A comparative study to access the awareness of Gross and Sensory-motor milestones among mothers of Rural and Urban areas

Mehr-un-nisa[1], Dr. Sadia Iftikhar[2], Dr. Farooq Islam[3], Prof. Asim Raza[4],Namra Sarwar[5], Nayab John[6]

*Department of Rehabilitation Sciences, University of Chenab, Gujrat, Punjab, Pakistan
**University Institute of Physical Therapy, University of Lahore, Punjab, Pakistan

ABSTRACT:

Background: Developmental milestones are a list of age-appropriate actions that children may perform at specific ages, and this development process can be accelerated by timely interventions provided by mothers through engagement. Children with a variety of developmental problems sometimes arrive late at medical appointments or rehabilitation facilities. One of the factors for this can be a lack of knowledge about developmental stages

Objective(s): To assess awareness of gross and sensory motor milestones in mothers of rural and urban area.

Methodology: The analytical cross-sectional study was conducted in district Gujrat on mothers having a child under age of 3 years. Data (n=385) was calculated through non-probability convenient sampling. Data was collected through a pre-tested questionnaire by making a personal visit to rural and urban areas in Gujarat.

Results: The results show a significant relationship between gross milestones like Head control, turning control in baby and pointing over things. And sensory milestones like communicating through cries, visually tracking moving objects, understanding gestures and speaks properly as they have p-value (<0.05%)

Conclusion(s): Mothers in rural regions were shown to be less knowledgeable about gross and sensory motor milestones versus mothers in metropolitan areas.Awareness of several milestones was shown to be correlated with education level. As one to three-year-old children are of utmost importance, it is vital to inform or train mothers about the usual developmental level of these youngsters.

***Keywords*:** *Gross-motor milestones, Sensory-motor milestones, Awareness, Poverty Areas*

Introduction:

The first three years of life are characterized by the early childhood era. According to Harvard University's Center on the Developing Child, throughout their formative years, newborns' brains create more than 1 million new synaptic connections every single second,
a rate that is unmatched throughout life.[1] A concept like "Development" involves both growth and maturation. Growth in the brain involves the formation of increasingly intricate interconnections as well as a rise in size. (McCarthy & Atkinson, 1993)[2]

Kids are expected to reach several objectives or milestones during development known as "Developmental milestones". It describes the ages at which children are expected to execute various tasks, They are divided into five categories: fine motor, verbal, cognitive, social-emotional and behavioral, and gross motor. [3]

When the child is born, his brain is primed to learn about the world through their senses. Long before they can walk or talk, infants are learning. Hearing, touch, taste, sight, smell, and movement are all used to learn known as "Sensory milestones ".[4] Any movement that involves the big muscles in your body is said to be "Gross motor skills". Example: Rolling, walking, running, jumping, climbing, hopping, skipping, bending, kicking, throwing, catching, balancing, and other motions.[5]

The term "Developmental delay" (DD) refers to a delay in the attainment of typical developmental benchmarks in the areas of cognition, language, social, emotional, and motor functioning. Aassociated with poor attention and behavioral issues in young children, and long-term effects on the mental, emotional, social, and financial well-being of these children as they enter adulthood.(Jose SM, Lukose P, et al ,2020)[1]

Early childhood social-emotional disturbances involves Autism, reactive attachment disorder, social anxiety disorder, generalised anxiety disorder, attention-deficit hyperactivity disorder, post-traumatic stress disorder, and other conditions. [6]Pakistan has a high burden of both child undernutrition and poor

development. [7] Typically, parents are the ones who first detect a regression in their child's growth.[8] Since women are most often the primary caretakers.[9]

A baby's relationship with its caregiver and how they respond to their feelings in a soothing, trustworthy manner have an impact on their sense of self-assurance, identity, and self-control.[6]A lack of knowledge, on the other hand, might result in unreasonable expectations and an overestimation of a child's rate of development, causes frustration or intolerance with the child's actions.[9]

The best growth of each kid depends on parental stimulation.[10]Many mothers had experience with motor development however little expertise had in cognitive milestone. Most mothers relied on their prior experiences with the child in the picture as their primary information source.[11] There is also a great deal of evidence in the research literature showing the results of early child development become factors that affect one's health throughout one's lifetime.[12]Clinicians can spot delayed development by having a basic understanding of typical development. When developmental problems are discovered early, children can be assigned to therapeutic services and are more likely to achieve developmental milestones if they get early intervention (Scharf RJ et.al, 2016)[13]

Early detection of a developmental disability determines whether the problem genuinely exists and the scope of any relevant inadequacies. Afterward, a thorough service structure. It is administered for early intervention.[14] From this study we evaluated the knowledge , attitude and practice of mothers regarding awareness of milestones. The study's objectives are to determine the awareness of children's early gross and sensory developmental milestones among mothers of rural and urban area of Gujrat.

Methodology:

The analytical cross-sectional study was conducted in district Gujrat on mothers having child under age 3. Sample size of 385 was calculated through non-probability convenient sampling. The participants fulfilling the eligibility criteria were included in this study. The Inclusion criteria consisted of Mothers from rural and urban area with reproductive age group**.** Mothers with child under the age 3 years.[2]Exclusion criteria included Adopted child of age (2-3 months and more). Mother with any mental trauma or disorder (Depression, Mental Torture, Schizophrenia). Mothers whose children are raise by caretakers. [2]

Questionnaire based survey. Semi structured questionnaire was given to targeted population after verbal consent the entire questionnaire was briefly explained. Information was collected from subjects after interviewing them from valid questionnaire. Response was recorded in the form of Known and Unknown. Questionnaire consists of 2 portions. First portion consist of 3 questions of demographic data (age, address, working status) Second portion consist of total 15 questions 7 from Sensory developmental milestones (Start smiling, communicate through cries, visual tracking objects, separation anxiety, response to their name, understanding gesture, proper communication) and 8 from gross motor milestones (head control, turning, crawling, pointing out, pincer grip, standing with support, walking, autonomy).

Pilot study was done to clarify the ambiguities. The study was done including 50 mothers 25 mothers from rural and 25 mothers from urban area. A general accepted rule is that Alpha of 0.69-0.7 indicated an acceptable level of reliability. After our pilot study on 50 mothers from rural and urban areas of Gujrat. We got the value of Cornbrash alpha = 0.794 that is statistically acceptable.

In this cross-sectional research, 385 mothers were chosen from rural and urban area using a straightforward sample approach. Participants in this research were select based on the inclusion and exclusion criteria that had been established. It was necessary to collect demographic information. All of the participants were questioned in order to determine their knowledge and attitude about developmental milestones via the questionnaire..

Data Analysis:

Data were entered and analyzed through statistical package for social sciences (SPSS). For descriptive analysis frequencies and percentages were calculated for qualitative variables. Bar chart and pie chart representation were done. Chi-square test was applied. Level of significance or Confidence Interval was (95%), and all data were analyzed at 95% confidence interval and p-value $\leq$ 0.05 were considered as significant value.

Results:

Table no. 1 :Demographic Data

Variables	Options	n(%)
Age of mother (years)	18-25	104(27%)
	26-32	162(42.1%)
	33-40	119(30.9%)
Working status of mother	Working	127(33%)
	Non-working	258(67%)

Area of Participants	Rural	194(50.4%)
	Urban	191(49.6%)

Table no. 2 :Response of mothers regarding Gross motor Milestone

Variables	**Responses**	**Area of participants**		**Total**	**Chi-Square Tests**	**P-Value**
		Rural	**Urban**			
Head control of baby	Participant response (Who Know)	115(59.3%)	135(70.7%)	250(64.9%)	5.495	0.019*
	Participant response (Who doesn't Know)	79(40.7%)	56(29.3%)	135(53.1%)		
Turning control of baby	Participant response (Who Know)	109(56.2%)	129(67.5%)	238(61.8%)	5.256	0.022*
	Participant response (Who doesn't Know)	85(43.8%)	62(32.5%)	147(38.2%)		
Pointing over things	Participant response (Who Know)	99(51.0%)	121(63.4%)	220(57.1%)	5.965	0.015*
	Participant response (Who doesn't Know)	95(49.0%)	70(36.6%)	165(42.9%)		
Crawling in baby	Participant response (Who Know)	120(61.9%)	127(66.5%)	247(64.2%)	0.9	0.343*
	Participant responses (Who doesn't Know)	74(38.1%)	64(33.5%)	138(35.8%)		
Standing with support	Participant responses (Who Know)	130(67.0%)	136(71.2%)	266(69.1%)	0.793	0.373*
	Participant responses (Who doesn't Know)	64(33.0%)	55(28.8%)	119(30.9%)		
Pincer grip in baby	Participant responses (Who Know)	96(49.5%)	113(59.2%)	209(54.3%)	3.632	0.057*
	Participant responses (Who doesn't Know)	98(50.5%)	78(40.8%)	176(45.7%)		
Walking in baby	Participant responses (Who Know)	134(69.1%)	147(77%)	281(73%)	3.04	0.081*
	Participant responses (Who doesn't Know)	60(30.9%)	44(23.0%)	104(27%)		

Table no.3 :Response of mothers regarding Sensory Motor Milestones

Variables	Response	Area of participants		Total	Chi-Square	P-Value
		Rural	Urban			
Do baby communicate through cries	Participant responses Who Know)	106(54.6%)	132(69.1%)	238(61.8%)	8.539	0.003*
	Participant responses (Who doesn't Know)	88(45.4%)	59(30.9%)	147(38.2%)		
Do baby visually track moving object	Participant responses (Who Know)	103(53.1%)	137(71.7%)	240(62.3%)	14.236	0.001*
	Participant responses (Who doesn't Know)	91(46.9%)	54(28.3%)	145(37.7%)		
Do baby understand gesture	Participant responses Who Know)	84(43.3%)	121(63.4%)	205(53.2%)	15.545	0.001*
	Participant responses Who don't Know)	110(56.7%)	70(36.6%)	180(46.8%)		
Do baby responses to his/her name	Participant responses o (Who Know)	108(55.7%)	116(60.7%)	224(58.2%)	1.014	0.314*
	Participant responses Who don't Know)	86(44.3%)	75(39.3%)	161(41.8%)		
Does baby feel separation anxiety	Participant responses (Who Know)	103(53.1%)	109(57.1%)	212(55.1%)	0.615	0.433*
	Participant responses Who don't Know)	914(46.9%)	82(42.9%)	173(44.9%)		
Does baby work independently	Participant responses Who Know)	102(52.6%)	110(57.6%)	212(55.1%)	0.978	0.323*
	Participant responses (Who doesn't Know)	92(47.4%)	81(42.4%)	173(44.9%)		
Does baby speak proper sentence	Participant responses Who Know)	100(51.5%)	129(67.5%)	229(59.5%)	10.214	0.001*
	Participant responses (Who doesn't Know)	94(48.5%)	62(32.5%)	156(40.5%)		

According to Table 1 of Demographic data out of 385 the ratio of Urban mothers is 191(49.6%) and 194(50.4%) are Rural area mothers. The mothers of reproductive age were included in this study out of which 104(27%) were from age group of 18-25 years, 162(42.1%) were of 26-32 years and 119(30.9%) were of 33-40 years. Out of 385 mothers 127(33%) was working and 258(67%) of mothers were non-working. In total 385 mothers take part in study out of which 194 are from rural area and 191 are from urban area, the majority of women were non-working and all of reproductive age having child age< 3.

From Table 2 of Gross motor milestones, from a comparison between rural and urban moms we found that mothers were correctly estimate or little bit overestimate the gross milestones as (64.9%) of moms know about when the baby start to hold their neck or head without support, (64.2%) moms knew when the baby start to crawl on the floor correctly and (73%) of mothers are aware when their child began to walk independently, In contrast (42.9%) mothers overestimated the time when child start to pointing over things and (45.7%) moms underestimated the time when child start making pincer grip, the variable like Head control, turning control in baby and pointing over things are proved to be significant as they have p-value (0.019%), (0.022%), (0.015%) that is (<0.05%) as there is a huge difference between knowledge of both arears and urban mothers seems to be more aware about these gross milestones as compare to rural moms and variables like crawling, standing with support , Pincer grip, Walking are proved to be non-significant as they have p-value (0.34%), (0.37%), (0.08%) that is (>0.05) that shows that mothers of both areas was well aware of these gross milestones

From Table 3 of Sensory milestones, we found that the knowledge of sensory motor milestones among mothers is low it is because many mothers ignore these milestones due to lack of their knowledge, variables like: Communicate through cries, Visually tracking moving objects, Understanding gestures and Speak properly were proved to be significant as they have p-value of (0.003%) (0.001%) (0.001%) and (0.001%)that is less than (<0.05) and variables like: Response to his/her name, Separation anxiety and Working independently are proved to be non-significant as they have p-value (0.31%), (0.43%)and (0.32%) that is more than (>0.05)

Education level was supposed to associate with awareness of various milestones.

Discussion:

This study was attempted to find the awareness of sensory and gross motor milestones between mothers of rural and urban area of Gujrat. In our study we have come to know that mothers were normally pretty informed about the relative order of developing skills, but they were not as educated about the time of talents' development. The time of the emergence of all developing abilities was frequently underestimated by mothers. In other words, mothers anticipated their children's developmental skills would manifest sooner or later than they actually do.[15] In case of head control in baby (59%)of Rural and (70%) of urban mothers were aware of it. While a cross sectional study in rural maternity hospital in rural India shows that mother awareness regarding neck or holds head steady is (47.4%)(SS Varghese,2020)[1]. In comparison to other gross-motor landmarks 96% of moms living in urban settings, and majority of moms (71%) in rural regions were aware of when a kid begins to walk(2020, N lohia)[2]While this study showed about (77%) of urban and (69.1%) of rural regions mothers were aware about independent walking by having highest percentage.

The study in rural south Indian hospital revealed low scores in the gross motor domain in comparison to other domains such as social and language. We wonder if it could be possible that language and social milestones are more rewarding as it helps the mother know that her affection and attention to her child is being reciprocated.[16]Our study revealed low score in sensory motor milestones in comparison to gross motor milestones because they required minute detailing and most of the mothers only known to walking, sitting and crawling in babies.

According to (Rikhy et al. 2006) Mothers were best able to determine the timing of physical progressive stages. However, women in rural regions spend relatively little meaningful time with their kids. That might also be one of the causes of failing to notice small changes and hence lacking a thorough understanding of developmental milestones.[17] Mothers seemed to be less aware in rural area because of compensated level of education comparative to the mothers of urban areas with quality educations were proved to be more aware. Lack of knowledge is present in mothers who were less involved in and social activity, usually more involved in their house hold work. Some children were raised by helpers.

One of the reasons for ignorance in rural regions is "impoverishment." According to a study, poverty-related environmental variables have an impact on

motor development. Lack of awareness is caused by a number of factors, including illiteracy, which prevents people from understanding how things normally grow (Cheung et al., 2001)[18] Mothers with quality education and high standards of living were able to observe minute and small changes occur in child developing years and show more care towards their child.

The study in Saudiashows developmental milestones are known to people at a relatively low level of understanding. Additionally, in rural areas, it is crucial to recognize the developmental milestones for children under the age of 4 since they can be used to track children's progress.[19]This prove that lack of milestone knowledge is not only issue to be resolved in our country but is a worldwide issue that is to be resolve otherwise it result in the formation or development of disable society.

Older women who have completed their education, are employed, and have a systematic effects rate have a solid understanding of children's developmental stages .Many mothers had experience with motor development however had little expertise in cognitive milestone. Most mothers relied on their prior experiences with the child in the picture as their primary information source.[11] Most of the mothers answer correctly because of their previous experience with other children but we found no connection between knowledge of milestones and the number of kids.

National statistics on children's development are very few, but we estimated, that there are over 200 million children below the age of five in developing nations who are not progressing to their full potential. Following that, the kid's poor academic performance and are more likely to spread poverty to the coming generation. [20]

Infants may learn about the world through motor development, but its essential function in social development is easily ignored. Researchers and practitioners need to give greater attention to this complicated link so that more specialized intervention strategies may be created for those who are at risk of developing motor, social, and linguistic impairments.[21]This study shows strong association of mother's awareness regarding sensory and gross milestones and literacy level of mother with a p-vale of (0.79%) which is statistically significant.

This poll suggested that, regardless of where mothers live, there is a need to spread awareness of gross motor milestones. As we deduced from our data that women living in rural regions are less aware of sensory/gross motor milestones, we raised awareness by travelling to the communities where we obtained our data. Programs will run in the villages to inform a group of mothers about developmental milestones. Additionally, they will receive brochures outlining the same.

Conclusion:

According to this study finding, the majority of rural mothers had below-average awareness of the typical developmental milestones for children between the ages of one to three. Evidently in relation to gross and sensory milestones, mothers were less aware of sensory milestones. Therefore, it is necessary to inform or educate mothers about the typical early developmental stages. Lack of information can lead to unfounded expectations and delay the identification of disabilities.

Conflict of Interest

There is no conflict of interest.

Financial Statement

No funding's were given by an authority; it was a project thesis of Doctor of Physical therapy

Data availability

Data will be approved on the demand by corresponding authors.

Reference:

1. Varghese SS, Joseph M, Gohil R, Thomas S, Jose SM, Lukose P, et al. How aware are mothers about early childhood developmental milestones? A cross-sectional study at a maternity hospital in rural South India. 2020;7(11):441-5.
2. Lohia N, Tomar US, Gupta N, Mattu SJJoDM, Rehabilitation. Awareness of Gross Motor Milestones among Mothers in Rural and Urban Areas: A Survey. 2020:111-6.
3. Misirliyan SS, Huynh AP. Development Milestones. StatPearls. Treasure Island (FL): StatPearls Publishing

4. Leonard HCJFip. The impact of poor motor skills on perceptual, social and cognitive development: the case of developmental coordination disorder. Frontiers Media SA; 2016. p. 311.
5. Gerber RJ, Wilks T, Erdie-Lalena C. Developmental milestones: motor development. Pediatr Rev. 2010;31(7):267-76; quiz 77.
6. Malik F, Marwaha R. Developmental stages of social emotional development in children. 2018.

7. Yousafzai AK, Rasheed MA, Rizvi A, Armstrong R, Bhutta ZAJTL. Effect of integrated responsive stimulation and nutrition interventions in the Lady Health Worker programme in Pakistan on child development, growth, and health outcomes: a cluster-randomised factorial effectiveness trial. 2014;384(9950):1282-93.
8. Meenai Z, Longia S. A study on prevalence & antecedents of developmental delay among children less than 2 years attending well baby clinic. 2009.
9. Darsoni JGA, Shehri NAA. Milestones: Are mothers aware?
10. Cook GA, Roggman LA, Boyce LKJFS. Fathers' and mothers' cognitive stimulation in early play with toddlers: Predictors of 5th grade reading and math. 2011;2(2):131-45.
11. Alkhazrajy LA, Aldeen ERSJAJoAS. Assessment of mothers knowledge regarding the developmental milestone among children under two years in Iraq. 2017;14(9):869-77.
12. Maggi S, Irwin LJ, Siddiqi A, Hertzman CJJop, health c. The social determinants of early child development: an overview. 2010;46(11):627-35.
13. Scharf RJ, Scharf GJ, Stroustrup AJPir. Developmental milestones. 2016;37(1):25-37; quiz 8, 47.
14. Alotaibi KSF, MashaeelAbdulkareemAlmwalad WM, Ateah MAA, YeslamBawazeer SA, AmerAsiri FA, Alhawsawi AM, et al. KNOWLEDGE OF SAUDI MOTHER TOWARD DEVELOPMENTAL MILESTONES.6(01):2019.
15. Tamis- Lemonda CS, Shannon J, Spellmann MJImhjopotwafimh. Low- income adolescent mothers' knowledge about domains of child development. 2002;23(1- 2):88-103.
16. Gupta A, Kalaivani M, Gupta SK, Rai SK, Nongkynrih B. The study on achievement of motor milestones and associated factors among children in rural North India. Journal of family medicine and primary care. 2016;5(2):378-82.
17. Iqbal U, Rikhy S, Dringenberg HC, Brien JF, Reynolds JNJN, teratology. Spatial learning deficits induced by chronic prenatal ethanol exposure can be overcome by non-spatial pre-training. 2006;28(3):333-41.
18. Ornoy A, Ratzon N, Greenbaum C, Wolf A, Dulitzky MJJoPE, Metabolism. School-age children born to diabetic mothers and to mothers with gestational diabetes exhibit a high rate of inattention and fine and gross motor impairment. 2001;14(Supplement):681-90.
19. Alqurashi FO, Awary BH, Khan BF, AlARhain SA, Alkhaleel AI, Albahrani BA, et al. Assessing knowledge of Saudi mothers with regard to parenting and child developmental milestones. 2021;28(3):202.
20. Grantham-McGregor S, Cheung YB, Cueto S, Glewwe P, Richter L, Strupp B. Developmental potential in the first 5 years for children in developing countries. Lancet (London, England). 2007;369(9555):60-70.
21. Leonard HC, Hill ELJC, Health AM. The impact of motor development on typical and atypical social cognition and language: A systematic review. 2014;19(3):163-70.

Authors:

First Author – Mehr-un-Nisa (**Main Author**), Doctor of physical therapy, University Institute of Physical therapy University of Lahore, (Phone number +923334441891)

E. mail Address: *Nisamehru98@gmail.com*

Second Author – Dr. Sadia Iftikhar (**Corresponding Author**), Dip PT, BPT, PP-DPT, MS-NMPT, Senior lecturer University Institute of Physical therapy University of Lahore

E. mail Address: *sadia.iftikhae@uipt.uol.edu.pk*

Third Author – Dr. Farooq Islam, Head of department (DPT), University Institute of Physical therapy University of Lahore

E. mail Address: *farooqislam47@gmail.com*

Fourth Author – Dr. Asim Raza, Ph.D. (Biostatistics), Assistant Professor, University Institute of Physical therapy University of Lahore, http://orcid.org/0000-0002-7667-1869

E. mail Address: *asimrazathakur@gmail.com* ,