

## Comparative study of birth weight in newborns in tribal and non-tribal area in Marathwada region of Maharashtra, India

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### Abstract

**Introduction:** Birth weight is an important health indicator. The health indicator helps us to know the trend of population structure and social setup of the tribal people. The present study was conducted to study the birth weight among two population categories - tribal population of Kinwat, District Nanded and non-tribal population of Badnapur, Jalna, Maharashtra.

**Materials and Methods:** The birth weight of 2000 neonates born from 1st April 2012 to 31st March 2014 were obtained from the registers of the maternity wards of two Hospitals; More Nursing Home, Kinwat District Nanded for tribal population and IIMSR Medical College & Noor Hospital, Badnapur, Jalna, Maharashtra, India.

**Results:** Mean birth weight among the tribal neonates (2.74 kg) was significantly lower (p-value=0.001) than among non-tribal neonates (2.88 kg). Also, the proportion of low birth weight neonates was significantly higher among the tribal population. Similarly, for maternal age (age group 20-25 years) and parity (Para 2-4), the mean birth weight is significantly lower in tribal population as compared to the non-tribal population.

**Conclusion:** The mean birth weight is lower in tribal population and also the proportion of low birth weight in neonates is high in this population. This signifies that the tribal population deserves attention and focused health interventions.

**Keywords:** Birth weight, Tribal population, Low birth weight, Maternal age, Parity.

### Introduction

Maharashtra is considered as an important developed state in our country in terms of education, industrialization and social growth, but scheduled tribes in this state are found in backward conditions and they struggle for survival.<sup>1,2</sup> Therefore, it is immensely necessary to study and understand population structure and social setup of the tribal people. According to 2011 census, the total population of Maharashtra is 11,23,74,333, out of it 1,05,10,213 reported as scheduled tribe. These tribal populations are more in rural, less educated and less occupationally skilled. Now, birth weight is an indicator of intrauterine growth which provides an index of individual variability and also some information on the nutrition and health status of the mother. Hence in the present study, an attempt has been made to study the birth weight among two population categories-tribal population of Kinwat, district Nanded and non-tribal population of Badnapur, Jalna, Maharashtra, India.

### Materials and Methods

The birth weight of 2000 neonates were obtained from the registers of the maternity wards of two hospitals - More Nursing Home, Kinwat, district Nanded for tribal population and IIMSR Medical College & Noor Hospital, Badnapur, Jalna for non-tribal population, where complete birth records are maintained by the hospital authorities. The results reported here are based upon only singlet on live births obtained from individuals belonging to the lower and middle classes of socio-economic groups. Still-births, prematures, multiple births and births belonging to the higher socio-economic group have not been considered in the present data. The data comprised of 2000 infants born from 1st April 2012 to 31st March 2014. Other information also recorded includes the age of the mother, the order of birth and the sex of the baby. The statistical significance of differences in birth weight for maternal age and parity were tested using the unpaired t-test, z-test and chi-square test.

### Results

**Table 1: Comparison of mean birth weight between two groups**

	Non-tribal	Tribal	p-value
Mean	2.88	2.74	0.001 (highly significant)
S.D.	0.870	0.503	

It was seen from Table 1 that the mean birth weight in singlet on tribal population was 2.74kg (S.D.=0.503) and that in non-tribal population was 2.88kg (S.D.=0.870). Thus, the p-value is 0.001 which is highly significant.

**Table 2: Distribution of birth weight according to study area**

Birth weight (in kg)	Non-tribal (%) (n=1000)	Tribal (%) (n=1000)	Chi-square	p-value
< 2	12 (1.2%)	46 (4.6%)	36.46	0.000 (highly significant)
2.0 - 2.5	270 (27.00%)	341 (34.1%)		
≥ 2.5	718 (71.8%)	612 (61.2%)		

It was observed from Table 2 that among study population, 71.8% of the non-tribal women had birth-weight ≥2.5 kg whereas 61.2% of the tribal women had birth weight ≥2.5 kg, which is highly significant (p=0.000). The overall low-birth weight (<2500g) rate for tribal population was 34.1% which was significantly higher as compared to non-tribal population (27.00%). Tribal women (4.6%) had higher proportion of births weighing less than 2kg than did the non-tribal women (1.2%) which is highly significant (p= 0.000).

**Table 3: Socio-demographic characteristics of the study population**

Category	Non-Tribal (n=1000) No. (%)	Tribal (n=1000) No. (%)
<b>Age</b>		
< 20	48 (4.8)	45 (4.5)
20 - 24	534 (53.4)	607 (60.7)
25 - 29	355 (35.5)	295 (29.5)
30 - 34	51 (5.1)	48 (4.8)
≥ 35	12 (1.2)	5 (0.5)
<b>Religion</b>		
Hindu	612 (61.2)	702 (70.2)
Muslim	217 (21.7)	183 (18.3)
Others	171 (17.1)	115 (11.5)
<b>Parity</b>		
Primi	237 (23.7)	548 (54.8)
Para 2-4	744 (74.4)	440 (44.0)
Para 5+	19 (1.9)	12 (1.2)
<b>Gender of Baby</b>		
Male	547 (54.7)	487 (48.7)
Female	453 (45.3)	513 (51.3)
<b>Location</b>		
Urban	77 (7.7)	592 (59.2)
Rural	923 (92.3)	408 (40.8)

It was seen from Table 3 that as to parity, 23.7% of non-tribal and 54.8% of the tribal mothers were primipara. On the other hand, 1.9% of the non-tribal mothers and 1.2% of tribal mothers were Para 5 or greater. As to maternal age, 4.8% of the non-tribal mothers and 4.5% of the tribal mothers were under age of 20 where as 1.2% of non-tribal and 0.5% of tribal women were over the age of 40. In non-tribal population, 54.7% were male baby and 45.3% were female baby. In tribal population, 48.7% were male baby and 51.3% were female baby. In our study population, 92.3% of the non-tribal population belonged to rural area, whereas 40.8% of the tribal population belonged to rural area and 59.2% of the tribal population to urban area.

**Table 4: Distribution of birth weight according to age of mother**

Mother's age	Non-tribal (%) Mean ± SD	Tribal (%) Mean ± SD	p-value
< 20	2.749 ± 0.42	2.581 ± 0.67	0.159 (not significant)
20 - 24	2.88 ± 1.3	2.723 ± 0.48	0.003 (highly significant)
25 - 29	2.89 ± 0.41	2.804 ± 0.48	0.016 (significant)
30 - 34	2.91 ± 0.43	2.77 ± 0.57	0.169 (not significant)
≥ 35	3.017 ± 0.48	3.04 ± 0.66	0.946 (not significant)

It was observed from Table 4 that the distribution of birth weight according to age of mother, in both tribal and non-tribal women there was no significant difference in birth-weight in both the groups for maternal age <20 years and in the group with maternal

age > 30 years. Similarly, in primipara and multipara (Para 5+), there was no significant difference in birth weight of tribal and non-tribal women. Thus, maternal age and parity (extremes of age and parity) are independent predictors of birth weight.

**Table 5: Distribution of birth weight according to parity**

Birth weight (in kg)	Non-tribal (%) Mean $\pm$ SD	Tribal (%) Mean $\pm$ SD	p-value
Primi	2.71 $\pm$ 0.37	2.69 $\pm$ 0.51	0.467 (not significant)
Para 2-4	2.93 $\pm$ 0.98	2.81 $\pm$ 0.48	0.006 (highly significant)
Para 5+	3.12 $\pm$ 0.49	2.93 $\pm$ 0.41	0.226 (not significant)

As shown in Table 5 that in the age group, 20-24 years, the mean birth weight in non-tribal population was 2.88 kg (S.D. $\pm$ 1.13) and that in tribal population was 2.723 kg (S.D. $\pm$ 0.48) which is highly significant ( $p=0.03$ ). Similarly in the age group of 25-29 years, the mean birth weight in non-tribal population is 2.89 kg (S.D. $\pm$ 0.41) as compared to the tribal population which is 2.804 kg (S.D. $\pm$ 0.48) which is again significant ( $p=0.16$ ). As for parity, the group of women belonging to Para 2-4, the mean birth weight for non-tribal women was 2.93 kg (S.D.  $\pm$ 0.98) and that for tribal women was 2.81 kg (S.D. $\pm$ 0.48) which is again highly significant ( $p=0.06$ ). Thus, from maternal age and parity, it is clear that birth weight depends upon the maternal nutrition, health education and socioeconomic status.

## Discussion

The present study showed that the mean birth weight is more in the non-tribal population as compared to the tribal population. Also, the frequency of low birth weight (LBW) and very low birth weight baby is significantly higher in the tribal population as compared to the non-tribal population. Similarly, for maternal age (age group 20-28 years) and parity (Para 2-4), the mean birth weight is significantly higher in the non-tribal population as compared to the tribal population. Similarly a study conducted by Morton S. Adams,<sup>1</sup> on birth weight among the various tribes of North American Indians showed distinct variation which was strongly correlated with variation in adult stature which was in turn correlated to characteristic food utilization patterns of various tribal groups suggesting an adaptation of physique to nutrition.

Similarly another study conducted by Ashtekar SV et al,<sup>2</sup> on the rural mixed population of tribal and non-tribal communities in Dindori block (Nashik district) showed that the mean birth weight is low (2.62 kg) and the overall proportion of low birth weight (< 2.5kg) babies was 24% and the data also shows that the LBW proportion and mean birth weight have changed little over two decades. Another study conducted by Baekgaard ES et al,<sup>3</sup> amongst four tribal communities in rural Tamil Nadu, India showed that overall birth weights amongst the tribal population in the area had improved over the past 10 years. Despite

improvements, however the overall average birthweight remains low by WHO classification at 2.43 kg. A study conducted by Helsel Deborch et al<sup>4</sup> showed that the mean birth weight was lower in Hmong tribes as compared to whites in California. Despite the difference in mean birth weight, there is no statistically significant difference between proportions of Hmong and white births at low (<2500g) or very low (< 1500g) birth weight. In India, birth weight has remained low with the NFHS reported proportion of low birth weight (LBW) babies about 23% for rural and 19% for urban population. The proportion of LBW has improved only marginally from NFHS-1 and 2 rounds.<sup>5,6</sup> The NFHS-3 reports association of LBW to place of residence (urban or rural), age of mother, religion and caste, birth order of the baby, education, wealth and use of tobacco. NFHS-3 reports LBW for Maharashtra state to be 22%.<sup>7</sup>

A study by Ounsted et al.<sup>8</sup> showed that birth weight is determined in large part by maternal factors which physiologically limit the size of the infant. Walton Arthur<sup>9</sup> also shown that the size of the infant was determined by the size of the mother. Thus, the results of present study are in conformity with the earlier studies. Contrary to the results of our present study, study conducted by Sarkar NC et al,<sup>10</sup> on the Changlang tribes of Arunachal Pradesh showed that tribal babies are heavier than other babies of North East India.

## Conclusion

According to Millenium development goals, a move should be made to improve access to services for remotely placed populations including people of tribal origin. Birth weight is an important health indicator. In the present study, we tried to map the trend in this health indicator which is of utmost importance in determining focused health interventions and in identifying subpopulations that may be lagging behind. The health of remote, marginalized populations deserves attention and focus and is an area likely to show great improvement with targeted intervention and health goals.

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