LOW BIRTH WEIGHT BABIES IN SITIAWAN, PERAK - RURAL HEALTH SURVEY 1997

Medical Students Stage III, Faculty of Medicine, University of Malaya and Atiya Ab Sallam[1]

[1]Department of Social and Preventive Medicine, Faculty of Medicine, University of Malaya, 50603 Kuala Lumpur, Malaysia

Introduction

The single most important determinant of newborn survival and future growth is the birth weight of the infant. According to the World Health Organisation (WHO), low birth weight contributes to an estimated 9.1 million infant deaths which occur each year. (1) It not only contributed to about 13.5% of all births at the maternity hospital in Kuala Lumpur but also to 74.8% of all deaths in 1985 (2).

Low birth weight is defined by WHO for international comparisons as "less than 2500g, irrespective of the gestational age" in the 29th World Health Assembly. The frequency of low birth weight varies from society to society with a much greater prevalence in the countries of the developing world e.g. Malaysia, where low birth weight infants run greater risks of malnutrition and are victims of infection such as respiratory tract infections and gastrointestinal tract infections. This further impairs their growth and development, and thus leads to further physical shunting. Those who manage to cross the bridge of increased risk of morbidity and mortality in infancy, would carry the problem over into their adult life, and thus hinder their participation in social and economic development.

No single factor can be implicated in the high incidence of low birth weight. Kramer (3) in a review article has identified 43 factors as possible determinants of low birth weight, including socio-economic status, parity, maternal age, height, weight, gestational weight gain, ante-natal care and infections just to quote a few examples. In Malaysia, studies show that the Indian, babies are the most likely to be low in birth weight and the Chinese babies are the least likely. This statement is supported by the evidence that 20.3% of Indian babies born weighed less than 2.5 kg whereas only 8.5% of Chinese babies had low birth weight. These figures were obtained from a study conducted on all babies born in the year 1985 who weighed 500g or over at the maternity hospital in Kuala Lumpur.

The Manjung Rural Health Survey (RHS) group had proposed to undertake a thematic project on birth weight of babies in Sitiawan. It is believed that birth weight data can be a useful indicator for evaluating health programmes.

Materials and Methods

The study sample was obtained from the two health clinics, namely Mother and Child Health Clinic, Health Office situated in Sitiawan and the other Mother and Child Health Clinic at Kampung Koh, located in a predominantly Chinese area. The data was contained in the ante- and postnatal records. Altogether there were 649 consecutive births between January 1994 and January 1997. Out of these 583 singleton, normal delivery cases were selected for the purpose of this study.

Further, only data for 1995 was considered as it had sufficient number of cases, i.e. 391 records. From these, 323 cases which contained most of the variables formed the final sample.

These data were specific to the population of mothers who were delivered at the Manjung Hospital and to the recording techniques of the hospital. The sample were analysed with respect to the ethnicity of the mother, maternal age, maternal height, maternal employment, parity, number of ante-natal visits, and the gestational age of the baby. The infant birth weight and gender were also studied.

All this data was transferred to a data transfer sheet and then entered into the computer using a database package dBase III Plus. An epidemiological package (EPI-INFO ver 5.0) was used for the purpose of statistical analysis. The data was inspected for transcription errors and out of range values. All the continuous variables were examined for normality distribution. Appropriate test of significant test was used to test the consistency of the data with the Null Hypothesis at the significant level of 0.05. Also included in the analysis was the reporting of the odds ratio with 95 % confidence interval.

Results

Sample data

There were altogether 391 records (ante- and postnatal cards) of births during 1995 from the two health centres in Sitiawan. These two health centres served mostly mothers from Sitiawan and Manjung townships, and a nearby Kampung Koh, about 3 kilometres from Sitiawan. Based on the inclusion and exclusion criteria, 323 singleton normal births were studied.

Birth weight distributions

With the exception of one extreme value, i.e. 1.6 Kg, the distribution of the birth weight is nearly symmetrical. (Figure 1) Most of the values tend to be closer towards the centre

Corresponding address:
Dr. Atiya Ab Sallam,
Department of Social and Preventive Medicine, Faculty of Medicine,
University of Malaya, 50603 Kuala Lumpur, Malaysia

of distribution, with the mean (std. deviation) of 3.19 (0.49)kg .

The distributions for the Malay, Chinese and Indian also reveal symmetric distribution even though it is slightly skew towards the left for the Indian infants.

As shown in Table 1, there seems to be some difference in the mean birth weights between the three ethnic groups, with Chinese and Malay were on average heavier compared to the Indian. Also, it is of interest to find that Indian babies' weight tend to be slightly more variable compared to the Malay and Chinese.

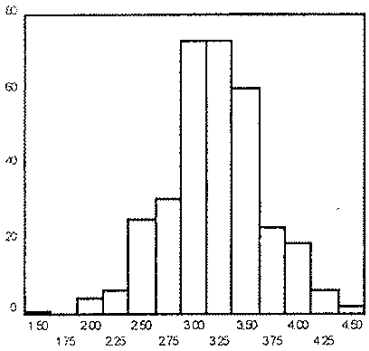
The relationship between mothers' characteristics and the birth weight

In order to examine the relationship between some of the characteristics collected in this study with low birth weight, the data on birth weight were classified either as low birth weight LBW (< 2.5 Kg) or normal birth weight (=>2.5 Kg). Each of the mothers' characteristics: ethnicity, employment status, height, parity, number of ante-natal visit, and gestational age was cross-tabulated with tile birth weight ('Low' versus 'Normal').

The overall incidence of LBW was 6.5 percents. As shown in Table 2, it can be seen that for ethnicity, mother's height, parity, and gestational age - the difference in the proportion of LBW among the various categories were statistically significant. The magnitude of its 'effect' can be seen from the odds ratio. For instance, if the mothers' height is less than 145 cm the risk of LBW is about 5.2 times (95% C.I. : 1.5, 17.6) compared to mothers' whose height is 145 cm or more. However, there were insufficient evidence to suggest that employment, and the number of antenatal visit were associated with LBW.

Table 1. Summary statistics for the birth weight (Kg) for the three ethnic group

Ethnicity	No.	Mean	Std. Dev.
Malay	121	3.26	0.42
Chinese	117	3.23	0.40
Indian	85	3.05	0.47



Distribution of birth weight of infants at two health centres, Sitiawan for the year 1995

Discussion and Conclusion

There were some differences in the mean birth weights among the three ethnic groups. The Indian babies on average seem to be lighter compared to the Chinese and Malay. This finding seem to be supported by studies done at Maternity Hospital Kuala Lumpur (2) and in Singapore. (3) These differences may be explained by the type of diet eaten, especially among those in a lower socio economic group. Apart from these factors which may explained some of these differences, the genetic predisposition among ethnic groups cannot be ruled out.

The overall incidence of LBW was 6.5%. This figure was much lower than those found elsewhere. (2, 4) This may not be reflective of the actual incidence as the sample were taken among the mothers who stay within the township of Sitiawan, where the health centres were located.

In terms of LBW among the three ethnic groups, the Indian showed the highest incidence (14.1%), while the Chinese being the lowest (1.7%). In terms of odds ratio, the risk of LBW among Indian, and Malay compared to the Chinese were 9.5, and 3.5 times respectively.

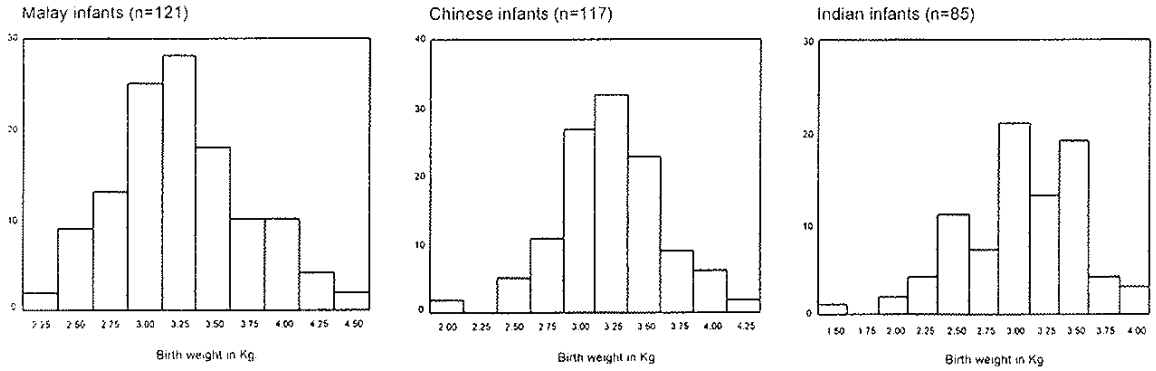


Figure 1. The distributions of birth weight (Kg) for the three ethnic groups.

In this study some of the maternal characteristics were examined for its association with LBW. As for the mothers' height, the association was statistically significant (p=0.004). We found that mothers whose height were less than 145, had 5.2 times the risk of having LBW babies (95% C.I. 1.5, 17.6). This may have contributed indirectly to the differences in the incidence of LBW among the three ethnic groups seen above. However, as for the pre-pregnancy weight the difference in the proportion between those with less than 50 Kg (8.2%) and those with 50 kg and more (6. 1 %) was not statistically significant (p=0.504).

As seen from other studies, birth weights were lower among lower socio-economic groups. In this study we examined mothers' employment status as a proxy measure for socio-economic status. The differences of LBW between working (3.0%) and non-working mothers (3.0%) was not statistically significant (p = 0.083) with the odds ratio of 2.8 (95% C.I. 0.8, 10.0). It must be stressed that the use of mother' employment status was rather inadequate as the type of occupation, level of education or income were not known.

As for parity, there was a significant association. The risk was lower for multipara (0.3) and grand multipara (0.8) compared to primipara. This finding was similar to the study carried out by Hashim, *et al. (2)*

The minimum requirement for ante-natal visits set by the Ministry of Health is eight. From the study done by Trivedi *et al* (5) there was a significant association between ante-natal care and birth weight. In this study we tried to find out whether mothers who had less than 8 visits to be more at risk of having LBW babies. However, the finding was not statistically significant (p=0. 145).

Gestational age was also thought to contribute to the incidence of low birth weight. From our finding, those mothers whose gestational age was less than 38 weeks, the proportion of LBW was significantly much higher (26.4%) compared those with gestational age of 38 weeks or more (2.3%), with the accompanying risk of about 15 times.

However, the findings from this study should be interpreted with caution because of the limitations and errors already mentioned. Furthermore, the analysis of the data is limited in the sense that it does not take into

Table 2. Relationship between mothers ethnicity, employment status, height, parity, no, of antenatal visit, gestational age and birth weight.

Characteristics	Birth weight				Total		p-value	O.R. 95% C.I
	Low		Normal					
Ethnicity								
Chinese*	2	(1.7%)	115	(98.3%)	117	(100.0%)	0.002	1.0#
Malay	7	(5.8%)	114	(94.2%)	121	(100.0%)		3.5
Indian	12	(14.1%)	73	(85.9)	85	(100.0%)		9.5
Employment								
Not working	18	(8.1%)	204	(91.9%)	222	(100.0%)	0.083	2.8
Working	3	(3.0%)	98	(97.0%)	101	(100.0%)		(0.8, 10.0)
Height								
< 145 cm	4	(23.5%)	13	(76.5%)	17	(100.0%)	0.004	5.2
> 145 cm	17	(5.6%)	287	(94.4%)	304	(100.0%)		(1.5, 17.6)
Parity								
Primipara**	9	(13.0%)	60	(87.0%)	69	(100.0%)	0.019	1.0#
Multipara	9	(4.0%)	216	(96.0%)	225	(100.0%)		0.3
Grandmultip	3	(10.3%)	26	(89.7%)	29	(100.0%)		0.8
Antenatal visit								
< 8 visit	10	(9.3%)	97	(90.7%)	107	(100.0%)	0.145	1.9
=> 8 visit	11	(5.1%)	205	(94.9%)	216	(100.0%)		(0.8, 4.7)
Gest. Age								
< 38 weeks	14	(26.4%)	39	(73.6%)	53	(100.0%)	0.000	15.2
=> 38 weeks	6	(2.3%)	254	(97.7%)	260	(100.0%)		(5.5, 41.9)

Footnote: *Chinese and **Primipara were used as baseline for calculating odds ratio.

95% C.I. was not calculated. Some of total does not add up to 323 cases due to missing data.

account of the multiplicity of factors that may influence the outcome (LBW) as well as the inter-relationship between the factors themselves. (6,7,8)

There are several limitations in this study. The data was secondary in nature as such there was no standard procedure in the measurement, e.g. birth weight. Thus, some of these variables were subjected to errors. Some of the records were incomplete, e.g. gender, where 81 records with no information about sex of the infant.

There was a selection bias, as the sample was obtained only from the two health centres. This may not be representative of the population at large. For example, those who delivered in private hospitals and clinics were not included. Moreover, both of the health centres were located in a more 'urbanised' areas.

Other variables, e.g. place of stay (urban or rural), education level, and dietary history could not be studied as these were not collected routinely.

However, this project has given us the opportunity to carry out a small scale study on the available data. It is quite obvious that the data from clinic records could be used for the purpose of examining health issues. In this situation, the birth weight data can be analysed to see the trend which can provide a picture of the health status in the community, specifically in the area of maternal and child health. Nevertheless, we take caution in the interpretation of these data.

Acknowledgement

We would like to express our gratitude to the Medical Officer of Health of Manjung district, Dr.Vimala Sothirajah for her permission to carry out this thematic project as part of the rural health posting requirement. Also our thanks to Sister Rogayah bt. Abd. Mutalib for her help in accessing the ante and postnatal records. We would like thank our fellow station colleagues who have helped to transfer the data and helped in the analysis.

References

1. World Health Organisation. Low birth weight - A tabulation of available information. 1991.Geneva.
2. Hashim M.Tahir et al. low Birth Weight In Kuala Lumpur. *Asia-Ocenia J Obstet. Gynaecol* 1991; 17 (2): 135-142.
3. Cheng MCE. Birth weight distribution of Singapore Chinese, Malay and Indian infants from 34 weeks to 42 weeks gestation. *J Obstet Gynaecol Br Commowealth. 1972*; 79: 149-153.
4. Kamaladoss T, Abel R, Sampathkumar V. Epidemiological Co-relates of Low Birth weight in Rural Tamil Naidu. *Indian J Paediatr. 1992*; 59: 299-304.
5. Trivedi CR, Mavalankar DV. Epidemiology of low birth weight in Ahmedabad. *Indian J Paediatr. 1986*; 53: 795-800.
6. Kreamer MS. Determinants of low birth weight: Methodological assessment and meta-analysis. *Bull WHO Org.* 1987; 67: (663-737).
7. Dougherty CRS. Determinants of birth weight. Am *J Obstet. Gynaecol.* 144; (2): 190-200, 1982
8. M.S Rogers and Kay Rogers, Determinants of birth weight in Vietnamese Detainees in Hong Kong. *Asia-Oceania J Obstet. Gynaecol.* 1994;Vol. 20 (4): 400.

List of Students, Manjung Rural Health Posting 1996.

Group 1

Ahmad Hapizi Abdullah
Akmal Haliza Hj Zamli (Cik)
Anita Delilah bt Salahuddin (Cik)
Azizul bin Adam
Chan Siew Hong
Chang Guang Swee
Jasvin Kaur Josen (Cik)
Jeffery Stephen

Group 2

Azah Alias (Cik)
Azainorsuzila bt Mohd Ahad (Cik)
Azman bin Othman
Herman Loi Deck Kiong
Khairanizam bin Abdullah
Kumareson a/l Nallusamy
Lawrence Hii Wei Soon
Tengku Mastura Tengku Mohd (Cik)

Group 3

Chew Kork Yin (Cik)
Lim Yew Chien
Rosnah Ismail
Roziah Husin
Samuel Phan Sern How
Sharmini Sivaraman (Cik)
Suhati binti Jusoh (Cik)
Ungku Ahmad Ameen U. Md Zam

Group 4

Che Nor Elani Ab Halim (Cik)
Masturawati Asari (Cik)
Rohaidah Hashim (Cik)
Saiful Aizar Hj Kesut
Tan Tee Yong
Too Seng Chin
Williemena Ong Hsu Chang (Cik)