

“Biological Predictors Of Gross Motor Development In Under-Five Year Children In Rural Belagavi: A Cross Sectional Study”

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Abstract:

Background: Optimal development of children in their early months and years has a bearing on their achievement levels later in life. Growth is the most important biological process in the first two decades or so of a person's life, including the nine months of prenatal development. Growth is the enlargement of the entire body or of specific body parts. It is a fundamental characteristic of all living organisms. Continual interactions among genes, hormonal changes, nutrients, and other factors are largely responsible for the integrated nature of growth and maturation. Children aged one to five account for 16.5% of the total population, while their mortality rate records 40% of all deaths in the nation. The epidemiological transition from communicable to non-communicable diseases, or a combination of both, poses a substantial threat to the health of the entire population or large groups.

Objectives: To assess the biological predictors of growth and development among under five children in rural belagavi

Methodology: A cross-sectional study was carried out in 855 under 5 children's in rural belagavi by using simple random sampling. Growth and Development was assessed using the Indian Council for Medical Research (ICMR) Development Screening Test.

Results: Looking into Biological factors of mothers in which Pattern of delivery shows that Repeat adult pregnancy contributed about 51.53% where as Adolescent (first) and adult (current) pregnancy contributed about 23.95% response. Consanguinity wise distribution of respondents. Out of a total of 885, maximum of 457 (51.64%) have not have Consanguinity as compared to 428 (48.36%) have consanguinity. Mode of delivery wise distribution of respondents. Out of a total of 885, maximum of 599 (67.68%) mother got a children by normal vaginal delivery by as compared to 286 (32.32%) mother got a children by caesarean delivery. Antenatal Care wise distribution of respondents. Out of a total of 885, maximum of 568 (67.68%) mothers are taken antenatal care as compared to 317 (35.82%) mothers are not taken antenatal care. Gestational at birth wise distribution of respondents. Out of a total of 885, maximum of 511 (57.74%) mothers have pre term as gestational at birth as compared to 374 (42.26%) mothers have term as gestational at birth. Multiple Gestation wise distribution of respondents. Out of a total of 885, maximum of 546 (61.69%) mothers have multiple gestation as compared to 339 (38.31%) mothers have no multiple gestation. History of birth asphyxia wise distribution of respondents. Out of a total of 885, maximum of 514 (58.08%) mothers have no history of birth asphyxia as compared to 371 (41.92%) mothers have history of birth asphyxia. Breastfeeding wise distribution of respondents. Out of a total of 885, maximum of 514 (58.08%) mothers have appropriate breastfeeding practice as compared to 371 (41.92%) mothers have inappropriate breastfeeding practice. family size wise distribution of respondents. Out of a total of 885, maximum of 473 (53.45%) are living family with 6-9 members as compared to 194 (21.92%) living family with 2-5 members followed by 218 (24.63%) living family with >=10 members.

Conclusion: Biological predictors of gross motor development have influence among under-five children's however normal vaginal delivery and breastfeeding have big impact for the complete growth and development among under five children. Additional research is required to understand complex interactions among these factors and their long-term effects on children's well-being.

Keywords: Biological predictors, gross motor development, breastfeeding, under-five children.

INTRODUCTION:

Growth is the most important biological process in the first two decades or so of a person's life, including the nine months of prenatal development¹. Growth is the enlargement of the entire body or of specific body parts. It is a fundamental characteristic of all living organisms. Continual interactions among genes, hormonal changes, nutrients, and other factors are largely responsible for the integrated nature of growth and maturation. Children aged one to five account for 16.5% of the total population, while their mortality rate records 40% of all deaths in the nation². The epidemiological transition from communicable to non-communicable diseases, or a combination of both, poses a substantial threat to the health of the entire population or large groups.

Child development is the gradual emergence of traits and characteristics determined by biology as the child gains experience. In developing countries, more than 200 million children under five fail to reach their cognitive and social development potential due to poverty, poor health, malnutrition, and inadequate care³. The majority of these children reside in South Asia and Sub-Saharan Africa, and many are exposed to multiple developmental risks, such as poverty, malnutrition, poor health, and an unstimulating home environment. The health effects of poverty, malnutrition, and social factors hinder an individual's ability to reach their full developmental potential. Parental behaviour, nutritional deficiencies, chronic infections, exclusive breastfeeding, inadequate feeding practices, and a lack of stimulation are additional factors that impede development during pregnancy and after birth⁴. pregnancy and childbirth ensures both mother and child's health. In addition, it promotes, protects, and maintains the health of the mother during pregnancy, reduces maternal and child complications and morbidity, and raises awareness of personal hygiene, environmental sanitation, child care, and mothercraft education⁶.

This study aims to identify the factors that influence growth and development by biological factors with BMI, height for age, weight for age, gross motor, fine motor skills, hearing language, and personal and social skills. Future detection and management planning will benefit from identifying the severity of problems and their associated factors.

Materials and methods

The research design: The research design employed for this study is a cross-sectional study.

Research Setting: The study is planned to be conducted in the rural areas of Belagavi, where data collection was based on the research question's nature and the type of information required.

Research Population: The population under investigation consists of children under five years children residing in the rural areas of Belagavi.

The sample selection criteria: The sample selection criteria for this study were as follows: Inclusion criteria comprised children aged below 5 years, specifically between one to four years old, whose mothers provided consent to participate in the study. On the other hand, exclusion criteria included children with a known history of chronic diseases such as protein-energy malnutrition, cretinism, malignancy, Type 1 diabetes mellitus, etc., and orphaned children and mothers with known autosomal recessive genetic disorders. Mothers who refuse to give consent.

Sample: The sample for this study comprises under-five years children from the rural areas of Belagavi. To determine the sample size, Cochran's formula is used, considering a 90% confidence level, a prevalence (p) of developmental delay found to be 7.1% from a previous study, and a relative precision (e) of 20% of p. The calculated minimum sample size is 885, but a larger sample may be included to improve precision.

Sampling Technique/Procedure: Stratified cluster sampling was used. The rural areas of Belagavi were classified into two villages, and samples were drawn from each village based on the proportion of the under-five years population, using simple random sampling.

Data Collection Permission: Ethical clearance was obtained before data collection.

Data Analysis: Data was analyzed using statistical methods such as measures of central tendency and dispersion for continuous variables and frequency and proportion for categorical variables. A chi-square test was performed to obtain an association between the demographic variables and outcome variables. Analysed data presented into table and graphs.

Results:

Table: 01 Pattern of delivery wise distribution of respondents

N=855

Pattern of delivery	No of respondents	% of respondents
Repeat adolescent pregnancy	217	24.52
Adolescent (first) and adult (current) pregnancy	212	23.95
Repeat adult pregnancy	456	51.53
Total	885	100.00

The above table represents the Pattern of delivery wise distribution of respondents. Out of a total of 885, maximum of 456 (51.53%) of mothers repeat adult pregnancy type of delivery and minimum of 212 (23.95%) of mothers have adolescent (first) and adult (current) pregnancy type of delivery followed by Repeat adolescent pregnancy type of delivery. The type of delivery wise distribution of respondents is also presented in the following figure.

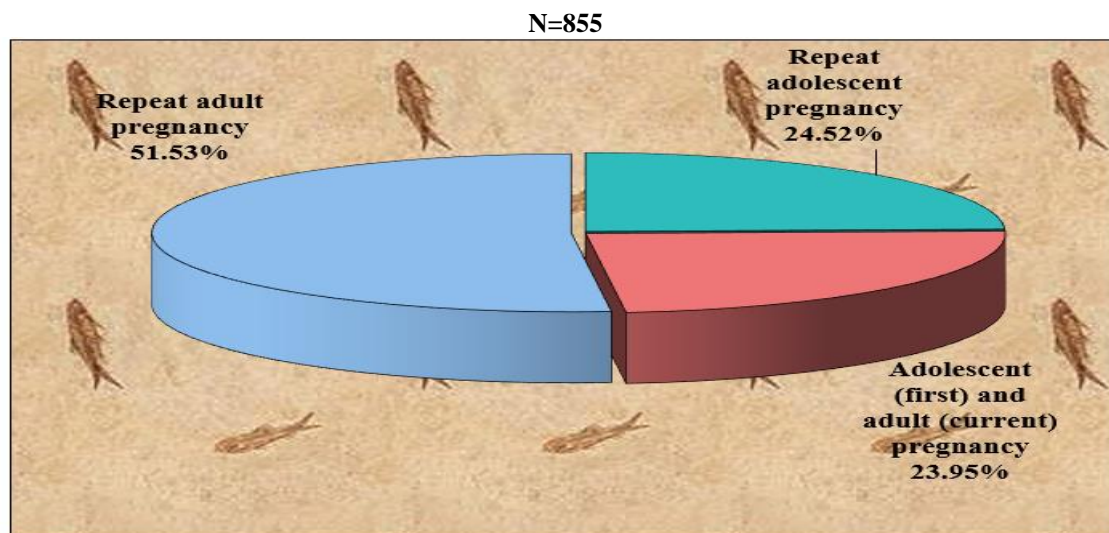


Figure: 1 Pattern of delivery wise distribution of respondents

Table:2 Consanguinity wise distribution of respondents
N=855

Consanguinity	No of respondents	% of respondents
Yes	428	48.36
No	457	51.64
Total	885	100.00

The above table represents the Consanguinity wise distribution of respondents. Out of a total of 885, maximum of 457 (51.64%) have not have Consanguinity as compared to 428 (48.36%) have consanguinity. The Consanguinity wise distribution of respondents is also presented in the following figure.

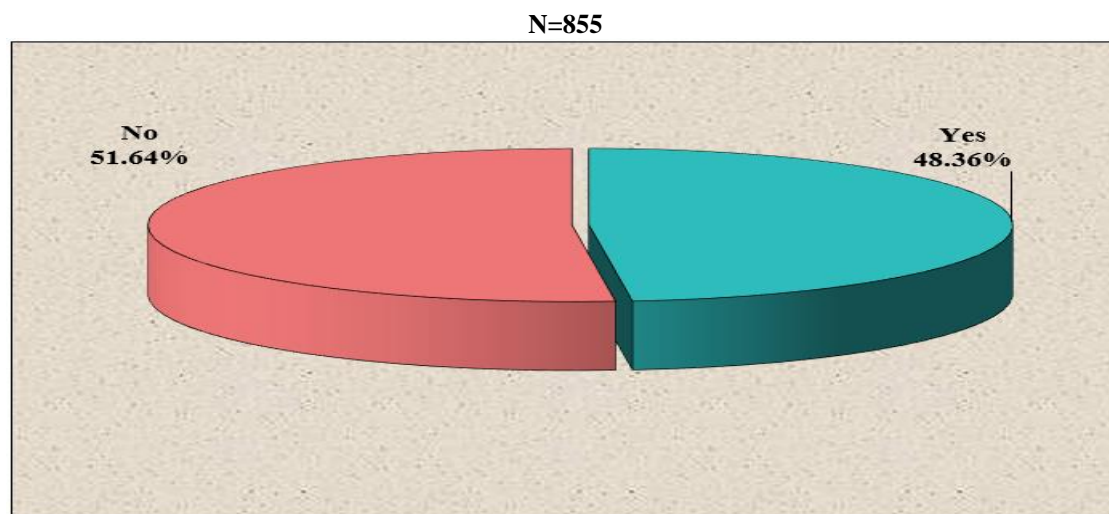


Figure:2 Consanguinity wise distribution of respondents

Table:3 Mode of delivery wise distribution of respondents
 N=855

Mode of delivery	No of respondents	% of respondents
Normal vaginal delivery	599	67.68
Caesarean	286	32.32
Total	885	100.00

The above table represents the Mode of delivery wise distribution of respondents. Out of a total of 885, maximum of 599 (67.68%) mother got a children by normal vaginal delivery by as compared to 286 (32.32%) mother got a children by caesarean delivery. The Mode of delivery wise distribution of respondents is also presented in the following figure.

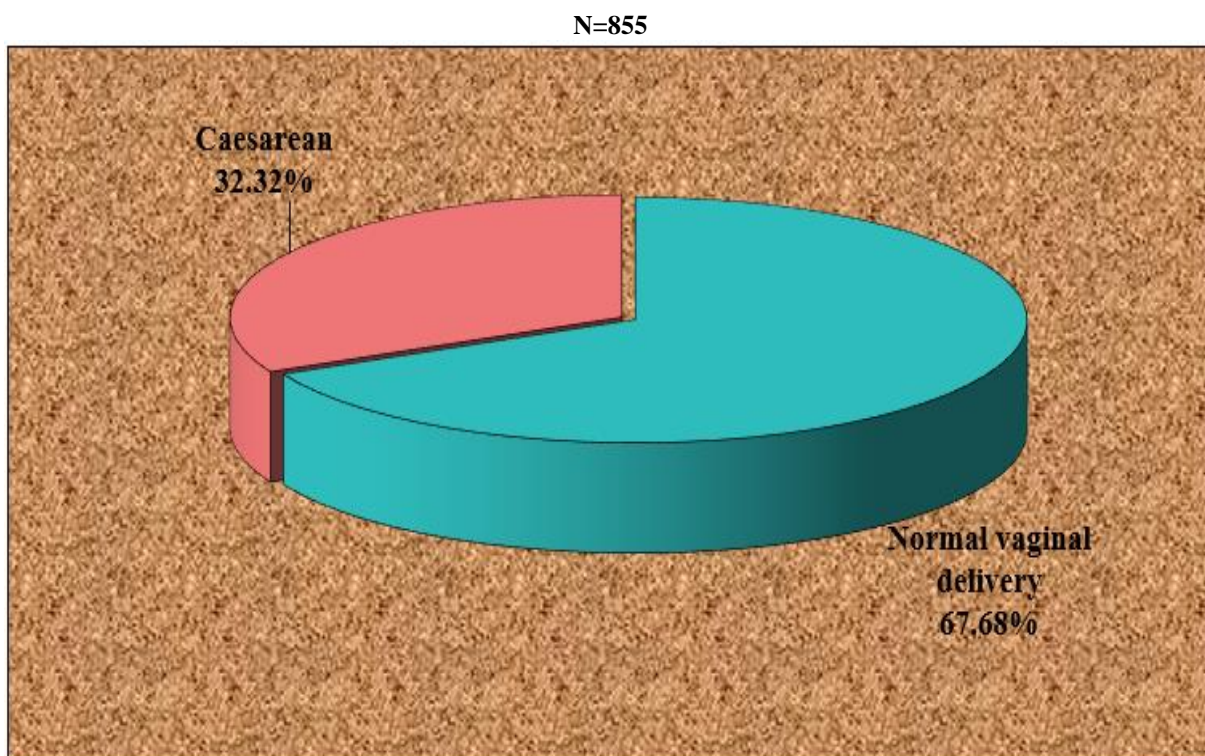


Figure:3 Mode of delivery wise distribution of respondents

Table: 4Antenatal care wise distribution of respondents
 N=855

Antenatal care	No of respondents	% of respondents
Yes	568	64.18
No	317	35.82
Total	885	100.00

The above table represents the Antenatal Care wise distribution of respondents. Out of a total of 885, maximum of 568 (67.68%) mothers are taken antenatal care as compared to 317 (35.82%) mothers are not taken antenatal care. The Antenatal care wise distribution of respondents is also presented in the following figure.

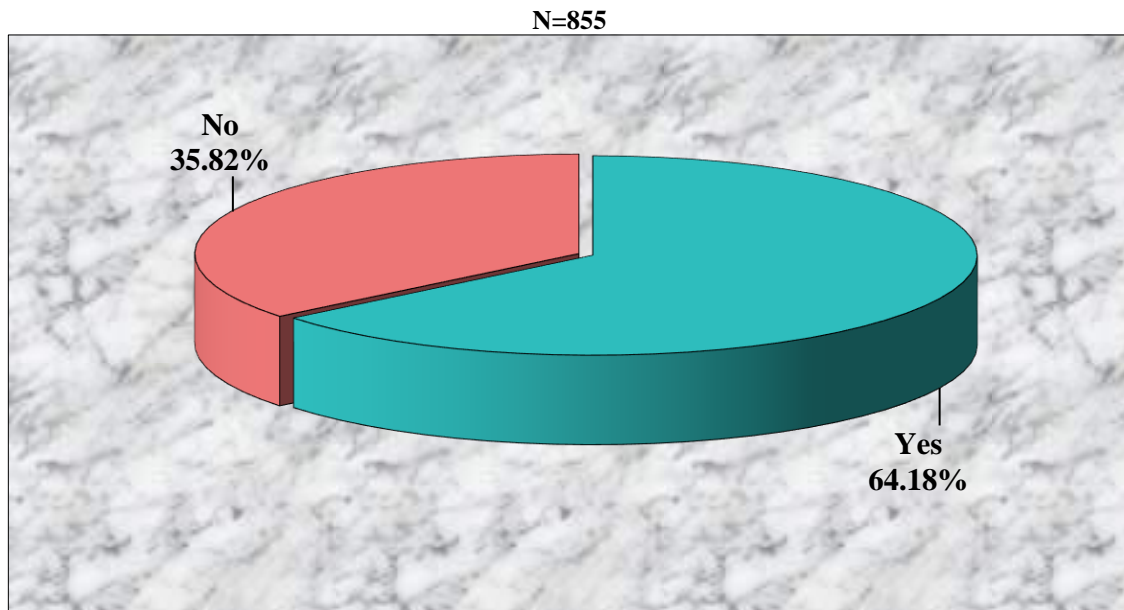


Figure:5 Antenatal care wise distribution of respondents

Table: 6 Gestational at birth wise distribution of respondents
 N=855

Gestational at birth	No of respondents	% of respondents
Pre-term	511	57.74
Term	374	42.26
Total	885	100.00

The above table represents the Gestational at birth wise distribution of respondents. Out of a total of 885, maximum of 511 (57.74%) mothers have pre term as gestational at birth as compared to 374 (42.26%) mothers have term as gestational at birth. The Gestational at birth wise distribution of respondents is also presented in the following figure.

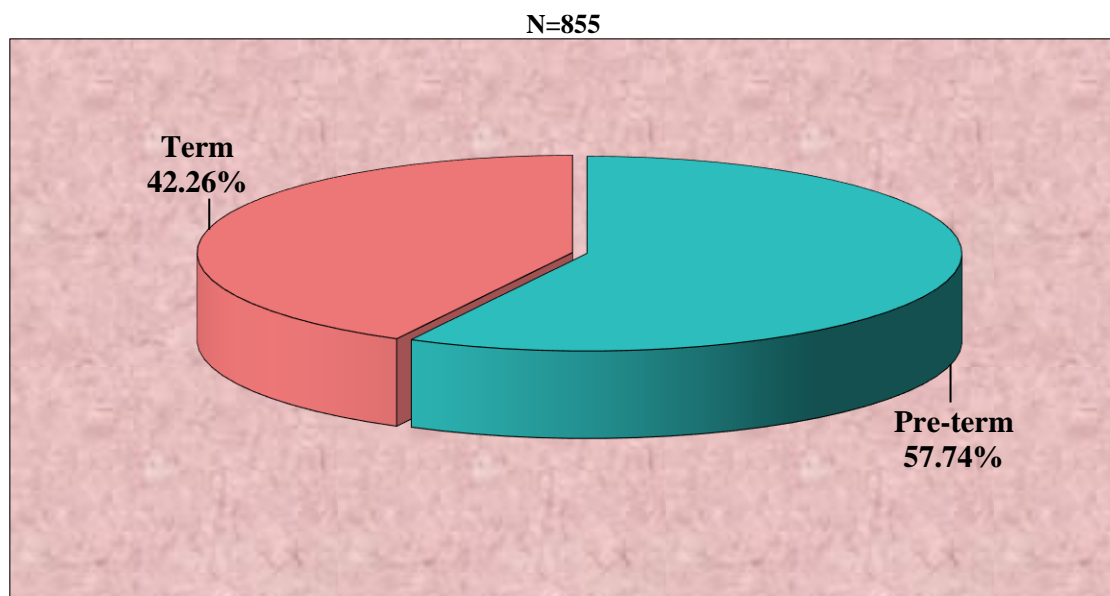


Figure: 6 Gestational at birth wise distribution of respondents

Table: 7 Multiple Gestation wise distribution of respondents
N=855

Multiple Gestation	No of respondents	% of respondents
Yes	546	61.69
No	339	38.31
Total	885	100.00

The above table represents the Multiple Gestation wise distribution of respondents. Out of a total of 885, maximum of 546 (61.69%) mothers have multiple gestation as compared to 339 (38.31%) mothers have no multiple gestation. The Multiple Gestation wise distribution of respondents is also presented in the following figure.

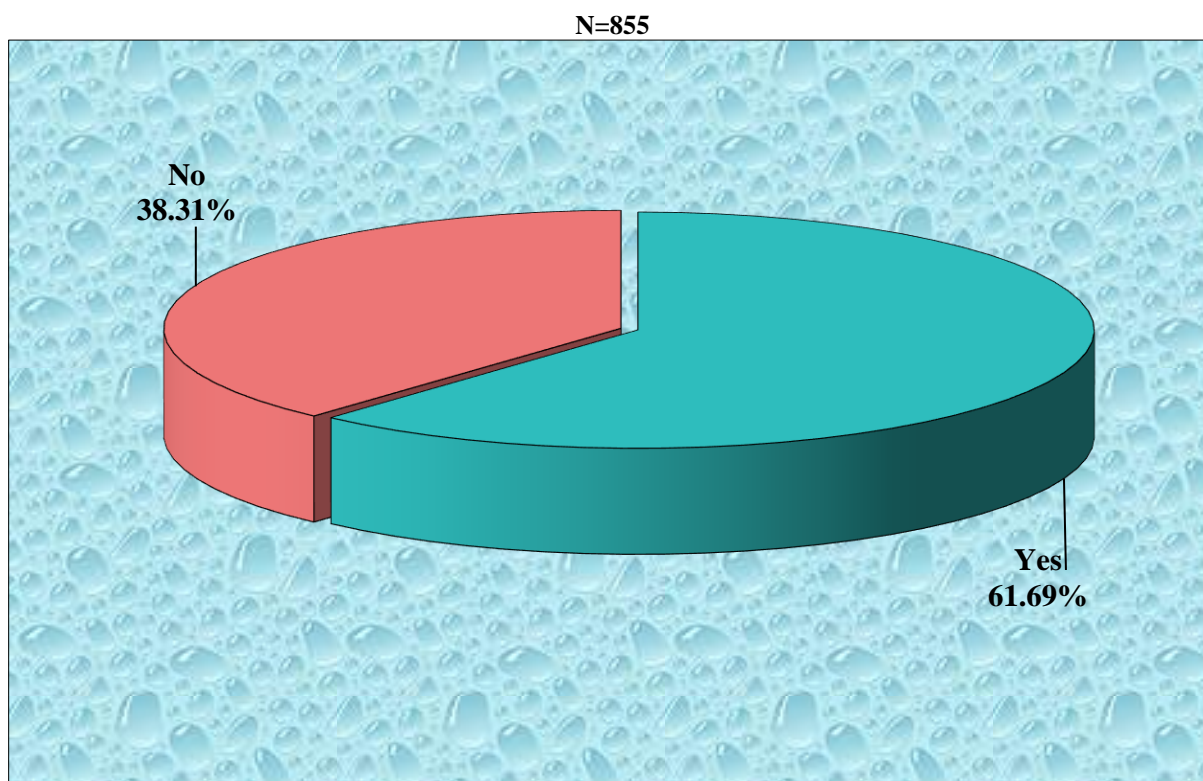


Figure:7 Multiple Gestation wise distribution of respondents

Table:8 History of birth asphyxia wise distribution of respondents
N=855

History of birth asphyxia	No of respondents	% of respondents
Yes	371	41.92
No	514	58.08
Total	885	100.00

The above table represents the History of birth asphyxia wise distribution of respondents. Out of a total of 885, maximum of 514 (58.08%) mothers have no history of birth asphyxia as compared to 371 (41.92%) mothers have history of birth asphyxia. The History of birth asphyxia wise distribution of respondents is also presented in the following figure.

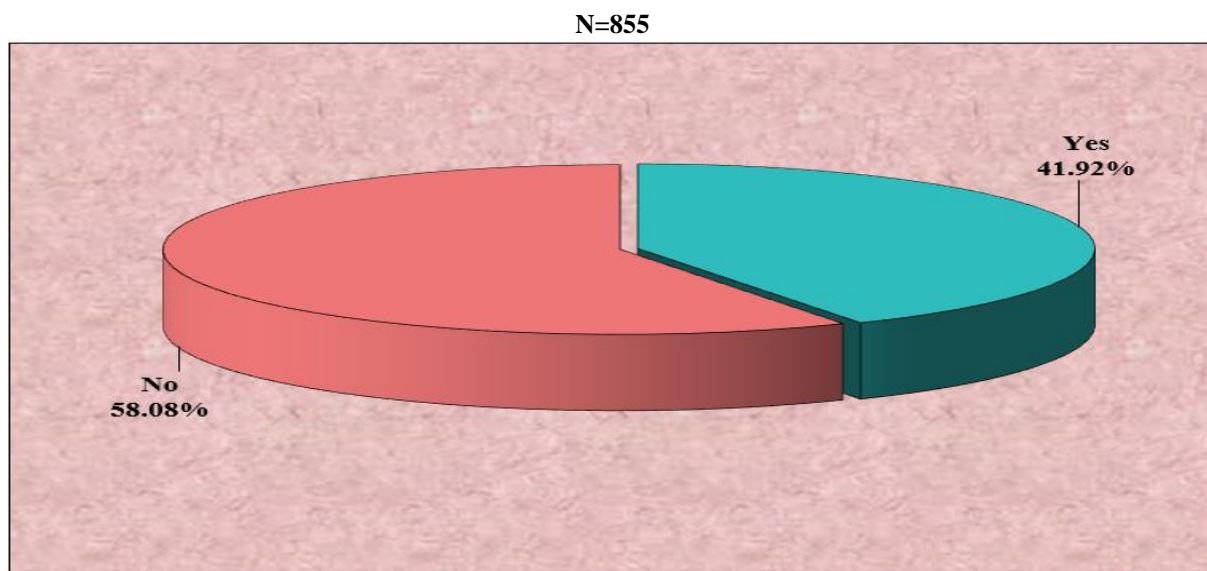


Figure: 8 History of birth asphyxia wise distribution of respondents

Table: 9 Breastfeeding wise distributions of respondents
 N=855

Breastfeeding	No of respondents	% of respondents
Appropriate	536	60.56
Inappropriate	349	39.44
Total	885	100.00

The above table represents the Breastfeeding wise distribution of respondents. Out of a total of 885, maximum of 514 (58.08%) mothers have appropriate breastfeeding practice as compared to 371 (41.92%) mothers have inappropriate breastfeeding practice. The His Breastfeeding wise distribution of respondents is also presented in the following figure.

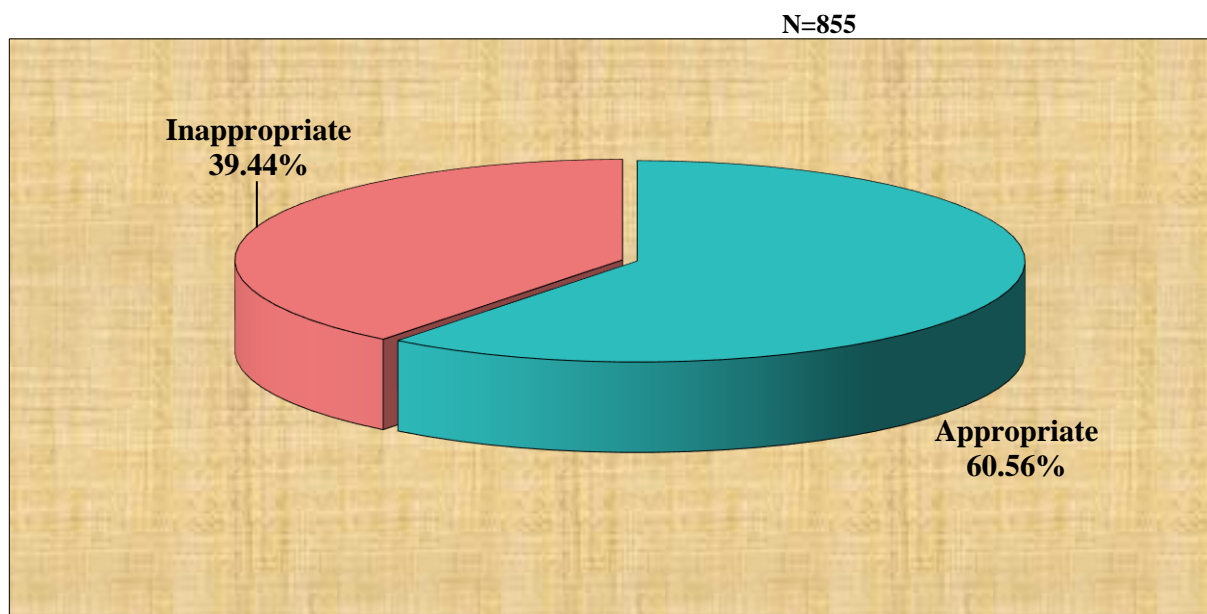


Figure:9 Breastfeeding wise distribution of respondents

Table: 10 Family size wise distribution of respondents
 N=855

Family Size	No of respondents	% of respondents
1--5	194	21.92
6--9	473	53.45
>=10	218	24.63
Total	885	100.00

The above table represents the family size wise distribution of respondents. Out of a total of 885, maximum of 473 (53.45%) are living family with 6-9 members as compared to 194 (21.92%) living family with 2-5 members followed by 218 (24.63%) living family with >=10 members. The His family size wise distribution of respondents is also presented in the following figure.

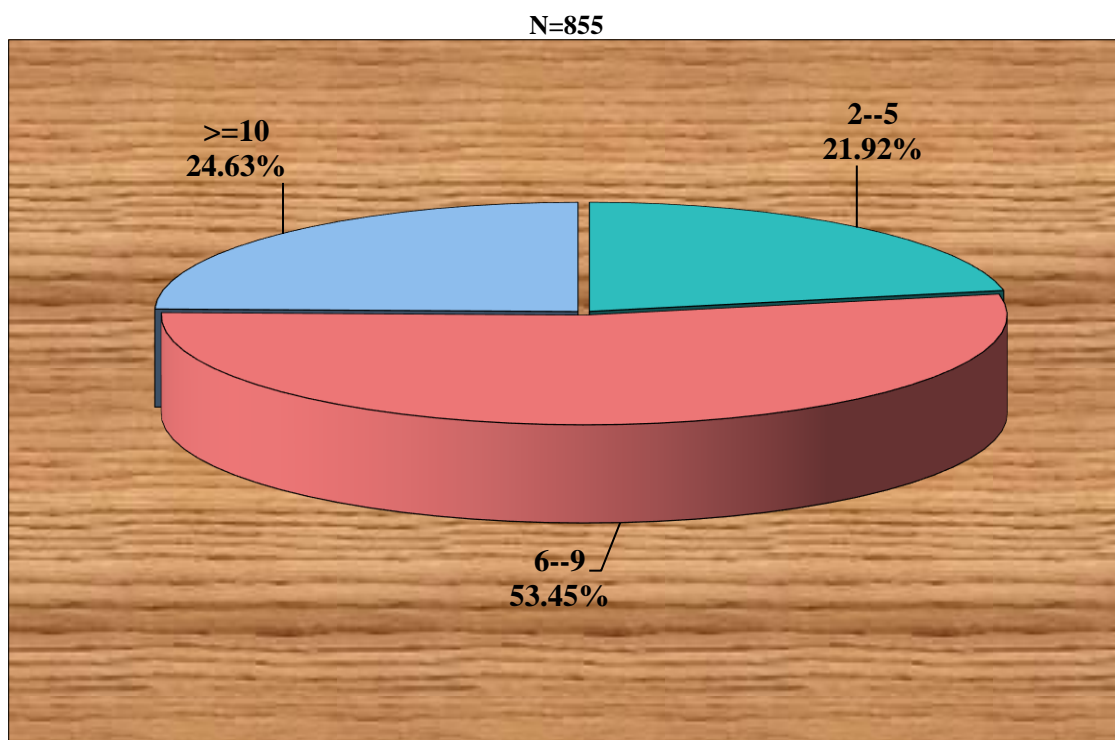


Figure: 10 Family size wise distribution of respondents

Discussion:

Looking into Biological factors of mothers in which Pattern of delivery shows that Repeat adult pregnancy contributed about 51.53% where as Adolescent (first) and adult (current) pregnancy contributed about 23.95% response. Consanguinity wise distribution of respondents. Out of a total of 885, maximum of 457 (51.64%) have not have Consanguinity as compared to 457 (48.36%) have consanguinity. Mode of delivery wise distribution of respondents. Out of a total of 885, maximum of 599 (67.68%) mother got a children by normal vaginal delivery by as compared to 286 (32.32%) mother got a children by caesarean delivery. Antenatal Care wise distribution of respondents. Out of a total of 885, maximum of 568 (67.68%) mothers are taken antenatal care as compared to 317 (35.82%) mothers are not taken antenatal care. Gestational at birth wise distribution of respondents. Out of a total of 885, maximum of 511 (57.74%) mothers have pre term as gestational at birth as compared to 374 (42.26%) mothers have term as gestational at birth. Multiple Gestation wise distribution of respondents. Out of a total of 885, maximum of 546 (61.69%) mothers have multiple gestation as compared to 339 (38.31%) mothers have no multiple gestation. History of birth asphyxia wise distribution of respondents. Out of a total of 885, maximum of 514 (58.08%) mothers have no history of birth asphyxia as compared to 371 (41.92%) mothers have history of birth asphyxia. Breastfeeding wise distribution of respondents. Out of a total of 885, maximum of 514 (58.08%) mothers have appropriate breastfeeding practice as compared to 371 (41.92%) mothers have inappropriate breastfeeding practice. family size wise distribution of respondents. Out of a total

of 885, maximum of 473 (53.45%) are living family with 6-9 members as compared to 194 (21.92%) living family with 2-5 members followed by 218 (24.63%) living family with ≥ 10 members.

Conclusion:

Biological predictors of gross motor development have influence among under-five children's however Normal vaginal delivery and breastfeeding have big impact for the complete growth and development among under five children. And rest of the factors need Additional research is required to understand complex interactions and its positive impact among under- five children's well-being.

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