ANALYSIS OF SELECTED MATERNAL FACTORS FOR DEVELOPMENT TRENDS IN SAINTHAMARUTHU MOH DIVISION

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Abstract

Prevalence of low birth weight (LBW) in Sri Lanka is 22 % and in the Ampara district it is 15.8%. It is believed the Sainthamaruthu Medical Officer of Health (MOH) division which is a suburban area in the Ampara district has improved maternal health facilities and this should have different statistics. In this descriptive research study, all the pregnant women who delivered babies in 2015 in Sainthamaruthu MOH area were studied for the selected maternal factors and this statistics were comparedfor development trend with2009. The associated maternal factors related to LBW were also studied.

The study results revealed that theprevalence of LBW was 12.65% which is significantly less than the district statistics (p = 0.032). The mean birth weight was 2997.47 g. The initial weight of the pregnant mothers was significantly associated with LBW (p = 0.0073). The relative risk of delivering LBW babies in 2015 compare to that of 2009 was between 0.866 to 1.969 (OR=1.3059, 95% CI: 0.866, 1.969). Therefore no improvement has occurred which is not a good contribution to the millennium development goal and therefore it is recommended to identify the high risk mothers early during their pregnancy time to provide special prenatal care.

Key words: Birth weight, Low birth weight, Maternal factors, Pregnancy.

Introduction

In the health sector, Sri Lanka is trying to achieve its development in different ways. One main side of this sector is related to maternal factors which is one of the millennium development goal. In Sri Lanka, maternal mortality was brought down to 27 per 100,000 live births, infant mortality is 11.2 per 1000 live births (Department of health services of Sri Lanka, 2002) and under five mortality rate is 4.4 per 1000 under five population (Ministry of Health Care Nutrition & Uva Wellassa Development, 2005).

The life expectancy has gone up to 73.0 years (70.7 years in males and 75.4 years in females), (Department of health services of Sri Lanka, 2002). However, Sri Lanka has much more to achieve in maternal and child health especially in nutrition targets compare to the developed countries or to reach millennium development goals. Birth weight is a major determinant of the maternal factor that determines perinatal mortality and mortality and morbidity (Perera and Lwin, 1984). Birth weight is the first weight of the fetus or newborn obtained after birth. For live births, birth weight should preferably be measured within the first hour of life, before significant postnatal weight loss has occurred (UNICEF and WHO, 2004).

Low Birth Weight (LBW) is a major determinant of mortality, morbidity and disability during infancy and childhood, also having a long term impact on health outcomes once adulthood is attained (Francis et al., 2012). World Health Organization (WHO, 1992) defined LBW as a condition where the weight at birth of a baby is less than 2500 grams

(5.5 pounds), usually measured in the first hour of life irrespective of the gestational age.The prevalence of LBW in Sri Lanka is 22 % in the sub region of South-Central Asia. There are 69,000 infants born with low birth weight here (UNICEF and WHO, 2004).According to the reporting of the Public Health Midwives (PHM) all over the country, since 2007 up to 2013 approximately 12-13 % of neonates' weight is less than 2500 grams at birth. Nuwara Eliya (20.6%) reported the highest percentage of newborn with LBW and Ampara (15.8%) also reported the higher percentage (Family Health Bureau, 2013).

Sainthamaruthu Medical Officer of Health (MOH) division is a suburban area in Ampara district of Sri Lanka. A descriptive cross sectional study was carried out for observing any development trends in selected maternal factors and to study the maternal related factors such as birth weight, maternal age, initial weight of the mothers, parity, BMI, the amount of hemoglobin (Hb) in blood, maternal weight gain during the pregnancy time, pregnancy duration, gender of the babies and delivery months vs. gender of the babies. The associations between prevalence of low birth weight and the maternal factors also were studied.

Methodology

This study was conducted in Sainthamaruthu MOH area in Ampara district. A total of 427 registered pregnant mothers' details were collected from 8 field level health staff in 2015 from their prepared data entry book and the collected data were entered in ascending order of delivery date by usingMicrosoft Excel. The details of those who relocated to other places, delivering twin deliveries and died infants excluded from the entries. The recorded data in the Excel data sheet were coded and transferred to Minitab data sheet and required statistical analysis were performed using Minitab-16 and SAS software. Further, 5% of significant level was used in this study.

Results and Discussion

LBW and Maternal Age

Figure 1 shows the percentage of babies born by age categories of the mothers for year 2009 and 2015. It was observed that 80 % and 80.3% of the mothers given birth were between 20 to 34 years old in 2009 and 2015 respectively, however the teenage mothers were 6.3% and 5.4 % at the same time. A slight decrease in teenage pregnancy has been observed, which is a good sign.

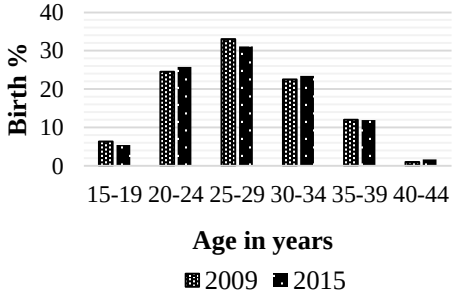


Figure 1: Maternal age and Birth weight

Figure 2 shows the average birth weight for maternal age categories for the compared two years. Less average birth weights were observed for the mothers of age 15 to 24 years. The 25 to 34 years of age mothers havegiven the average birth weight of 3036.7g in 2009 where more than 35 years of age mothers havegiven average birth weight of 3054.9g in 2015.

The table 1 shows that the LBW prevalence in the year 2009 and 2015 were 9.98% and 12.41 % respectively which a negative improvement. No associations were found between age of mothers and LBW (p = 0.160, 0.9096). The LBW prevalence was not significantly higher among the teenage mothers as expected (6.3 % in 2009, 13% in 2015) andit might be due to additional consideration and care taken by them.

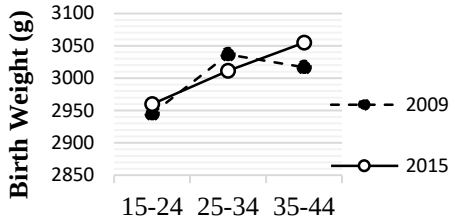


Figure 2: Maternal age and Birth weight

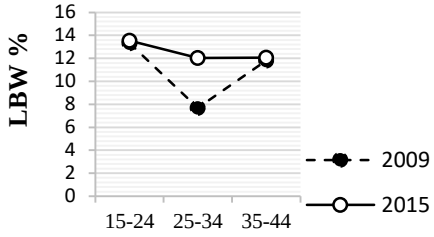


Figure 3: Maternal age and LBW%

Table 1: Distribution of age pregnancy and prevalence of LBW

Age	Year					
	2009			2015		
	No. of Births	No. of LBW	Birth weight*(g)	No. of Births	No. of LBW	Birth weight*(g)
15-24	150	20 (13.3%)	2945.05	133	18 (13.53%)	2959.77
25 – 34	273	21 (7.7%)	3036.74	233	28 (12.02%)	3011.55
35 -44	68	8 (11.8%)	3016.57	58	7 (12.07%)	3054.91
Total	491	49 (9.98%)	3005.9	427	53 (12.41%)	2997.47
	(X^2 = 3.709, DF = 2, P = 0.160)			(X^2 = 0.1895, DF=2, P =0.9096)		

LBW on Initial Weight of the Mothers

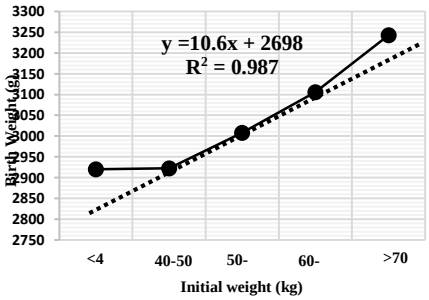
Table 2 gives birth weight and low birth weight percentage observed among the initial weight of mothers for the 2009 and 2015. A significant association was found between initial weight and prevalence of LBW in 2009 and 2015. The highest prevalence of LBW 34.62 % was found for the mothers whose initial weights were less than or equal to 40kg in 2015 and 14.58% was found for the same category of the mothers in 2009. A significant difference in birth weight was also observed for different maternal initial weight categories to both 2009 and 2015.

Figures 4 and 5 show the relationship between birth weight and maternal initial weight. A 73.7 g birth weight increase was observed for each 10 kg increase in initial weight of

mothers from the 40 kg initial weight in 2015. In 2009, from 40 Kg initial weight, for each 10 Kg increase in initial weight, 106 g increase in birth weight was observed.

Table 2: Distribution of maternal initial weight and prevalence of LBW

Initial weight (kg)	Year					
	2009			2015		
	No. of Births	No. of LBW	Birth weight * (g)	No. of Births	No. of LBW	Birth weight * (g)
≤ 40	48	7 (14.58%)	2919.85	26	9 (34.62%)	2787.8
>40 - ≤ 50	159	23 (14.47%)	2922.5	112	14 (12.5%)	2956.1
>50 - ≤60	158	15 (9.49%)	3007.61	121	17 (14.05%)	2984.1
>60- ≤70	93	4 (4.3%)	3106.02	97	8 (8.25%)	3053.6
>70	33	0 (0%)	3243.03	67	6 (8.96%)	3115.9
	(X^2=11.7318, DF=4, P=0.0195) (*F=3.05, P=0.034)			(X^2 =13.9841, DF=4, P=0.0073) (*F=3.15, P=0.014)		



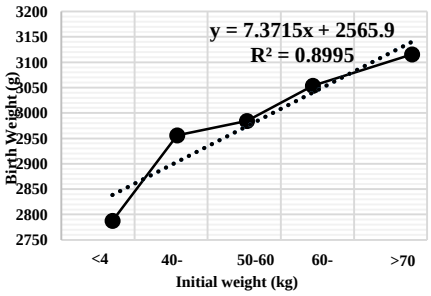


Figure 4: Initial weight and Birth weight Figure 5: Initial weight and Birth weight

LBW on Parity

The figure 6 and 7 shows, the birth weight increases with parity and LBW prevalence decrease with parity for the both years.Table 3 shows the percentage of low birth weight was highest as 15.6 % when the parity was one. No significant difference in birth weight was observed for different parity categories (F=0.81, p=0.543).

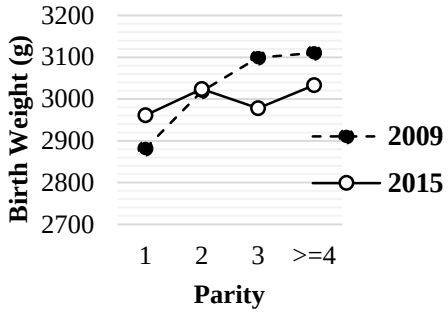


Figure 6: Parity and Birth weight

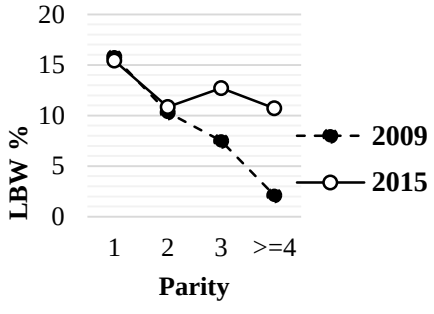


Figure 7: Parity and LBW %

Table 3: Distribution of parity in pregnancy and prevalence of LBW

Parity	Year					
	2009			2015		
	No. of Births	No. of LBW	Birth weight*(g)	No. of Births	No. of LBW	Birth weight*(g)
1	165 (33.6%)	26 (15.8%)	2881.3	149 (34.89%)	23 (15.44%)	2961.4
2	136 (22.7%)	14 (10.3%)	3018.9	129 (30.21%)	14 (10.85%)	3024
3	94 (19.14%)	7 (7.5%)	3098.9	63 (14.75%)	8 (12.7%)	2978.1
4	48 (9.78%)	2 (2.1%)	3110.8	44 (10.3%)	6 (13.64%)	2980.9
5	26 (5.3%)			23 (5.39%)	2 (8.7%)	3154
6	13 (2.7%)			9 (2.11%)	1 (5.88%)	3011.1
> 6	9 (1.8%)			8 (1.87%)		2992
	(X^2 =13.481, DF=3, P=0.004) (*F = 8.21, P=0.000)			(X^2=2.4824, DF=5, P=0.7791) (*F=0.81, P=0.543)		

LBW on BMI of pregnant mothers

Figure 8 shows the average birth weight for the different BMI category of the mothers. Table 4 shows the relationship between the BMI categories of mothers and prevalence of low birth weight. In 2015, BMI was categorized into four types. No significant association was found between the prevalence of LBW and BMI categories (χ^2 =2.3988, p=0.4939) and no significant difference in birth weight was also observed for different BMI levels (F=1.93, p=0.124).

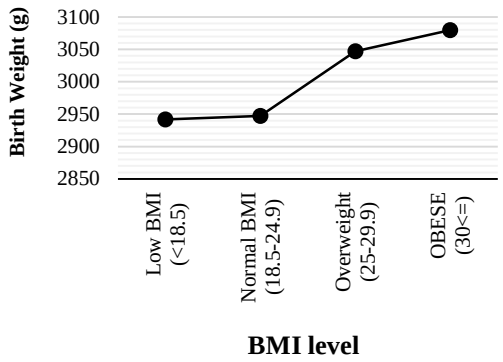


Figure 8: BMI level and Birth weight in 2015

Table 4: Distribution of BMI Level of mothers and prevalence of LBW

BMI level	Year					
	2009			2015		
	No. of Births	No. of LBW	Birth weight *(g)	No. of Births	No. of LBW	Birth weight*(g)
Low BMI (<18.5)	50	7 (14.89%)	-	49 (11.48%)	8 (16.33%)	2941.9
Normal BMI (18.5-24.9)	424	40 (10.07%)	-	191 (44.73%)	27 (14.14%)	2947.2
Overweight (25-29.9)	-	-	-	112 (26.23%)	10 (8.93%)	3046.9
Obese (30<=)	-	-	-	57 (13.35%)	8 (14.04%)	3079.6
	(X^2 = 1.044, DF=1,P=0.307)			(X^2=2.3988, DF=3, P=0.4939) (*F=1.93, P=0.124)		

LBW on maternal weight gain during the pregnancy time

Table 5 shows that a significant association was not found between weight gain during the pregnancy and prevalence of LBW in year 2015 (χ^2=2.9075, p=0.2337). But the year 2009 exhibited a significant association amongst the weight gain andprevalence of LBW (χ^2=7.351, p=0.026). However, in boththe years highest prevalence of LBW was observed when the weight gain is less than 5g.

Table 5: Distribution of weight gain during pregnancy and prevalence of LBW

Weight gain (kg)	Year					
	2009			2015		
	No. of Births	% LBW	Birth weight* (g)	No. of Births	% LBW	Birth weight* (g)
≤5	24	25%	2899.79	60	18.33%	2882.9
5 - ≤9	173	10.47%	2971.69	132	11.36%	3062.5
>9	295	8.14%	3034.54	186	10.22%	3011.7
	(X^2 = 7.351, DF=2, P=0.026)			(X^2=2.9075,DF=2, P=0.2337)		

LBW and Gender of the babies

Table 6 gives average birth weight and prevalence of low birth weight among the gender. In 2015, the birth weight of boy and girl were ranged from 1100 g – 4180 g and 1110 g – 4300 grespectively. Nosignificant difference was observed between the gender of the babies (t= -1.24, p =0.214). No significant association was found between prevalence of LBW and gender of the babies in both years (χ^2=0.051, p=0.821, χ^2= 0.0384, p= 0.8446). The sex ratio at birth was 0.94 male per female in 2015 when the national ratio was 1.04 (Central Intelligence Agency, 2015).

In 2009, the average birth weight of sample was 3005.9 g. The birth weight of boy and girl neonates were ranged from 1425g – 4500g and 1055g – 4470g respectively. No significant difference was seen amongst boy and girl neonates (t= -0.81, p=0.416). The prevalence of LBW was 9.98% (9.78 ± 2.27 % at 95 % CI).

Table 6: Distribution of Gender of the babiesand prevalence of LBW

Gender	Year					
	2009			2015		
	No. of Births	No. ofLBW	Birth weight * (g)	No. of Births	No. of LBW	Birth weight * (g)
Boy	248 (50.5%)	24 (10.29%)	3021.7	200 (46.8%)	25 (12.5%)	3021.9
Girl	243 (49.5%)	25 (9.68%)	2989.8	213 (49.9%)	28 (13.15%)	2963.8
Total	491	49 (9.98%)	3005.9	427	54 (12.65%)	2997.5
	(X^2=0.051, DF=1, P=0.821) (*t= -0.81, P=0.416)			(X^2=0.0384, DF=1, P=0.8446) (*t= -1.24, P= 0.214)		

Conclusion

This study found that in 2015, the average birth weight was 2997.47 g and prevalence of LBW was 12.41%. Noassociation was found between maternal age and prevalence of LBW. But the percentage of LBW was highest among teenage mothers. Therefore, at least the teenage pregnancy should be avoided. An association was found between the prevalence of LBW and the maternal initial weight. Maternal weight gain during the pregnancy time did not show significant associations with the prevalence of LBW. Noassociation was seen between the gender of the babies and LBW.When comparing the prevalence of LBW for the years 2009 and 2015, the relative risk of 2015 compare to that of 2009 was between 0.866 to 1.969 (OR 1.3059, 95% CI:0.866,1.969).

Therefore no improvement has been observed and it is not a good contribution to the millennium development goals. Therefore pre-pregnancy counseling should be made available to all mothers. Pregnant mothers can make some significant minor lifestyle changes. Like minimizing stress and having sufficient sleep can have significant benefits on growing foetus. It should concentrate on achieving the normal level of BMI, discouraging teenage pregnancy, keep pre-existing medical illnesses under control and maintain healthy weight gain and good nutrition. So it is recommended to identify the high risk mothers early during their pregnancy time and to start and provide the prenatal care during that same time.

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