

The effect of mother's age, parity and antenatal clinic attendance on infant birth weight

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Data from 252 deliveries at a rural hospital during 1988 and 1989 showed that infants born to adolescent mothers had the lowest mean birth weight and highest incidence of low birth weight. Adolescent mothers were, in general, mothers with low parity levels, and the highest incidence of low birth weight was observed in mothers of parity 0 or 1. Average birth weights were higher at parity levels of 4 and 5. Although almost every woman attended the antenatal clinic, women who attended the clinic more than 3 times during pregnancy tended to have higher birth weight infants. More detailed data from 40 of these deliveries suggested that low family socioeconomic status and household food insecurity during pregnancy are also associated with lower birth weight infants.

Introduction

Birth weight reflects intrauterine growth. It is a determinant of the child's potential for survival and future health. Fetal growth is affected by heredity and environment. Environment includes maternal characteristics such as disease, infection, intoxication, age, parity, size, nutrition, emotional state, smoking, and alcohol consumption¹. Socioeconomic status and prenatal care of the mother also influence the environment indirectly. Malawi has a very high infant mortality rate (151 per 1000 live births)². Low birth weight infants (i.e. <2.5 kg) have higher risks of neonatal and infant mortality than normal weight infants³. Twenty per cent of the infants born in Malawi have low birth weight⁴, and thus low birth weight is likely to be a major factor contributing to Malawi's high infant mortality rate. Three major factors affecting mother's condition (age, parity and antenatal care) were chosen to investigate the determinants of differences in infant birth weight.

Methods

Data collected by the Ministry of Health in 1988 from 212 mothers and infants delivered in the

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Maternity unit of Mitundu Rural Hospital were analyzed to assess the effect of mother's age, parity and attendance at ante-natal clinics on birth weight. In order to find more detailed information on factors affecting birth weight, another 40 mothers who delivered babies in the same maternity unit in 1989 were interviewed using a questionnaire. Midwives' delivery books were also used to collect further information on these 40 mothers in 1989. The data were then analyzed using one way analysis of variance to compare mean birth weights as affected by age, parity and attendance at antenatal clinic attendance⁵.

Results and Discussion

MOTHER'S AGE AND INFANT BIRTH WEIGHT

Mothers were divided into three groups: below 20 years, 20-35 years and older than 35 years. Table 1 presents the mean birth weight of infants and incidence of low birth weight infants according to mother's age.

Table 1 Incidence of low birth weight (LBW) and mean birth weight of babies from different age groups of mothers

Mother's age (years)	Number of mothers	Number of babies	Number of LBW babies (%)	Mean birth weight (kg) (\pm SE mean)
< 20	48	19	(39.6%)	2.7 \pm 0.38 ^a
20-35	135	21	(15.6%)	3.0 \pm 0.42 ^b
> 35	29	2	(9.6%)	3.1 \pm 0.44 ^b
Total	212	42	(19.6%)	3.0 \pm 0.44

^a is significantly different from ^b ($p < 0.05$)

The percentage of low birth weight infants was 19.6% (42/212) which is close to the national average⁴. The data from 1988 on 212 births presented in Table 1 is similar to data from the 40 interviewed mothers in 1989. The mean birth weight of the babies from all mothers was 3.0 kg which is slightly lower than the international standard adopted by WHO⁶. The mean birth weight of the full-term infants born in the paying maternity unit of Kamuzu Central Hospital was 3.3 kg for boys and 3.2 kg for girls. It appears that the birth weight of the children born from high socioeconomic classes in Malawi is not significantly different from international standards⁶.

Percentage low birth weight was highest (39.6%) in adolescent mothers, which agrees with findings of Roberts and colleagues that there is a high

incidence of low birth weight infants in adolescent mothers⁷. The mean birth weight for adolescent mothers was 2.7 kg which is significantly lower than the infants of older mothers. In the adolescent mothers, the incidence of having low birth weight infants is high mainly because of competition between the metabolic demands of the growing adolescent mother and the nutrient needs of her developing fetus^{8,9}. Adolescent mothers' own needs for growth and development are compromised by the extra demands on their system. Thus the inability of the placenta to function adequately and the unavailability of nutrients for active fetal growth could be responsible for the low weight of the babies. The American Dietetic Association¹⁰ stated that pregnant adolescents are nutritionally at risk and require nutrition intervention early and throughout the duration of their pregnancies. However, infants born to adolescent mothers who were overweight before conception had heavier weight infants (mean 3.3 kg) than their underweight peers (mean 2.77 kg) who had also not completed their expected growth⁹. Thus, age itself does not seem to be the critical factor, rather it is the general physical and nutritional condition of the mother that matters most. The pre-pregnancy weight and weight gain during pregnancy were not determined in this study. It is therefore difficult to know in what state the adolescent mothers entered pregnancy. It would be interesting to study the nutritional status of teenage pregnant mothers and their pregnancy outcome, especially when a high proportion of teenage pregnancy exists in the country. In Malawi, the mean age at first birth was reported as 19 years and 30% of the women aged 15 to 19 had at least one birth¹¹. Mothers who were older than 35 years had lowest number of low birth weight infants, which is contrary to other findings¹² where older mothers had more incidence of low birth weight infants. In the present study, the mothers who were older than 35 years had significantly better pregnancy outcomes than the adolescent mothers. Compared to the adolescent mothers, the older mothers could have been economically better off. When old aged mothers maintain good physical fitness, they appear to be able to reduce the risks of pregnancy considerably¹. Thus, the mother's overall health seems to be the major determinant in pregnancy outcome.

MOTHER'S PARITY AND INFANT BIRTH WEIGHT

Table 2 summarises the incidence of low birth weight infants and mean birth weight of infants at

different parity levels of the mother.

The results from the separate study of 40 mothers in 1989 were similar to the data in Table 2. Highest incidence of low birth weight (25.6%) was observed in mothers of parity 0 - 1 and this generally decreased up to parity levels of 4 - 5 (10.3%).

Mothers with parity levels of 0 - 1 were mostly adolescent mothers. The general trend was that there was an increase in incidence of having above

Table 2 Incidence of low birth weight infants and mean birth weight of the infants at different parity levels

Parity level	Number of mothers	Number of LBW	Mean birth weight infants (kg)
0 - 1	86	22 (25.6%)	2.8 ± 0.39 ^a
2 - 3	46	8 (17.4%)	3.1 ± 0.45 ^b
4 - 5	38	4 (10.3%)	3.0 ± 0.44 ^b
> 5	42	8 (20.0%)	3.0 ± 0.44 ^b
Total	212	42	3.0 ± 0.44

^a is significantly different from ^b (p < 0.05)

average birth weight infants as parity increased. In general, the first-born weighs less, but birth weight increases as parity increases up to four and then decreases with parity greater than five¹³. Low birth weight and neonatal deaths are more serious in adolescent and old aged mothers with high parity due to draining of nutritional resources. A mother who has several pregnancies within a limited number of years enters each successive pregnancy at high risk¹².

ATTENDANCE AT ANTENATAL CLINICS

In an effort to reduce pregnancy complications and to improve pregnancy outcome, antenatal clinics operate in Malawi. Mothers are given malaria prophylaxis, iron and folic acid tablets, and tetanus toxoid injections. Mother's weight gain is monitored since low pregnant weight gain leads to low birth weight infants⁹. Lessons on nutrition prior to, during and after pregnancy, child spacing, personal and family hygiene to reduce infectious diseases and sanitation are taught.

The data showed that almost everyone had attended an antenatal clinic (98%). Detailed data on antenatal attendance was not available for the 212 mothers in 1988 but was for the 40 mothers in 1989. This smaller sample showed that most mothers started attending the clinic in the second and third trimester. Two thirds of the mothers attended the clinic three to five times. The time that women started attending the class did not seem to have any profound effect on baby's birth weight. However, the women who attended the clinic more than 3 times during the pregnancy had higher birth weight

infants. Mothers who attend antenatal clinics should have a greater chance to participate in, or have access to, services such as nutritional classes and lessons on prenatal care.

OTHER FACTORS WHICH INFLUENCE INFANT BIRTH WEIGHT

Socioeconomic and other details were collected from the 40 women interviewed in 1989. Most of the mothers were from subsistence farming backgrounds. Most of them grew maize but some people grew beans, tobacco and vegetables. Many kept small numbers of chicken and goats.

60% of the interviewees did not have enough food to last the whole year and the mean birth weight of the babies from this group of women was lower than the ones from those households with sufficient food throughout the year. This shows a negative effect of food shortage on pregnancy outcome. Most of the mothers had finished their food by January and they had to rely on purchases from ADMARC.

Half of the mothers studied reduced their work in the 3rd trimester from carrying heavy loads, farming activities and some laborious jobs. The mothers who reduced their workload did not have higher birth weight babies. Similar studies done elsewhere have not shown differences in birth weight of babies¹.

Changes in diet during pregnancy were studied. Half of the subjects changed diet. Fish, beans, pork, goat meat, mice and okra were the most avoided food by pregnant mothers. They were avoided due to vomiting, constipation, and difficulty in breathing. The food avoided in pregnancy is usually high in protein. In the other countries, the same aversions often result in decreased intake of animal protein¹². However, the nutritional significance of this behaviour is difficult to evaluate and the dietary intake in individuals would have to be studied in detail to evaluate its effect.

The most frequent illnesses the pregnant mothers suffered from were fever and malaria, pre-eclampsia, dizziness and diarrhoea. Most mothers suffered from malaria and fever (75%). It is suspected that the pregnant mothers may not have taken malaria prophylactic even though it is prescribed in the antenatal clinics. Illness during pregnancy brings about both direct and indirect effects on fetal growth.

Only 2 out of 40 mothers interviewed were taking alcohol. One was a teenager who was also smoking, and she had a premature baby weighing 1.6 kg with gestational age of 28 weeks. Smokers have infants with lower birth weights than those who do not smoke⁹. The growth-retarding impact of smoking relates to the effects of carbon mono-

xide, nicotine and possibly other compounds on placental perfusion and oxygen transport to the fetus. Alcohol also directly affects the growing fetus by producing babies with fetal alcohol syndrome¹². However, father's habit of drinking beer seemed to have no effect on babies' birth weight because the mean birth weight was lowest in fathers who did not take beer (2.8 kg) and highest in those whose fathers regularly drank beer (3.37 kg). The father who could drink alcohol must have had the economic means to do so. Therefore the babies born to drinking fathers in this study could have had better nourished mothers.

Conclusion

Infants born to adolescent mothers had the lowest mean birth weight. Low birth weight infants have higher neonatal and infant mortality rate. For the health of both mothers and babies, the women should not start bearing children in their teens. Women should, if possible, delay starting a family until they are at least 20 years old. The emphasis on education should be on the adolescent pregnant mothers because the "still-growing" teenage body is imposed on by the additional demands of the pregnancy. Almost all the mothers attended antenatal clinics but those who attended clinic more than 3 times tended to have better pregnancy outcomes.

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