Original article

Birth weight pattern and factors affecting birth weight in urban areas of South-Western Ethiopia

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Abstract: A community-based cross-sectional study of birth-weight was carried out in 30 villages of Jimma Zone, to determine the pattern of birth weight, its relationship with ante-natal care, and the influencing factors in birth-weight. A total of 537 mother-newborn pairs were included in the study revealing an overall low birth weight rate of 10.6%.

About 72% of the mothers were booked for ante-natal care during the current pregnancy, and 332 (86%) of the deliveries were attended by trained personnel, including trained traditional birth attendants. Mean birth-weight for both sexes was 3,202 grams; and there was no statistically significant difference between the sexes (P>0.05). Higher mean birth weight was observed for newborns whose mothers attended ante-natal clinic and whose births were attended by trained personnel than those mothers without ante-natal care and unattended by trained personnel (P<0.05). Low birth weight was associated with being single, poor, without ante-natal care and not attended by trained personnel during delivery. Efforts to increase the utilization of ante-natal care services is recommended to minimize the risk of low birth-weight as it will help the timely correction of factors predicting low birth weight. [*Ethiop. J. Health Dev.* 1998;12(1):33-37]

Introduction

Birth-weight is governed by two major factors: duration of gestation and intrauterine growth rate. Antenatal care (ANC) may benefit both factors through early identification and proper management of risk factors, and pregnancy complications. It is very difficult to reach at firm conclusions about the possible benefit of early or frequent antenatal visits on either intrauterine growth or gestational duration (1). There are a number of components of ANC interventions that have been found to be effective, investigation, detection, treatment and referral of anaemia, hypertension and infections being some in the list. Therefore, foetal weight gain, birth- weight, and neonatal health have been shown to be significantly affected by the mother's use of ANC. Nevertheless, only a small number of the population in developing countries receive ANC (2). In Ethiopia coverage with ANC ranges from around 10% in rural areas to 60% in some urban areas. Data on distribution of birth weight are scanty. The few available are from deliveries conducted by health institutions. Of all deliveries in Ethiopia, more than 85% are attended by lay personnel and take place outside health units. In addition to having problems of coverage and representativeness, data from health units lack validity and reliability (3-6). Although they are inconsistent in defining low birth-weight (LBW), the existing institution-based data indicate a high magnitude of LBW in Ethiopia (7-11).

WHO estimates the incidence of LBW for Ethiopia as 10-20% (3). A similar estimate made by UNICEF indicates the percentage of LBW in Ethiopia to be 13% with the average birth-weight being 10% lower than those born in some developed countries (6).

The objectives of this study were to assess the magnitude of LBW, its relationship with

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prenatal care and to examine factors governing birth-weight among delivered newborns in Jimma Zone. It is hoped that findings of this study will provide better and representative data on the pattern of birth- weight and factors affecting it.

Methods

Study area: This cross-sectional community-based study was undertaken in 30 villages of Jimma administrative zone in South Western Ethiopia. The villages were selected using convenience sampling techniques. Two health centers, three clinics, and one hospital were located within 10 and 50 kms. radius from these villages, respectively. All the health facilities are involved in providing delivery and antenatal clinic (ANC) services.

Study population: All delivered newborns from 1st October to 31st January, 1993 were included in the study.

Data collection and analysis: Expectant mothers were registered, and visited on daily basis throughout their 3rd trimester by TTBAs and enumerators of their respective villages. The TTBAs and the enumerators met twice daily (morning and afternoon) in their respective Kebele offices and exchanged information on women who have delivered. A pre-tested structured questionnaire consisting of socio-economic, obstetric, and MCH service utilization pattern of the mother was completed by trained female enumerators within 24 hours after birth. The enumerators were provided with a salter spring balance with a capacity to weigh up to 10,000 grams and a piece of cloth weighing less than 5 grams to be used as a weighing pant. The accuracy of the balances was checked regularly using a standard weight.

The National Center for Health Statistics (NCHS) reference was used to define LBW i.e <2500 gm or less (12). Women who had had one or more visits to an ANC clinic in the current pregnancy were considered as users of ANC. Still births and multiple deliveries were excluded for analysis of this study. Data were entered and analyzed using SPSS/PC statistical package. Descriptive statistics as well as analytic methods were employed during analysis and presentation of the data.

Results

A total of 543 newborns were reported during the study period. Of these, six (two stillbirths and two sets of twin deliveries) were excluded while the remaining 537 mother- newborn pairs were included in this study. Of the 537 singleton live births reported, 393(73.1%), 123(22.9%) and 21(3.9%) were from Jimma, Agaro, Yebu and Serbo towns, respectively.

Table 1: **Distribution of study mothers by socio-economic characteristics, Jimma, 1994.**

Characteristics	N	%
Marital status		
Married	484	90.1
Unmarried	53	9.9
Total	537	100.0
Educational status		
Can't read and write	153	28.5
1-8 grade	170	31.7
Grade 9 & above	214	39.8
Total	537	100.0
Occupational status		
House wife	442	82.5
Others	94	17.5
Total*	536	100.0
Family Income		
No. Income	50	9.3

≤100 Birr	181	33.7
101-200 Birr	137	25.5
201-300 Birr	67	12.5
301- 400 Birr	28	5.2
400+	74	13.8
Total	537	100.0

* Analysis is based on non-missing data.

The mean age of the mothers was 25 years with a SD of 5.9. Among the study mothers 24.7% were primiparous, 27.7% grand multiparous (≥5) and 47.6% were with 2-4 previous pregnancies. History of prior abortion and stillbirths were reported in about 11% and 2% of the study mothers, respectively. The majority of the mothers were married (90.1%), able to read and write (72.9%), and house wives (82.5%) (Table 1). Table 2 shows the distribution of newborns by sex and birth-

Table 2: **Distribution of new borns by sex and category of birth weight Jimma, 1994**.

Category of Birth Weight	Male		Female		Total	
	N	%	N	%	N	%
Normal birth weight	273	57.9	207	43.1	43.1	89.4
Low birth weight	28	49.1	29	51.9	51.9	10.6
Total	301	56.1	236	43.9	43.9	100.0

$x^2 = 1.24$

P = 0.2655

LBW < = 2500 gms; NBW > 2500 gms

weight category. As indicated in the table the overall LBW rate was 10.6% with a male to female ratio of 1.3:1. Comparison of normal and low birth-weights by socio-demographic and health service use factors is presented in Table 3. LBW babies were found mostly among single and low family income mothers than others (P<0.05). A higher proportion of mothers with LBW babies were not booked for ANC and their deliveries were unattended by trained personnel than did women whose pregnancy ended in normal birth-weight (NBW) babies. The difference is statistically significant (P<0.05).

Table 4 summarizes the distribution of the study mothers' ANC status by attendants of the delivery. Trained personnel, including TTBAs attended 81.4% of the deliveries. There was a significant difference between attended and unattended deliveries with the status of antenatal care (P<0.01). Table 5 shows the influence of different socio-demographic variables on mean birthweight. Newborns delivered to mothers who were married and have visited an ANC at least once during the current pregnancy had higher mean birth- weight than newborns whose mothers were single and did not have ANC follow-up (P<0.05). However mean birth-weight was not influenced by factors like literacy status of mothers and sex of the baby (P>0.05).

Results of Regression analysis: Those independent variables, having significant bi-variate association with birth-weight in Tables 3 and 5 were entered into a linear regression model in consecutive steps. Among these variables used in the linear regression model only ANC and delivery attendant were found to have a significant relationship with birth weight at p = 0.02 and p = 0.001, respectively. The overall contribution of the variables when taken together is estimated to be .31047 (the linear regression explains a significant proportion of the total variation in birthweight). However other factors which were not included might affect birth weight in this study.

Discussion

Though strict comparisons may be difficult, the overall prevalence of LBW observed in this study is close to the reports from Gondar and Jimma (9,11). The overall mean birth weight in this study is slightly higher than the previous report from Jimma (11). Males in this study tended to have lower mean birth- weight than their female counterparts when compared to other studies in Jimma (10,11). The likely explanation for the higher LBW rate in those mothers who were not married and whose deliveries were not attended by trained personnel is that they are more likely to be of lower income group and may have less access to health care facilities. Furthermore, they might make less use of ANC and their nutritional status may also be sub-optimal as reported in other previous studies (13,14). As reported elsewhere (15,16), the more socio-economically disadvantaged the subpopulation, the poorer the perinatal outcome, and the higher the incidence of LBW. This conforms with the association of family income level and LBW in our study. On the contrary, other studies have reported that income did not differ

Table 3: **Comparison of normal and low birth-weight babies by socio-demographic, and health service use factors, Jimma, 1994.**

Characteristics	Birth weight category					
	LBW		NBW		X^2	P-value
	N	%	N	%		
ANC						
Yes	23	40.4	128	26.7	4.96	
No	34	59.6	352	73.3		P=0.025
Birth attendant						
Trained	38	66.7	397	82.7	7.51	
Untrained	19	33	83	17.3		P=0.006
Place of delivery						
Health Unit	20	35.1	231	48.1	2.97	
Home	37	64.9	249	51.9		P=0.084
Marital status						
Married	48	84.2	453	94.4	6.86	
Unmarried	9	15.8	27	5.6		p=0.009
Literacy status						
Grade 1 & above	19	33.3	353	23.7	0.94	
Can't read and write	38	66.7	126	26.3		p=0.332
Family Income						
No Income	10	17.5	40	8.3		
<100	25	43.9	156	32.5		
101-200	12	21.1	126	26.3	11.20	
201-300	3	5.3	63	13.1		

301-400	2	3.5	26	5.4		p=0.024
400+	5	8.8	69	14.4		
Sex of Baby						
Male	28	49.1	273	56.9		
Female	29	50.9	207	43.1		p=0.33

LBW < = 2500 gms; NBW > 2500 gms

significantly between LBW and NBW mothers (1). The provision of ANC is a means for better utilization of trained personnel and health units for delivery services as it was found in our study that mothers who had ANC are more likely to deliver in health units or by trained personnel than mothers without ANC. Among important factors included in this study, age, parity, religion and ethnicity of the mother were not found to be associated with birth-weight of an infant. The factors mentioned were among factors predicting birth-weight in other studies (1,6,18,19,20). The observed non-significant difference might be due to the relatively better maternal level of education in our study where mothers may be more likely to comply with medical advice during pregnancy or to make better use of health care services.

Table 4: **Distribution of mothers ANC status by attendant of delivery, Jimma, 1994.**

Attendant of delivery	Antenatal Clinic					
	Yes		No		Total	
	N	%	N	%	N	%
Trained	332	86.0	115	69.5	437	81.4
Untrained	54	14.0	46	0.5	00	8.6
Total	386	71.9	151	28.1	537	00.0

x $_2$=16.17 P=0.0005

Although gestational age and prematurity were not determined, bias as a possible explanation of the finding of the study was minimized by providing training to enumerators, and through frequent supervision, to avoid measurement bias during data collection. Moreover data quality was controlled by five field supervisors and the principal investigator regularly.

Table 5: **Mean birth-weight and factors affecting mean birth-weight, Jimma, 1994.**

Variables	Mean birth weight	t-value	p-value
ANC			
Yes	3179.2		
No	3071.9		
Birth attendant		2.32	p=0.0104
Trained	3179.2		
Untrained	3071.2		
Place of delivery		3.25	p=0.0006
Health unit	3191.2		
Home	3111.2		
Marital status		2.12	p=0.017
Married	3162.1		
Not married	2961.1		
Literacy status		3.48	p=0.0002
Grade 1 & above	3154.5		
Can't read & write	3130.3		
Sex of baby		0.54	p=0.295
Male	3169.1		
Female	3122.5		

Conclusion and Recommendation

The findings of this study have demonstrated that LBW is higher and mean birth-weight is lower among mothers without ANC. Based on this, we recommend that efforts to encourage mothers to utilize ANC services to minimize the risk of LBW is mandatory. Further study to measure the quality or quantity of ante-natal care is also recommended.

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