

Gross Motor Developmental Milestones of Children

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Abstract: A comparative study was conducted to assess gross motor developmental milestones of children in rural and urban areas. A descriptive comparative research design was used for the study. The sample of 120 school children of age 6-8 years was taken by non-probability purposive sampling technique. Self-structured checklist was used to assess gross motor developmental milestones. The study result showed out of 20 samples for each age group, 50% had normal gross motor developmental milestones and 50% had mild delayed developmental milestones in rural area, whereas 65% had normal gross motor developmental milestone and 35% children had mild delayed milestones in urban area. In both rural and urban areas 7 years old children (100%) had normal gross motor developmental milestone. Children of age 8 years 16 (80%) had normal gross motor developmental milestones and 4 (20%) children with mild developmental delay in rural area, whereas children 17 (85%) had normal developmental milestones and 3 (15%) children with mild developmental delay in urban area. In both rural and urban areas at all age group 0% children had delayed developmental milestones.

Keywords: Gross motor developmental milestones, children.

1. Introduction

A phenomenon peculiar to the pediatric age group is growth and development. Growth and development include not only physical aspect, but also intellectual emotional and social aspects. Normal growth and development take place with optimal nutrition; freedom from recurrent episodes of infection and adverse genetic and environmental influences. Family as the primary institution have a major role in the process of development and the influence of family increases the rate of growth and development. The health of a growing child is always a matter of great concern to the parents.

Development is different than growth. Growth refers to an increase in number and size of cells as they divide and synthesize new proteins; results in increased size and weight of whole or any of its parts. Development takes place at the greatest rate in the early childhood years. Development refers to a gradual change and expansion; advancement from lower to more advanced stages of complexity; the emerging and expanding of individual's capacities through growth, maturation and learning. This process involves learning and mastering skills like sitting, walking, talking, skipping, and tying shoes.

Developmental milestone are a set of functional skills or age-specific tasks that most children can do at a certain age range. Although each milestone has an age level, the actual age when a normally developing child reaches that milestone can vary quite a bit.

2. Literature Survey

The review is divided into following headings:

- 1) Studies related to developmental milestones in rural and urban area.
- 2) Studies related to factors affecting developmental milestones

Studies Related to Developmental Milestones in Rural and Urban Areas

Ali, Balaji, Dhaded, Goudar (2011) conducted a study to assess growth and global developmental delay among young children in a rural community of India. The sample comprised of 530 children of age 3 year. The study result revealed that children displayed delay in personal-social (42.5%), gross motor (38.1%) and problem-solving skills (34.9%). Maternal educational level was positively associated with communication and problem-solving skills ($P=0.000$) while monthly household income was positively associated with communication, gross motor and problem-solving skills ($p=0.000$). The study concluded that suggest a high prevalence of developmental delay and poor child health in this rural population.

Carolina et al., (2010) conducted a study to assess the motor performance and the gross and fine motor skills of infants attending two public child care centres full-time. The sample comprised of 30 infants assessed at 12 and 17 months of age with the Motor Scale of the Bayley Scales of Infant and Toddler Development. The study result revealed that most of the participants showed global motor performance within the normal range, but below the reference mean at 12 and 17 months, with 30% classified as having "suspected delays" in at least one of the assessments. Gross motor development was poorer than fine motor development at 12 and at 17 months of age, with great discrepancy between these two subtests in the second assessment.

Studies related to factors affecting developmental milestones

Gottschling, Franze, Hoffmann (2014) conducted a study to determine prevalence and risk factors for motor developmental delays in 3 to 6 year old preschool children in mecklenburg-western Pomerania. The sample comprised of 599 children by using Dortmund Developmental Screening. The study result revealed that RF for FM and GM are irregular utilization of preschools (Fine motor: OR: 2.63; $p=0.009$; 95% CI: 1.27-5.45; Gross motor: OR: 2.56; $p=0.021$; 95% CI: 1.15-5.68) and male sex (Fine motor: OR:

2.97; $p < 0.001$; 95% CI: 1.93-4.57; Gross motor: OR: 1.87; $p = 0.016$; 95% CI: 1.12-3.10).

Sprague et al. (2013) conducted a study on Socioeconomic Status and Motor Skills in Preschool Aged Children. The sample comprised of 87 children between the ages of 3-5 years. The study revealed that there was a significant correlation between SES and fine and gross motor skill performance. Results indicate that children from low SES families are more likely to have weaker fine and gross motor function

3. Problem Definition

- i. **Gross motor developmental milestones:-** Gross motor developmental milestones refers to control of child over his/her body by increasing mobility which include using large groups of muscles to sitting, standing, walking, running, head control, climbing upstairs, riding tricycle.
- ii. **Children:-** Children refer to the age group of 6 to 8 years.
- iii. **Rural area:-** Rural area refers to Rainbow Public School of rural area.
- iv. **Urban area:-** Urban area refers to Maghi Public School of urban area.

4. Material and Methods

Research Design: The research design used in study was Descriptive Comparative design.

Setting of the study: The study was conducted in Rainbow Public School Sakrali (rural area school) and Maghi Public School Amlah (urban area school) of Fatehgarh Sahib District.

Sample size/ Sampling technique: The Purposive Non-Probability Sampling Technique was used to select 120 children of six to eight years of Rainbow Public School Sakrali in rural area and Maghi Public School Amlah in urban area. Out of which 60 children were from rural area school and 60 children were from urban area school. A demographic data sheet was filled by investigator.

Description of the tool

The tool comprised of two sections:

Section: 1

Demographic variable data sheet

Demographic data sheet was developed by the investigator for the purpose of collecting background information of the sample. It includes age, gender, area of residence, type of family, mother education, mother occupation, monthly family income, diet pattern. The item in this tool had not scoring as it reflects factual information.

Section: 2

Gross motor developmental milestones checklist

A gross motor developmental milestones checklist was formulated to assess gross motor developmental milestones of children.

- At 6 years milestones assessed were Runs lightly on toes, Walks on balance beam, Jumps rope, Catches a small ball, Get up without using hands, Catches soft objects with both hands.
- At 7 years milestones assessed were Runs, Jumps forward with both feet together, Hops, Running around obstacles while maintaining balance, Jumping over an object and leading with both feet together, Throws and catches balls
- At 8 years milestones assessed were Walking backward heel to toe, Standing and maintaining balance on one foot, Using a skipping rope, Kicks rolling ball, Throws a ball skill fully overhead, Races

5. Results

Table 1: Frequency and Percentage Distribution of Demographic Characteristics of Children of Rural area and Urban Area

N=120

$n_r = 60$ $n_u = 60$

Sr. No.	Demographic Characteristics	Rural Area		Urban Area	
		f	%	f	%
1	Age				
1.1	6 years	20	100	20	100
1.2	7 years	20	100	20	100
1.3	8 years	20	100	20	100
2	Gender				
2.1	Male	29	48.3	32	53.3
2.2	Female	31	51.7	28	46.7
3	Area of residence				
3.1	Rural	60	100	0	0
3.2	Urban	0	0	60	100
4	Type of Family				
4.1	Nuclear	14	23.3	19	31.7
4.2	Joint	46	76.7	41	68.3
5	Mother Education				
5.1	Matric	37	61.7	35	58.3
5.2	Secondary	22	36.7	20	33.4
5.3	Graduation and above	1	1.6	05	8.3
6	Mother Occupation				
6.1	Housewife	60	100	60	100
7	Monthly family income				
7.1	6000-8000	09	15	19	31.7
7.2	8001-10,000	30	50	20	33.3
7.3	10,001-12000	19	31.7	12	20
7.4	Above 12,000	02	3.3	09	15
8	Diet				
8.1	Vegetarian	52	86.7	45	75
8.2	Non- Vegetarian	08	13.3	15	25

Table 1 revealed that in the rural area maximum of the children were female 31(51.7%) and most of children 46 (76.7%) residing in joint families. On the other hand in urban area maximum of the children were male 32 (53.3%) and most of children 41 (68.3%) residing in joint families. In relation to mother education in both areas majority were matric qualified 37 (61.7%) in rural and 35 (58.3%) in urban area. Regarding mother occupation in rural area and urban area all children's mother were house wife 120 (100%).

In relation to monthly family income in rural area maximum number of children 30 (50.0%) were from family having

monthly income of 8001-10,000 Rs/month. In urban area maximum number of children 20 (33.3%) were from family also having monthly income of 8001-10,000 Rs/month.

Regarding the diet pattern of children in rural area majority of the children were vegetarian 52(86.7%) and in urban area majority of children 45 (75.0%) were vegetarian.

Table 2: Gross Motor Milestone Score of Rural Area and Urban Area Children
 N=120
 $n_r=60, n_u=60$

Age	Level of gross motor score	Rural area		Urban area	
		f	(%)	f	(%)
6 years	Normal (5-6)	10	50	13	65
	Mild delayed (3- 4)	10	50	7	35
	Delayed (0 – 2)	0	0	0	0
7 years	Normal (5-6)	20	100	20	100
	Mild delayed (3- 4)	0	0	0	0
	Delayed (0 – 2)	0	0	0	0
8 years	Normal (5-6)	16	80	17	85
	Mild delayed (3- 4)	4	20	3	15
	Delayed (0 – 2)	0	0	0	0

Maximum gross motor milestone score: 6
 Minimum gross motor milestone score: 0

Out of 20 samples for each age group in both area equal number of children of 6 years old 10 (50%) had normal gross motor developmental milestones (score=5-6) and 10 (50%) had mild delayed developmental milestones (score=3-4) in rural area, whereas 13 (65%) had normal gross motor developmental milestone and 7 (35%) children had mild delayed. In both rural and urban areas 7 years old children (100%) had normal gross motor developmental milestone.

Children of age 8 years 16 (80%) had normal gross motor developmental milestones and 4 (20%) children with mild developmental delay in rural area, whereas children 17 (85%) had normal developmental milestones and 3 (15%) children with mild developmental delay in urban area. In both area rural and urban at all age group 0% children had delayed developmental milestones (score=0-2).

Table 3: Mean, Standard Deviation and, t^{**} value of Gross Motor Milestones Score of Rural Area and Urban Area Children, N=120

Age	Rural Area Mean \pm S.D	Urban Area Mean \pm S.D	t value
6 years	4.45 \pm 0.52	4.65 \pm 0.47	1.23
7 years	5.5 \pm 0.5	6.1 \pm 0.43	3.95*
8 years	5.1 \pm 0.76	5.25 \pm 0.61	0.92

Maximum gross motor score: 6 * Significant $p \leq 0.05$
 Minimum gross motor score: 0 $df = 38$
 $t_{tab} = 1.645$

At age of 6 years old the mean gross motor score was 4.45 with S.D 0.52 in rural area and mean gross motor score was 4.65 with S.D 0.47 in urban area.

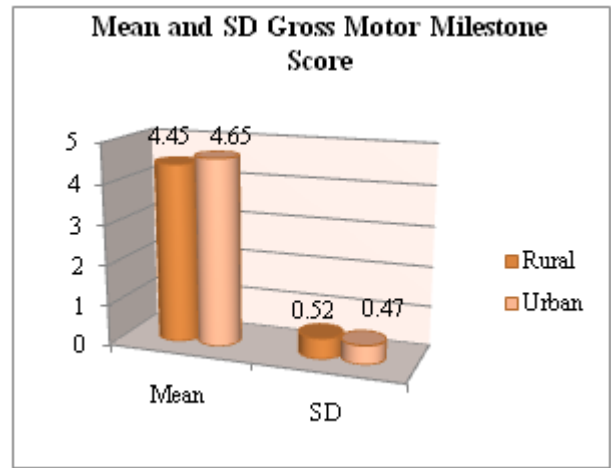


Figure 1: Cylindrical Bar Graph Showing the Mean and S.D Gross Motor Developmental Milestone Score of children 6 years in rural area and urban area

At the age of 7 years old the mean gross motor score was 5.5 with S.D 0.5 in rural area and the mean gross motor score was 6.1 with S.D 0.43 in urban area.

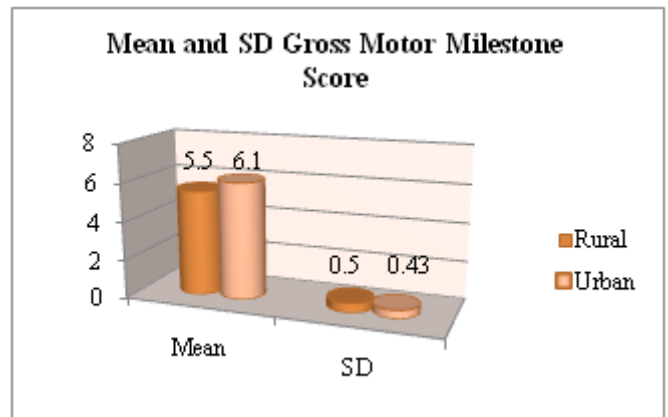


Figure 2: Cylindrical Bar Graph Showing the Mean Gross Motor Developmental Milestones Score of children 7 years in rural area and urban area.

At 8 years old the mean score was 5.1 with S.D 0.76 and mean gross motor score was 5.25 with S.D 0.61 in urban area.

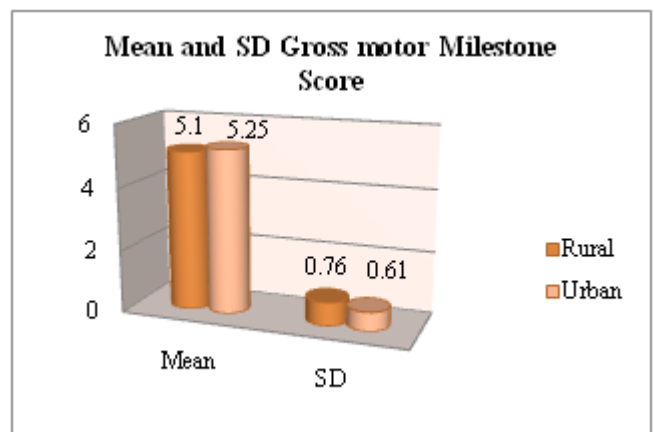


Figure 3: Cylindrical Bar Graph Showing the Mean Gross Motor Developmental Milestone Score of children 8 years in rural area and urban area.

The unpaired t- test revealed that there was no significant difference between developmental mean score of children in rural area and urban area at 6 years and 8 years where as the children had significant difference between developmental mean score of children in rural area and urban area at the level of $P < 0.05$.

6. Discussion

At 6 years equal number of children (50%) had normal gross motor developmental milestones and (50%) had mild delayed developmental milestones in rural area, whereas (65%) had normal gross motor developmental milestone and (35%) children had mild delayed. In both rural and urban areas 7 years old children (100%) had normal gross motor developmental milestone. Children of age 8 years (80%) had normal gross motor developmental milestones and (20%) children with mild developmental delay in rural area, whereas children (85%) had normal developmental milestones and (15%) children with mild developmental delay in urban area. In both area rural and urban at all age group (0%) children had delayed developmental milestones. These findings were consistent with the findings of **Ali, Balaji, Dhaded, Goudar** who conducted a study to assess growth and global developmental delay among young children in a rural community of India. The study result revealed that children displayed delay in personal-social (42.5%), gross motor (38.1%) and problem-solving skills (34.9%).

7. Conclusion

The study was concluded that there was no significant difference between developmental mean score of children in rural area and urban area at 6 years and 8 years where as at 7 years concluding that the children had significant difference between developmental mean score of children in rural area and urban area. The study also revealed that there was no association with selected demographic variables Gender, type of family, mother education, monthly family income and diet.

8. Further Scope

- 1) There is less Comparative study on assessment of gross motor developmental milestones. So more study can be conducted on this topic.
- 2) A descriptive study can be conducted to assess the developmental milestones of children at different stages.
- 3) A descriptive study can be conducted to assess the knowledge of mothers regarding developmental milestones of children

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