places any time during pregnancy. Socio-economic characteristics of the subjects were measured by three indicators commonly used in social studies, namely education, occupation, and income.[18] Occupations of the subjects were categorized on the basis of the degree of skills (manual and non-manual) involved. All interviews were conducted by the main researcher.

Recording of Pregnancy Outcomes

The main outcome of interest in this study was infant birth weight, categorized into normal birth weight (NBW), or LBW. The definition of LBW in this study was as defined by the World Health Organization which is a birth weight of less than 2500gm regardless of duration of pregnancy.[1] The degree of severity of LBW was determined based on descriptions by Mayfield *et al.*[19], moderately LBW (MLBW; birth weight 1501 to 2499gm), very low birth weight (VLBW; birth weight 1001 to 1500gm) or extremely low birth weight (ELBW; birth weight 1000gm or less). Gestational week of delivery was also noted. Estimation of gestational age was based on either the date of last menstrual period or ultrasound examinations by the medical physician at the respective health centre during antenatal check-ups.

Statistical Analysis

Data entries and analyses of results were done using the Intercooled Stata (version 7.0, StataCorp, Texas), SPSS for Windows (version 11.0, SPSS Inc., Chicago), and Epi Info (version 6.0, CDC, Atlanta) statistical software packages. To begin with, descriptive statistics were determined for both exposed and non-exposed groups, including differences in distribution of variables between the two groups. Independent *t*-tests and chi-square tests were used to compare continuous and categorical variables respectively. The level of significance was set at 0.05.

Later, univariate and multivariate logistic regression analyses were done to determine the association between LBW and maternal periodontitis, as well as other variables of interest. Crude and adjusted odds ratio (OR) of the association were calculated at 95% Confidence Interval (CI). The likelihood-ratio (LR) chi-square and *p*-value of the association were also obtained in order to make inferences to the study population.

Results

Maternal Profile: Descriptive Analysis

Of 500 subjects enrolled in the study, 28 (5.6%) were either lost to follow-up or excluded. The reason for exclusion was mainly due to poorly controlled medical problems as diagnosed by the attending medical physician such as gestational diabetes and risk for pre-eclampsia. Of the remaining 472 subjects, 240 were in the non-exposed group and 232 were in the exposed group.

Socio-demographic profile of the subjects is shown in table 1. The age of the subjects ranges from 14 to 46 years old. The mean age of the subjects in the exposed and non-exposed groups was not significantly different. The non-exposed however, consisted more of those with higher education level, better occupation standing, and higher household income. The differences were significant.

Table 1 Socio-demographic profile of 232 exposed and 240 non-exposed subjects

Socio-demographic profile	Periodontal disease status		χ^2 statistics (df)	*p* value
	Exposed Frequency (%)	Non-exposed Frequency (%)		
Age (years)	29.32 (6.79)[a]	28.90 (6.28)[a]	0.697(470)[b]	0.486
Education level				
Tertiary/postsecondary education	46 (19.8)	77 (32.1)	13.85 (2)	0.001
Secondary education	147 (63.4)	143 (59.6)		
Primary education	39 (16.8)	20 (8.3)		
Occupation				
Unemployed/housewife	160 (69.0)	131 (54.6)	14.37 (3)	0.002
Non/semiskilled worker	51 (22.0)	61 (25.4)		
Skilled worker	12 (5.2)	30 (12.5)		
Highly skilled worker	9 (3.8)	18 (7.5)		
Monthly household income (RM)	800.00(800.00)[c]	1200.00(1398.75)[c]	5.601(470)[b]	<0.001

[a] Mean (SD)
[b] t-statistics (df)
[c] Median (IQR)

Table 2 shows the comparison of the distribution of obstetric profile in the exposed and non-exposed groups. It was noted that the exposed group had significantly lower mean rate of weight gain (kg/week) during the second trimester, shorter duration of pregnancy, and there were more of them with past history of LBW.

Table 2 Obstetric profile of 232 exposed and 240 non-exposed subjects

Obstetric profile	Periodontal disease status		χ^2 statistics (df)	*p* value
	Exposed Frequency (%)	Non-exposed Frequency (%)		
Parity status				
Primiparity	60 (25.8)	67 (27.9)	2.08 (2)	0.353
Multiparity	131 (56.5)	142 (59.2)		
Grand/Great grandmultiparity	41 (17.7)	31 (12.9)		
Onset of care (gestational weeks)				
First trimester (< 14 weeks)	64 (27.6)	70 (29.2)	0.78 (2)	0.676
Early 2nd trimester (14-20 weeks)	127 (54.7)	122 (50.8)		
Late 2nd trimester (> 20 weeks)	41 (17.7)	48 (20.0)		
No. of antenatal visits				
< 8 visits	44 (19.0)	37 (15.4)	1.05 (1)	0.307
≥ 8 visits	188 (81.0)	203 (84.6)		
Gestational duration at delivery (weeks)	38.70 (1.39)[a]	39.05 (0.99)[a]	3.14 (470)[b]	0.002
Haemoglobin level (g/dL)				
≤ 10.5 g/dL	31 (13.4)	24 (10.0)	1.30 (1)	0.255
> 10.5 g/dL	201 (86.6)	216 (90.0)		
Rate of weight gain during 2nd trimester (kg/week)	0.41 (0.19)[a]	0.50 (0.20)[a]	4.70 (470)[b]	<0.001
Rate of weight gain during 3rd trimester (kg/week)	0.38 (0.23)[a]	0.38 (0.17)[a]	0.67 (470)[b]	0.946
History of PTB	221 (95.3)	230 (95.8)	0.09 (1)	0.762
No	11 (4.7)	10 (4.2)		
Yes				
History of abortion	194 (83.6)	207 (86.2)	0.64 (1)	0.424
No	38 (16.4)	33 (13.8)		
Yes				
History of LBW	185 (79.7)	219 (91.2)	12.67 (1)	<0.001
No	47 (20.3)	21 (8.8)		
Yes				
Passive smoking exposure	91 (39.2)	100 (41.7)	0.29 (1)	0.589
No	141 (60.8)	140 (58.3)		
Yes				

[a] Mean (SD)
[b] t-statistics (df)

Incidence of LBW

The total incidence of LBW in this study was 8.7%. Of these, 14.2% (95% CI: 9.7-18.8) occurred among subjects with periodontitis compared with only 3.3% (95% CI: 1.1-5.6) that occurred among those without periodontitis (Table 3). The relative risk (RR) of LBW infants in subjects with periodontitis was 4.27 times higher than in those without periodontitis,

indicating a positive association (RR=4.27, 95% CI: 2.01-9.04). The proportion of risk for LBW attributable to periodontitis in the group of exposed subjects was 76.6% (95% CI: 50.3-88.9).

Table 3 Incidence of LBW in 232 exposed and 240 non-exposed subjects

Periodontal disease status	n	LBW Frequency (%)	95% CI
Exposed	232	33 (14.2)	9.7 – 18.8
Non-exposed	240	8 (3.3)	1.1 – 5.6

Of 41 LBW deliveries, 39 infants were MLBW, while the other 2 infants were VLBW that required admission to the Neonatal Intensive Care Unit in Kota Bharu Hospital due to post-natal complications. Both cases of VLBW were delivered by mothers exposed to periodontitis. It was also noted that of all births, 19 (4%) were delivered prematurely and of these, 18 (94.7%) were also LBW.

Association between Maternal Periodontitis and LBW

At univariable level, maternal periodontitis was significantly associated with LBW (OR=4.81, 95% CI: 2.17-10.65). Likewise, at multivariable level, periodontitis was significantly associated with LBW with an OR of 3.84 (95% CI: 1.34-11.05). Table 4 summarizes the results of multiple logistic regression analysis for the association between maternal periodontitis and LBW adjusted for other significant risk factors.

Table 4 Association between maternal periodontitis and LBW

Maternal risk factors	Crude OR[a]	Adjusted OR[b]	95% CI[b]	LR χ^2 (df)[b]	*p* value[b]
Periodontal status					
Non-exposed	1.00	1.00	–	6.91 (1)	0.009
Exposed	4.81	3.84	1.34 – 11.05		
Education					
Tertiary/post-secondary	1.00	1.00	–	29.00 (2)	<0.001
Secondary	0.25	0.15	0.04 – 0.55		
Primary	6.50	3.18	1.05 – 9.58		
Gestational duration (weeks)	0.22	0.24	0.15 – 0.37	78.32 (1)	<0.001

[a] Determined by simple logistic regression analysis
[b] Determined by multiple logistic regression analysis

Discussion

The total incidence of LBW in our study was 8.7%. This is similar with the incidence reported in a study done on predominantly African-American subjects by Dasanayake[13] in Alabama. It was also noted that the incidence of LBW among our subjects, which comprised of only Malay women, was lower than the estimation for the general Malaysia population given by Unicef.[2] This highlights a probability of racial differences in LBW incidence in this country that need further investigations.

The results of our study support the research hypothesis that there is a significant association between maternal periodontitis and LBW. The incidence of LBW was 14.2% (95% CI: 9.7-18.8) in pregnant mothers with periodontitis, compared with only 3.3% (95% CI: 1.1-5.6) in those without periodontitis. Significant association was found between maternal periodontitis and LBW at both univariable (OR=4.81, 95% CI: 2.17-10.65) and multivariable level analysis (OR=3.84, 95% CI: 1.34-11.05). As shown in table 5, it was noted that the strength of association in our study is comparable with studies done elsewhere among other populations.[10-16]

Table 5 Comparison of human studies suggesting positive association between maternal periodontal disease and LBW, PTB, and PLBW

Author	Study design	Place of study	Periodontal measurement index	Outcome	OR/RR (95% CI)
Offenbacher *et al.* [10]	Case-control	North Carolina, USA	CAL	PLBW	OR = 7.9 (1.52-41.40)
Offenbacher *et al.* [11]	Case-control	North Carolina, USA	Mean PGE_2 level in GCF	PLBW	*p* value=0.02 (OR/RR not calculated)
Dasanayake [12]	Matched case-control	Chiangmai, Thailand	CPITN = 0	LBW	OR = 0.3 (0.12-0.72)
Dasanayake *et al.* [13]	Retrospective cohort	Birmingham & Tennessee, USA	*P.gingivalis*-specific serum IgG	LBW	OR = 1.02 (1.01-1.04)
Jeffcoat *et al.* [14]	Prospective cohort	Birmingham, USA	CAL, PD	PTB	OR = 4.45 (2.16-9.18)
Lopez *et al.* [15]	Prospective cohort	Santiago, Chile	CAL, PD	LBW	RR = 3.6 (1.06-11.40)
Mokeem *et al.* [16]	Case-control	Riyadh, Saudi Arabia	Mean CPITN	PLBW	OR = 4.21 (1.99-8.93)
This study	Prospective cohort	Kota Bharu, Kelantan	CAL, PD	LBW	OR = 3.8 (1.34-11.05)

The results of our study also showed that many preterm infants are LBW too. These were in consistent with a report on the increasing incidence of LBW in the United States from the

year 1981 to 1991, which was attributed to an increase in preterm births.[20] Further, evidence from an ultrasound study had demonstrated that preterm infants indeed weigh less than infants of the same gestational age who remain *in utero*.[21] Consequently, the reverse can also be true, meaning that birth weight may also increase with greater gestational age. This is apparent in our findings when the risk of LBW was significantly reduced with longer gestational period (OR=0.24, 95% CI: 0.15-0.37).

Poor socio-economic conditions as indicated by low level of education, occupation and household income, are important risk factors for LBW.[22, 23] Of these three socio-economic indicators measured in this study, only poor maternal education was associated with an increased risk for LBW. The effects of maternal occupation and household income were not significant. However, as income is considered by many to be a sensitive topic, the absence of such association should not be easily dismissed. The sensitivity associated with revealing information on the income level in our society can lead to error in reporting, and thus creating an additional source of unreliability. Nevertheless, we agree that education is the dimension of socio-economic status that most strongly predicts health.[24] It is also supported by our findings that more of periodontally healthy subjects hold higher qualifications in education. Thus, we postulated that education may have independent effects, above and beyond income or occupation, because mothers with higher education may be more aware and well-informed about healthy behaviours during pregnancy and family planning.

Poor past obstetric outcomes such as history of LBW or preterm delivery and spontaneous abortion are well-known risk factors for adverse pregnancy outcomes in successive births.[25, 26] Presence of intrinsic biological factors was suggested to be responsible for this observation, although the mechanisms through which they function have not as yet been clearly explained. Persistence of deleterious risk factors such as smoking, alcohol consumption, and poor caloric intake during subsequent pregnancy was also proposed to contribute to such trend rather than a true inherent tendency. However, these poor obstetrical factors were not associated with LBW in our study probably because there were only a small proportion of subjects at risk. Similarly, parity was not a significant risk factor for LBW in our study.

Foetal growth is affected by maternal nutrition which is reflected by the mother's weight gain during pregnancy. As such, low maternal weight gain has been used as a predictor of LBW.[27] Such association, however, was not apparent in this study. Nevertheless, the results of our study are in agreement with those of studies showing that the average rate of maternal weight gain during the second trimester is higher before slowing down slightly in the third trimester.[28, 29]

Micronutrient malnutrition, particularly iron deficiency anaemia, has been associated with an increased risk of prematurity and LBW.[30-32] In many developing countries, including Malaysia, where moderate and severe anaemia in pregnancy is common, current control programmes undertaken by public health agencies have consisted largely in the administration of iron tablets as part of antenatal care. While there is still inadequate evidence to suggest that routine iron supplementation during pregnancy is beneficial in improving clinical outcomes for the mother, foetus or newborn, there is also insufficient proof to recommend against it.[33] Nevertheless, the provision of routine iron supplementation to pregnant women in this country appears to have a positive effect as the majority of subjects (88.3%) were able to maintain the haemoglobin concentration at an optimum level of at least 10.5 g/dL measured during the second trimester, thus may explain why we did not see any significant effects of low haemoglobin level on infant birth weight.

Adequate and comprehensive antenatal care has long been recognised as the means to improve pregnancy outcomes by promoting preventive health care and healthy behaviours among mothers.[34] The number of antenatal visits and the stage of pregnancy at which care was initiated have been used to define antenatal care. In Malaysia, comprehensive antenatal care is delivered free of charge as an integral component of primary health care services provided at the maternal and child health clinics and community nurse clinics. The national average number of antenatal visits is 9 visits,[35] and among our subjects, 82.8% of them had made at least 8 antenatal visits during the course of their pregnancy. Although a few studies have reported favourable outcome on birth weight with early antenatal care and more frequent antenatal visits,[36-38] the evidence is inconclusive,[39, 40] and our study also failed to establish such relationship.

Maternal passive exposure to cigarette smoke has been linked to LBW deliveries.[41-43] However, the definitive causal association is still absent owing to the conflicting results, which is probably due to the lack of a standardized measure of passive smoking exposure and the problems of content validity of the measures used. Maternal serum cotinine level is the indicator of choice for passive smoking exposure.[44] However, due to time and financial limitations, this method is not always feasible. Instead, self-reported exposure has been used in most epidemiological studies, as well as ours, as predictor of LBW. The results of our study showed no evidence for an association between passive smoking exposure and LBW. We conclude that imprecise exposure classification might contribute for such findings since actual passive exposure and, hence, individual absorption tends to vary widely depending on the dose, duration and intensity of exposure, as well as room size and ventilation rate.

Among the strengths of this study is that the measurement of exposure variable was done prior to the onset of the outcome, thus allowing for determination that periodontitis was present before LBW. While this knowledge alone does not prove a causal association between maternal periodontitis and LBW, it is one of the necessary criteria for such relationship. Exclusion of women with history of tobacco and alcohol use, pre-existing medical problems or diagnosed with multiple gestation allowed for controlling of their confounding effects on LBW. The confounding effects of gestational duration and other risk factors for LBW were handled at the analytical stage through appropriate statistical models.

On the other hand, the use of secondary data obtained from maternal health records posed a limitation to this study. It should also be noted that logistic regression analysis, yielding OR as an approximation of RR,[45] was utilized to determine the association between maternal periodontitis and LBW. Thus, the results should be interpreted with caution as there is a possibility that the OR might have slightly overestimated the true risk of association.

However, within these limitations, we concluded that the odds of having LBW infants was significantly increased for pregnant women with periodontitis compared to those without periodontitis in our study, and hence provided additional evidence that support the role of periodontitis as an etiologic factor in LBW. From a public health perspective, the importance of this study lies in the fact that poor periodontal health is a factor that is easily amenable to prevention. This finding reflects the essential contribution of oral health care as the necessary and essential component of a comprehensive antenatal health care programme. Ultimately, it is hoped that the results of this study would establish the groundwork for a closer communication and improved consultation between medical and dental professionals in this country to improve the quality of antenatal health care services towards achieving the nation's visions and goals for health.

References

1. World Health Organization. The incidence of low birth weight: an update. Weekly Epidemiol Record 1984; 59: 205-211.

2. Unicef. The state of the world's children 2004. 2004 [cited 2004 October 2004]; Available from: http://www.unicef.org/.

3. Ministry of Health Malaysia. Annual report 1999: Stillbirths and neonatal deaths in Malaysia. 2002: Kuala Lumpur.

4. ACC/SCN. Low birthweight: Report of a meeting in Dhaka, Bangladesh on 14-17 June 1999, in Nutrition Policy Paper #18, J. Pojda and K. Kelley, Editors. 2000, ACC/SCN in collaboration with ICDDR: Geneva.

5. Holst E, Goffeng AR, Andersch B. Bacterial vaginosis and vaginal microorganisms in idiopathic premature labor and association with pregnancy outcome. J Clin Microbiol 1994; 32: 176-186.

6. Hillier SL, Nugent RP, Eschenbach DA, Krohn MA, Gibbs RS, Martin DH, Cotch MF, Edelman R, Pastorek JG, Rao AV, McNellis D, Regan JA, Carey JC, Klebanoff MA. Association between bacterial vaginosis and preterm delivery of a low-birth-weight infant. N Engl J Med 1995; 333: 1737-1742.

7. Williams MC, O'Brien WF, Nelson RN, Spellacy WN. Histologic chorioamniotis is associated with fetal growth restriction in term and preterm infants. Am J Obstet Gynecol 2000; 183: 1094-1099.

8. Gibbs RS, Romero R, Hillier SL, Eschenbach DA, Sweet RL. A review of premature birth and subclinical infection. Am J Obstet Gynecol 1992; 166: 1515-1528.

9. Collins JG, Windley III HW, Arnold RR, Offenbacher S. Effects of a *Porphyromonas gingivalis* infection on inflammatory mediator response and pregnancy outcome in hamsters. Infect Immun 1994; 62(10): 4356-4361.

10. Offenbacher S, Katz V, Fertik G, Collins J, Boyd D, Maynor G, McKaig RG, Back J. Periodontal infection as a possible risk factor for preterm low birth weight. J Periodontol 1996; 67: 1103-1113.

11. Offenbacher S, Jared HL, O'Reilly PG, Wells SR, Salvi GE, Lawrence HP, Socransky SS, Beck JD. Potential pathogenic mechanisms of periodontitis-associated pregnancy complications. Ann Periodontol 1998; 3(1): 233-250.

12. Dasanayake AP. Poor periodontal health of the pregnant woman as a risk factor for low birth weight. Ann Periodontol 1998; 3(1): 206-212.

13. Dasanayake AP, Boyd D, Madianos PN, Offenbacher S, Hills E. The association between *Porphyromonas gingivalis*-specific maternal serum IgG and low birth weight. J Periodontol 2001; 72(11): 1491-1497.

14. Jeffcoat MK, Geurs NC, Reddy MS, Cliver SP, Goldenberg RL, Hauth JC. Periodontal infection and preterm birth: results of a prospective study. J Am Dent Assoc 2001; 132: 875-880.

15. Lopez NJ, Smith PC, Gutierrez J. Higher risk of preterm birth and low birth weight in women with periodontal disease. J Dent Res 2002; 81(1): 58-63.

16. Mokeem SA, Molla GN, Al-Jewair TS. The prevalence and relationship between periodontal disease and pre-term low birth weight infants at King Khalid University Hospital in Riyadh, Saudi Arabia. J Contemp Dent Pract 2004; 5(2): 40-56.

17. Lin D, Smith MA, Champagne CME, Elter J, Beck JD, Offenbacher S. *Porphyromonas gingivalis* infection during pregnancy increases maternal tumour necrosis factor alpha, suppress maternal interleukin-10, and enhances fetal growth restriction and resorption in mice. Infect Immun 2003; 71: 5156-5162.

18. Dunlop S, Coyte PC, McIsaac W. Socio-economic status and the utilisation of physicians' services: results from the Canadian National Population Health Survey. Soc Sci Med 2000; 51: 123-133.

19. Mayfield SR, Uauy R, Warshaw JB. The premature newborn, in *Principles and practice of pediatrics*, F.A. Oski, et al., Editors. 1994, J. B. Lippincott Company: Philadelphia. 325-331.

20. Centers for Disease Control and Prevention. Increasing incidence of low birth weight - United States, 1981-1991. MMWR 1994; 43(18): 335-339.

21. Secher NJ, Hansen PK, Thomsen BL. Growth retardation in preterm infants. Br J Obstet Gynecol 1987; 1987: 115-120.

22. Torres-Arreola LP, Constantino-Casas P, Flores-Hernández S, Villa-Barragán JP, Rendón-Macías E (2005) Socioeconomic factors and low birth weight in Mexico. BMC Public Health Volume,

23. Dickute J, Padaiga Z, Grabauskas V, Nadisauskiene RJ, Basys V, Gaizauskiene A. Maternal socio-economic factors and the risk of low birth weight in Lithuania. Medicina (Kaunas) 2004; 40(5): 475-482.

24. Kramer MS, Goulet L, Lydon J, Seguin L, McNamara H, Dassa C, Platt RW, Chen MF, Gauthier H, Genest Jr J, Kahn S, Libman M, Rozen R, Masse A, Miner L, Asselin G, Benjamin A, Klein J, Koren G. Socio-economic disparities in preterm birth. Paediatric Perinatal Epidemiol 2001; 15(Suppl. 2): 104-123.

25. Lee T, Carpenter MW, Heber WW, Silver HM. Preterm premature rupture of membranes: risks of recurrent complications in the next pregnancy among a population-based sample of gravid women. Am J Obstet Gynecol 2003; 188: 209-213.

26. de Bernabe JV, Soriano T, Albaladejo R, Juarranz M, Calle ME, Martinez D, Domiguez-Rojas V. Risk factors for low birth weight: a review. Eur J Obstet Gynecol 2004; 116: 3-15.

27. Carmichael SL, Abrams BF. A critical review of the relationship between gestational weight gain and preterm delivery. Obstet Gynecol 1997; 89(5): 865-873.

28. Abrams BF, Selvin S. Maternal weight gain pattern and birth weight. Obstet Gynecol 1995; 86: 163-169.

29. Abrams BF, Carmichael SL, Selvin S. Factors associated with the pattern of maternal weight gain during pregnancy. Obstet Gynecol 1995; 86: 170-176.

30. Scanlon KS, Yip R, Schieve LA, Cogswell ME. High and low hemoglobin levels during pregnancy: differential risks for preterm birth and small for gestational age. Obstet Gynecol 2000; 96: 741-748.

31. Xiong X, Buekens P, Alexander S, Demianczuk N, Wollast E. Anemia during pregnancy and birth outcome: a meta-analysis. Am J Perinatol 2000; 17: 137-146.

32. Yazdani M, Tadbiri M, Shakeri S. Maternal hemoglobin level, prematurity, and low birth weight. Int J Gynecol Obstet 2004; 85: 163-164.

33. Mahomed K (1999) Iron supplementation in pregnancy (abstract). The Cochrane Database of Systematic Reviews Volume,

34. Alexander GR, Korenbrot CC. The role of prenatal care in preventing low birth weight. The Future of Children 1995 [cited 2004 July]; Available from: http://futureofchildren.org/.

35. Ministry of Health Malaysia. Annual Report 2002: Division of Family Health Development. 2004: Kuala Lumpur.

36. Desjardins E, Hardwick D. How many visits by health professionals are needed to make a difference in low birth weight? A dose-response study of the Toronto Healthiest Babies Possible Program. Can J Public Health 1999; 90(4): 224-228.

37. Letarno G, Majelantle RG. Factors influencing low birth weight and prematurity in Botswana. J Biosoc Sci 2001; 33(3): 391-403.

38. Petrou S, Kupek E, Vause S, Maresh M. Antenatal visits and adverse perinatal outcomes: results from a British population-based study. Eur J Obstet Gynecol Reprod Biol. 2003; 106(1): 40-49.

39. Fiscella K. Does prenatal care improve birth outcomes? A critical review. Obstet Gynecol 1995; 85: 468-479.

40. Carroli G, Villar J, Piaggio G, Khan-Neelofur D, Gülmezoglu M, Mugford M, Lumbiganon P, Farnot U, Bersgjø P. WHO systematic review of randomised controlled trials of routine antenatal care. Lancet 2001; 357: 1565-1570.

41. Dejin-Karlsson E, Hanson BS, Ostergren P, Sjoberg N, Marsal K. Does passive smoking in early pregnancy increase the risk of small-for-gestational-age infants? Am J Public Health 1998; 88(10): 1523-1527.

42. Goel P, Radotra A, Singh I, Aggarwal A, Dua D. Effects of passive smoking on outcome in pregnancy. J Postgrad Med 2004; 50: 12-16.

43. Dejmek J, Solansk´y I, Podrazilová K, Srám RJ. The exposure of nonsmoking and smoking mothers to environmental tobacco smoke during different gestational phases and fetal growth. Environ Health Perspect 2002; 110(6): 601-606.

44. Peacock JL, Cook DG, Carey IM, Jarvis MJ, Bryant AE, Anderson HR. Maternal cotinine level during pregnancy and birthweight for gestational age. Int J Epidemiol 1998; 27(4): 647-656.

45. Zhang J, Yu KF. What's the relative risk? A method of correcting the odds ratio in cohort studies of common outcomes. JAMA 1998; 280: 1690-1691.

HIGHER INCIDENCE OF LOW BIRTH WEIGHT INFANTS AMONG MALAY WOMEN WITH PERIODONTITIS IN KOTA BHARU, KELANTAN

Norkhafizah, S, Norsa'adah, B.*, Zainuddin, S.L.A.*, Sosroseno, W.*, N. Hazlina, N.H.****

31015

ABSTRACT

The causes of low birth weight (LBW) are complex and multifactorial. Current epidemiological and microbiological studies have suggested that maternal periodontal infection may increase the risk of delivering LBW infants. The objective of this prospective cohort study was to determine the incidence of LBW infants among pregnant women with periodontitis. Malay pregnant women were recruited from two selected Klinik Kesihatan Ibu dan Anak (KKIA) in the district of Kota Bharu. Of 472 women studied, 232 who had periodontitis were classified as being exposed, while the rest who did not have periodontitis were in the non-exposed group. The incidence of LBW was 14.2% (95% CI: 9.7-18.8) in women with periodontitis, and 3.3% (95% CI: 1.1-5.6) in women without periodontitis. Pregnant women with periodontitis are at higher risk of delivering LBW infants ($p<0.001$). This knowledge should increase physician and patient awareness to the relevance of oral infections. Ultimately, it should help to establish the groundwork for closer communication between the medical and dental colleagues to improve the quality of antenatal care towards achieving our vision and goals for health.

Keywords: *low birth weight, Malay, periodontitis, pregnant*

INTRODUCTION

The causes of low birth weight (LBW), a birth weight of less than 2500gm LBW, are complex and multifactorial (World Health Organization, 1984). Associated maternal factors for LBW include genetic, socio-demographic and obstetric factors, nutritional status, morbidity, toxic exposures and antenatal care (Kramer, 1987). In the last decade, many investigators have been interested in studying the role of subclinical maternal infection in preterm labour, and chronic oral infection like periodontitis has been suggested as a possible risk factor for pre-term low birth weight deliveries (Offenbacher *et al.*, 1998). Although the mechanism by which periodontitis may cause LBW remains unclear, based on the current understanding that inflammatory mediators that occur in periodontitis also play an important role in the initiation of labour, this association is biologically feasible (Madianos *et al.*, 2001).
The objective of this prospective cohort study was to determine the incidence of LBW infants among pregnant women with periodontitis.

METHODOLOGY

This study was a prospective cohort study conducted from December 2003 to March 2004. Exposed group comprised of pregnant women with periodontitis while the non-exposed group comprised of those without periodontitis. The selected centres, KKIA Bandar Kota Bharu and KKIA Wakaf Che Yeh, were randomly assigned for selection of non-exposed and exposed groups respectively. Screening periodontal examinations were performed on all pregnant women attending both KKIA during the study period who fit the inclusion and exclusion criteria for screening. Study subjects were then selected using systematic random sampling from the respective sampling frames. The inclusion criteria for screening of non-exposed subjects were pregnant women in the second trimester (14 to 27 weeks' gestation). However, due to ethical consideration, exposed subjects were selected only from those in the third trimester (at least 28 weeks' gestation). We excluded patients with potential confounders such as those who smoke cigarettes and diagnosed with pre-pregnancy diabetes, or those with known risk factors for LBW such as chronic hypertension, alcohol use during pregnancy, and having multiple foetuses as confirmed by ultrasound examinations. Patients with history of periodontal treatment during the current pregnancy, patients with fewer than 20 teeth and those who were taking antibiotics for any reason were also excluded as these might lead to misclassification of exposure status. For safety reason, patients who require

* *School of Dental Sciences,*
** *Biostatistics and Research Methodology Unit, School of Medical Sciences,*
*** *Obstetrics and Gynecology Department, School of Medical Sciences, Universiti Sains Malaysia Health Campus, 16150 Kubang Kerian, Kelantan.*

prophylactic antibiotics for any periodontal procedures were also not screened for the study. Clinical attachment loss (CAL) and probing depth (PD) in millimetre (mm), and presence of gingival bleeding on probing (BOP) were determined by clinical periodontal examination (American Academy of Periodontology, 1996). The presence of 4 or more sites with PD 4mm or higher, and CAL 3mm or higher at the same site with presence of BOP were diagnosed as periodontitis (Lopez *et al.*, 2002). Data on infant birth weight was taken from the home-based maternal health record.

RESULTS

Of 500 women enrolled in the study, 28 (5.6%) were either lost to follow-up or excluded for various reasons. Of the remaining subjects, 240 were in the group of periodontally healthy women and 232 were in the group with periodontitis. Table 1 shows the comparison of the incidence of LBW at 95% Confidence Interval (CI) between subjects exposed and not exposed to periodontitis during pregnancy. The total incidence of LBW was 8.7%. Of these, 14.2% of LBW occurred among subjects with periodontitis compared with only 3.3% incidence among those without periodontitis. Subjects exposed to periodontitis had significantly higher incidence of LBW as compared with the non-exposed subjects (OR=4.81 95% CI: 2.17-10.65). All of LBW deliveries among the non-exposed subject are of moderate severity (1501–2499g) while 6.1% of the LBW infants from periodontitis mothers could be classified as very severe (1001–1500g). None of infants from all subjects were extremely LBW (1000gm or less). Of all infants, 19 (4%) were delivered prematurely, and 18 of them were also LBW. Sixteen (84.2%) premature infants were delivered by mothers with periodontitis as compared to only three (15.8%) premature deliveries among mothers with healthy periodontium.

Table 1: Incidence of LBW in 232 subjects with periodontitis and 240 subjects without periodontitis

Periodontal disease status	*n*	*LBW Frequency (%)*	*95% CI*	*OR (95% CI)*	*p value**
Subjects without periodontitis	240	8 (3.3)	9.7 – 18.8		
Subjects with periodontitis	232	33 (14.2)	1.1 – 5.6	4.41 (2.17-10.65)	<0.001

* Chi-square test

DISCUSSION

The findings of this study support the research hypotheses that there was a significantly higher incidence of LBW among pregnant women with periodontitis compared to those without periodontitis. The total incidence of LBW found in this study was 8.7%. This figure was slightly lower than the 10% total incidence of LBW in general Malaysia population as estimated by Unicef (2004). However, the incidence of LBW in this study was higher than the results of a prospective study by Lopez *et al.* (2002), in which, the incidence was only 1.9% in their total subjects and 3.4% in women with periodontal disease. Of all live births in this study, 19 (4.0%) were born prematurely, and 18 (94.7%) of these were LBW. These findings are in accordance with evidence from a study by Secher *et al.* (1987) which showed that preterm infants weigh less than infants of the same gestational age who remain *in-utero*, meaning that many preterm infants were also growth-retarded and hence, LBW. The risk of having LBW attributed to maternal periodontitis in the total population was approximated at 67% using formula given by Gordis (1996) based on 10% incidence of LBW in Malaysia (Unicef, 2004). Thus, if there is an effective nationwide prevention program eliminating periodontitis among pregnant mothers, a maximum of 67% reduction in the incidence of LBW could be achieved in Malaysian general population. From a public health perspective, this is an important answer for the policy-makers and those responsible for funding the preventive programs. The amount of total impact of a proposed prevention program on the community and how is it going to reduce the burden and suffering in the population are among the major concerns. However, since the reference population in this study was pregnant women Kota Bharu, Kelantan, the attributable risk should be interpreted with caution as it can only be used as an approximation and might not be the

true risk for Malaysian population. In conclusion, LBW incidence among pregnant women with periodontitis was significantly higher than those with healthy periodontium. The incidence of LBW in the general population attributed to maternal periodontitis was also high. As such, oral health services should be an integral component of all health programs. All physicians should increase their awareness and attention to the medical relevance of dental infections and oral diseases. Thus, it is timely for medical and dental colleagues to work together and share knowledge so that the appropriate diagnosis and treatment can be provided to the patients.

ACKNOWLEDGEMENTS

We gratefully acknowledge the Ministry of Health Malaysia for the approval to conduct this study at the selected centres. The study was funded by Universiti Sains Malaysia short term grant (304/PPSG/6131335).

REFERENCES

American Academy of Periodontology (1996). Epidemiology of periodontal diseases. *J Periodontol,* **67,** 935-945.

Gordis, L. (1996). *Epidemiology*, W. B. Saunders Company, Philadelphia, pp 155-162.

Kramer, M. S. (1987). Determinants of low birth weight: methodological assessment and meta-analysis. *Bull World Health Organ,* **65,** 663-737.

Lopez, N. J., Smith, P. C. & Gutierrez, J. (2002). Higher risk of preterm birth and low birth weight in women with periodontal disease. *J Dent Res,* **81(1),** 58-63.

Madianos, P. N., Lieff, S., Murtha, A. P., Boggess, K. A., Auten Jr, R. L., Beck, J. D. & Offenbacher, S. (2001). Maternal periodontitis and prematurity. Part II: maternal infection and fetal exposure. *Ann Periodontol,* **6,** 175-182.

Offenbacher, S., Jared, H. L., O'Reilly, P. G., Wells, S. R., Salvi, G. E., Lawrence, H. P., Socransky, S. S. & Beck, J. D. (1998). Potential pathogenic mechanisms of periodontitis-associated pregnancy complications. *Ann Periodontol,* **3,** 233-250.

Secher, N. J., Hansen, P. K. & Thomsen, B. L. (1987). Growth retardation in preterm infants. *Br J Obstet Gynecol,* **1987,** 115-120.

Unicef. The state of the world's children 2004. Available at: http://www.unicef.gov/. Accessed October 2004.

World Health Organization (1984). The incidence of low birth weight: an update. *Weekly Epidemiol Record,* **59,** 205-211.

5th Ministry of Health Malaysia - Academy of Medicine of Malaysia Scientific Meeting 2004
Incorporating the 7th Scientific Meeting of the National Institutes of Health, Ministry of Health Malaysia

25 - 28 August 2004

Venue : Sunway Lagoon Resort Hotel, Petaling Jaya, Malaysia

Academy of Medicine of Malaysia

Ministry of Health Malaysia

The Medical Journal of Malaysia

Official Journal of the Malaysian Medical Association

Volume 59 Supplement D August 2004

ISSN 0300-5283

Higher Risk of Low Birth Weight Infants in Women with Periodontitis

31020

S Norkhafizah*, B Norsa'adah, A Z Siti Lailatul*, S Wihaskoro*, N H Nik Hazlina*****

*Pusat Pengajian Sains Pergigian, **Jabatan Perubatan Masyarakat, ***Jabatan Obstetrik dan Ginekologi, Pusat Pengajian Sains Perubatan, Hospital Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia

Summary

Worldwide, low birth weight (LBW) is a significant risk factor for neonatal and infant mortality. It is also a well-documented determinant of infant and childhood morbidity resulting in long-term neurodevelopmental disturbances. Significant advances in perinatal medicine and understanding of reproductive physiology contributed substantially to a decrease in the infant mortality rate over the past 25 years. However, this improvement in infant survival has been attributed mainly to reduced specific mortality rates rather than to changes in the birth weight or gestational age distribution. Current epidemiological and microbiological studies have suggested that maternal periodontitis among pregnant women may increase the risk of LBW. The objective of this prospective study is to determine the incidence of LBW infants among pregnant women with periodontitis. The reference population consisted of pregnant women attending the government maternal and child health clinics in the district of Kota Bharu, Kelantan. Of 472 women studied, 232 who had periodontitis were in the exposed group, and the rest who did not have periodontitis were in the non-exposed group. The incidence of LBW was 14.2% in women with periodontitis, and 3.3% in women without periodontitis (relative risk= 4.81, 95% CI= 2.17 to 10.65). Besides providing additional evidence that pregnant women with periodontitis are at higher risk of delivering LBW infants, the importance of this finding lies in the fact that poor periodontal health is a factor that is easily amenable to prevention. This knowledge should increase physician and patient awareness to the relevance of oral infections. Ultimately, it should help to establish the groundwork for closer communication between the medical and dental colleagues to improve the quality of antenatal care towards achieving the country's vision and goals for health.

MALAYSIAN JOURNAL OF

PUBLIC HEALTH MEDICINE

ISSN : 1675-0306 Volume 4 (Supplement 1) 2004

Official publication of the
MALAYSIAN PUBLIC HEALTH SPECIALIST ASSOCIATION

P3 3102

A REVIEW OF DENGUE INCIDENCE IN KOTA BHARU, KELANTAN FROM YEAR 1998-2003

[1]*Narwani H.*, [1]*Jesni J.*, [2]*Hamzah A.M.*, [2]*A.Haris M.*, & [2]*M.Noor*

[1]*Universiti Sains Malaysia, Kampus Kesihatan, Kelantan*
[2]*Pejabat Kesihatan Kota Bharu, Kelantan*

Dengue is the most common and widespread arthropod borne arboviral infection in the world today. In Malaysia, it has become a major public health problem.

Objectives: To describe the incidence of dengue fever and dengue hemorragic fever in Kota Bharu Kelantan from year 1998-2003.

Methodology: This is a secondary data review of all dengue case notified to Kota Bharu District Health Office from year 1988 to 2003. All the care were extracted from VEKPRO program database to Microsoft Excel Program and later on to SPSS program.

Results: A total of 4716 dengue cases were notified involving 4476 (94.9%) DF and 240 (5.1%) DHF, which was increasing by years. The highest incidence was in January (14.9%) while the lowest was in May (4.0%). 40% of cases were in the 15-29 years old group. Majority were Malays (86.1%) and 55.2% were male. 95% were local cases and 91% from urban area. For priority areas, 80% were from priority 1. More than 50% have positive serology result. All symptoms occurred in more than 96% of cases and fever was the commonest (99.7%). The mean value for age, temperature, systolic and diastolic blood pressure were 27.8 years, 37.9°C, 115mmHg and 73mmHg respectively. The mean value for time interval between onset of symptoms and diagnosis, onset of symptoms and notification and time of diagnosis to notification were 5.1, 5.9 and 0.8 days respectively.

Conclusion: The increased in incidence of dengue in Kota Bharu need to be addressed promptly with effective surveillance, prevention and control programs.

P4

HIGHER RISK OF LOW BIRTH WEIGHT INFANTS IN WOMEN WITH PERIODONTITIS

[*]***Norkhafizah Saddki***, [**]*Norsa'adah Bachok*, [*]*Siti Lailatul Akmar Zainuddin*, [*]*Wihaskoro Sosroseno*, [***]*Nik Hazlina Nik Hussain.*

[*] *Pusat Pengajian Sains Pergigian, Universiti Sains Malaysia, Kubang Kerian, Kelantan.*
[**] *Jabatan Perubatan Masyarakat, Pusat Pengajian Sains Perubatan, Universiti Sains Malaysia, Kubang Kerian, Kelantan.*
[***] *Jabatan Obstetrik dan Ginekologi, Pusat Pengajian Sains Perubatan, Universiti Sains Malaysia, Kubang Kerian, Kelantan.*

Worldwide, low birth weight (LBW) is a significant risk factor for neonatal and infant mortality. It is also a well-documented determinant of infant and childhood morbidity resulting in long-term neurodevelopmental disturbances. Significant advances in perinatal medicine and understanding of reproductive physiology contributed substantially to a decrease in the infant mortality rate over the past 25 years. However, this improvement in infant survival has been attributed mainly to reduced specific mortality rates rather than to changes in the birth weight or gestational age distribution. Current epidemiological and microbiological studies have suggested that maternal periodontitis among pregnant women may increase the risk of LBW. The objective of this prospective study is to determine the incidence of LBW infants among pregnant women with periodontitis. The reference population consisted of pregnant women attending the government maternal and child health clinics in the district of Kota Bharu, Kelantan. Of 472 women studied, 232 who had periodontitis were in the exposed group, and the rest who did not have periodontitis were in the non-exposed group. The incidence of LBW was 14.2% in women with periodontitis, and 3.3% in women without periodontitis (relative risk= 4.81, 95% CI= 2.17 to 10.65). Besides providing additional evidence that pregnant women with periodontitis are at higher risk of delivering LBW infants, the importance of this finding lies in the fact that poor periodontal health is a factor that is easily amenable to prevention. This knowledge should increase physician and patient awareness to the relevance of oral infections. Ultimately, it should help to establish the groundwork for closer communication between the medical and dental

3 1 0 22

colleagues to improve the quality of antenatal care towards achieving the country's vision and goals for health.

P5

TRAINING NEEDS OF ACADEMIC STAFF AT THE FACULTY OF MEDICINE AND HEALTH SCIENCES, UiTM JALAN OTHMAN PJ

Adlina S, Edariah AB and Abdul Rahim MN

Faculty of Medicine, Universiti Teknologi MARA (UiTM), Jalan Othman,46000 Petaling Jaya, Selangor, Malaysia

Training of staff is an important aspect of career development. New methods of teaching and new research means that knowledge and skills have to be constantly updated in order to be abreast with current information and skills which would be passed on to the students.

This study was conducted to determine:

- The training needs of lecturers
- The specific areas of training that lecturers felt they required.

A self directed questionnaire was distributed to 53 staff members in November 2003. The response rate was 60%. This study found that 75% of lecturers felt they did not have adequate knowledge to teach and 72% felt that they needed training in teaching skills. The 3 most required teaching areas were Problem Based Learning, Research Methodology and Publication Skills. The areas that were less needed were English Mastery, Learning Objectives and Lecturing Skills. It was recommended to management to look into the training needs of the lecturers especially in the required areas.

P6

THE INFLUENCE OF SOCIOECONOMIC STATUS ON ANTENATAL MOTHERS' KNOWLEDGE ON THEIR RIGHTS AND PREFERENCES FOR INTRAPARTUM CARE

Sulaiman Zaharah [1], *Mohamed Hassan Mohamed Hashim, Abdullah Mazlan, Winn Than.*

[1] *Department of Community Medicine, School of Medicine, Health Campus, Universiti Sains Malaysia, Kubang Kerian, Kelantan*

Objectives:

1. To determine antenatal mothers':
a. Knowledge on their rights in intra partum care
b. Preferences for intra partum care
2. To determine the association between socioeconomic status (monthly household income, occupation and education) and:
a. Antenatal mothers' knowledge on their rights in intrapartum care
b. Antenatal mothers' preferences for intrapartum care

Methodology: A cross sectional study was conducted on 340 Malays, antenatal mothers who attended selected Women and Child Health Clinics in Kota Bharu district, from November 2003 to February 2004. The data were obtained using interviewer guided questionnaire containing 3 domains (socioeconomic, knowledge and preference).

Results: The mean household income was RM 1260.00 a month. 68 % were housewives and 20 % had tertiary education. On the average, only 22 % of respondents had knowledge on their rights. If they were given a choice, they preferred the delivery to be conducted by female (86 %) and Muslim (77%) doctors. 78 % agreed medical and nurse trainees should only assist in the delivery and only 10 % allowed trainees to deliver their babies. Only 43 % wanted pain relief. 60 % requested husbands accompanying the labor. There was a significant association ($p<0.05$) between socioeconomic status and patients' knowledge on their rights but not with their preferences for intrapartum care.

Conclusion: Socioeconomic status influences antenatal mothers' knowledge on their rights, but not their preferences for intrapartum care.

MALAYSIAN JOURNAL OF

PUBLIC HEALTH MEDICINE

ISSN 1675-1302 Volume 5 (Supplement) 2005

Official Publication of

THE MALAYSIAN PUBLIC HEALTH SPECIALISTS ASSOCIATION

Results

661 questionnaires were returned. The mean age of total participants was 31.4 years (standard deviation (SD) 6.45) while the mean BMI was 24.4 kg/m2 (SD 2.47). 45 subjects (6.8%, 95% CI: 5.0-9.0) were categorized in the high risk group of OSAS. The neck circumferences , PNS_P (length of the soft palate), MPT (maximum soft palate thickness), MPH (distance between the mandibular plane and hyboid bone), maxillary intermolar distance, mandibular intermolar distance and middle PS (posterior airway space) were significantly different both groups. There were significant associations between the following variables and the risk of having OSAS: mandibular intermolar distance, PNS_P and MPH. The current study demonstrates presence of distinct dentofacial features in subjects at high risk of OSAS.

P9 31023

ASSOCIATION BETWEEN MATERNAL PERIODONITIS AND LOW BIRTH WEIGHT INFANTS AMONG MALAY WOMEN IN KOTA BHARU, KELANTAN

***Norkhafizah Saddki**, Norsaadah Bachok, Nik Hazlina Nik Hussein, Siti Lailatul Akmar Zainuddin, Wihaskoro Sosroseno.*
School of Dental Sciences, Biostatistics and Research Methodology Unit, School of Medical Sciences, Obstetrics and Gynecology Department, School of Medical Sciences, Universiti Sains Malaysia, Health Campus, 16150 Kubang Kerian, Kelantan

Low birth weight (LBW) is a well-documented risk factor for neonatal and infant morbidity as well as mortality. Subsequent medical and neurodeveloplement disorders that may lead to long term health problems for the infants not only cause a tremendous impact on family but also on the health care system. Current studies have suggested maternal periodontal infection as a risk factor for LBW. The objectives of this prospective cohort study were to determine the incidence of LBW infants among pregnant women who attended Klinik Kesihatan Bandar Kota Bharu and Klinik Kesihatan Wakaf Che Yeh for antenatal care during the study period. Systematic random sampling was utilized for selection of study subjects. Of 442 women studied, 232 who had periodontitis were in the exposed group, and the rest who did not have periodontitis were in the non-exposed group. The incidence of LBW was 14.2% in women with periodontitis, and 3.3% in women without periodontitis (OR=4.81, 95% CI: 2.17 – 10.65). After controlling for significant associated maternal factors, periodontitis remain significantly associated with LBW (OR=3.77 95% CI: 1.31 – 10.87). The results of this study provide additional evidence that pregnant women with periodontitis are at significantly higher risk of delivering LBW infants. It is hoped that this study would stimulate further research that explores the role of oral diseases in human health. Ultimately, it should help to establish the ground work for better communication between the medical and dental colleagues towards improving the quality of antenatal care in our country.

P10 31024

DISTRIBUTION OF LOW BIRTH WEIGHT DETERMINANTS AMONG PREGNANT WOMEN IN KOTA BHARU, KELANTAN

***Norkhafizah Saddki**, Norsaadah Bachok, Nik Hazlina Nik Hussein, Siti Lailatul Akmar Zainuddin, Wihaskoro Sosroseno.*
School of Dental Sciences, Biostatistics and Research Methodology Unit, School of Medical Sciences, Obstetrics and Gynecology Department, School of Medical Sciences, Universiti Sains Malaysia, Health Campus, 16150 Kubang Kerian, Kelantan

Birth weight is considered the most important determinant of the chances of a newborn infant to survive, grow and develop healthily. The acute consequences of low birth weight (LBW) may give rise to chronic medical problems such as those seen in the gastrointestinal system, respiratory system, nervous system, and in the eyes. These adverse outcomes appear to increase as the birth weight decreases, and may lead to significant long term health and developmental problems for the survivors. LBW determinants consists of factors that are related to genetic, socio-demographic, obstetric, nutritional, maternal mobility during pregnancy, toxic exposures and antenatal care. The objective of this cross

sectional study was to describe the distribution of LBW were recruited among pregnant women in Kota Bharu, Kelantan. Malay pregnant women were recruited from two randomly selected maternal and child health clinics in the district of Kota Bharu/ Standardized structured questionnaire was used in data collection. Of 472 pregnant enrolled in this study, 26.9% were primiparous, 57.8% were multiparous, and 15.3% were grandmultiparous or great grandmultiparous. The mean age of the subjects was 29.11 years (SD 6.53). It is hoped that findings derived from this study would provide some additional facts on the health and well-being of pregnant women in Malaysia. Henceforth, this acknowledge should stimulate and motivate further research and development that would explore on the association of these determinants and LBW incidence in our local community

P11

ASSESSMENT OF PHYSICAL, MENTAL AND FUNCTIONAL STATUS OF MALAYSIAN ELDERLY

Latiffah, A.L. [1] *, Aizan, A.H.* [2]*, Khor, G.L.* [3]*, Zaitun, Y.* [3]*, Fauziah, M.* [4]*, Mohmad, S.* [5]*, Lee, F.S.* [6] *& Yau, W.K.* [6]

[1]*Department of Community Health, Faculty of Medicine and Health Sciences, UPM*

[2]*Institute of Gerontology, UPM*

[3] *Department of Nutrition and Health Sciences, Faculty of Medicine and Health Sciences, UPM*

[4] *Institute for Mathematical Research, UPM*

[5] *Department of Development of Family Health, Ministry of Health*

[6] *Geriatric Unit, Kuala Lumpur Hospital*

Ageing is commonly associated with health problems. It is often perceived that old age is inevitably associated with biological and physical decline. Aim: There is a need to study the relationship between the health status among our elderly and their functional status. Among the indicators used are Elderly Cognitive Assessment Questionnaire (ECAQ12), General Health Questions (GHQ12), and Instrumental Activities of Daily Living Scale (IADL) for measuring the functional status of the elderly. Methods: A cross sectional study involving 637 elderly from 3 states in Peninsular Malaysia was done to determine the health status of the older Malaysians and the relationship between their cognitive level, general health and functional status. The inclusion criteria were older people 60 years and above in the community and Malaysian citizen or permanent resident. Only household containing 1 person 60 years and above will be included in the sampling frame. Results: The reliability of GHQ12 was 0.85 and the reliability for IADL was 0.88. There is a significant difference between total ECAQ scores and functional status ($p<0.000$) and also between GHQ12 scores and functional status ($p<0.000$) using One-way ANOVA. Conclusion: As a conclusion there is an association between cognitive level and general health and their functional status among elderly.

P12

AWARENESS TOWARDS HEALTHY DIET AMONG FOUR SELECTED RURAL VILLAGES IN KUALA NERANG, KEDAH.

Hazreen Majid (a) *, Noran Naqiah Hairi (a) and Kuala Nerang CRP members(b)*

(a) Dept. of Social & Preventive Medicine, Faculty of Medicine, University of Malaya, Malaysia.

(b) MBBS 2004 Kuala Nerang CRP group members.

Aim:

The prevalence of chronic diseases in Malaysia is on the rise, in both urban and rural areas. This is due to aging population and lifestyle behaviour changes. Health promotion and health education on healthy lifestyle focusing on balanced diet should be advocated to everyone. The aim of this study is to describe the rural settlers' attitude towards dietary intake and food expenditure.

Methods and Materials:

This is a cross sectional survey conducted among four selected rural villages in Kuala Nerang, Kedah from 7th June to 19th June 2004. Study population consists of 200 households from three Malay traditional villages and one Siamese village. Data was