Cross-Sectional Study on Assessment of the Knowledge of Mothers Regarding Identification of Developmental Milestones of Young Children at an Urban Area of Bhavnagar, Gujarat

Nayan H. Joshi[1], Atul V. Trivedi[2], Mihir Rupani[3]

[1]Resident Doctor, [2]Associate Professor, [3]Assistant Professor, Department of Community Medicine, Government Medical College, Bhavnagar, Gujarat, India

Correspondence : Dr. Atul V. Trivedi, E mail: trivediatul@gmail.com

Abstract :

Introduction : The present study focused on the levels of knowledge about development among mothers. This is the first population-based study to examine maternal knowledge of child development in urban environments in a Gujarat. This research supports other studies conducted on mothers on the finding that majority have inadequate knowledge about child development. **Objectives:** This study was carried out with the objective to find out the levels of knowledge of mothers regarding identification of developmental milestones of child and factors contributing to it. **Method:** It was a cross-sectional study conducted amongst 195 mothers by interviewing, with objective to measure knowledge score regarding developmental milestones of child by mothers from an urban health training centre area affiliated to community medicine department, Govt. medical college, Bhavnagar. **Results:** Out of 195 mothers, maximum 148 (75.9%) mothers had average score of knowledge followed by 26(13.3%) had good and 21(10.8%) had poor score. The independent t-test between knowledge score of mothers did have a significant difference with respect to religion, caste, education, status of mother employment and mother native place. Pearson's correlation coefficient "r" between knowledge score of mothers and age, number of family members, per capita income, years of education were significantly different from 0. **Conclusion:** We conclude that the most of mothers had average knowledge about developmental milestones. Further, it was observed that knowledge regarding motor development was higher than cognitive milestone. Age of mother, religion, caste, level of education, employment status, socio-economical status and native place of mother were associated with good knowledge score of mothers regarding child development.

Key words : Developmental Milestones, Gross and Fine Motor Development, Physical Growth.

Introduction:

"The children of today are the citizens of tomorrow"

The birth of a child is a major occasion in any family. The health of a growing child is always a matter of great concern to the parents. The Growth of a child is at most requirement for mental and physical development as well as social integrity. Growth refers to an increase in the physical size of the whole or any of its parts. It results because of cell division and the synthesis of proteins. It causes a quantitative change in the child's body. Development refers skills and capacity to function. It results in a qualitative changes in child's functioning.[1]

Developmental delays are common in early childhood affecting at least 10 percent of the children. These delays if not intervened timely may lead to permanent disabilities including cognitive, hearing or vision impairment.[2]

Knowledge of developmental milestones is essential for assessing normal development and to identify any delay in development. Normal growth and development take place only if there is optimal nutrition, freedom from recurrent episodes of

infection and freedom from adverse genetic and environmental influences. In a developing country like India, the high prevalence of under-nutrition, iodine deficiency, iron deficiency and inadequate cognitive stimulation are important risk factors for sub-optimal development. Yet, health care providers at the primary level are mostly unaware of the importance of the timely acquisition of developmental milestones by children under their care.

Mothers who are usually taking care of the child, must have adequate knowledge regarding monitoring the child growth and development. So this knowledge is very important because it will help to identify the developmental disabilities and seek early interventions and management.

This research was carried out with the objective to find out the knowledge of mothers regarding identification of developmental milestones of young children and the variables affecting it.

Method:

Study area: The study was conducted among 195 young mothers from UHTC area, which is affiliated to Community Medicine Department, Govt. Medical College, Bhavnagar. The Medical College is functional since the year 1996 and tertiary care hospital is attached with it, which is catering to around thirty lakh population of Bhavnagar district.

Study type: It was a cross-sectional study conducted among young mothers.

Study duration: The study was carried out for a period of 4 months from June-September 2016.

Sample size: The minimum sample size was estimated to be 195 using the formula $N = 4PQ/ L^2$ where P is the prevalence, Q = 1-P and L = allowable error. The prevalence of good knowledge score regarding developmental milestones of infants in mothers was taken as 53%[3] and allowable error was decided to be kept at ±0.75.

Study tool: Data was collected by personal interviews of mothers using pre-tested and pre-structured proforma and grading of mother's knowledge regarding developmental milestone done by Tool.

Development and Description of tool: A structured knowledge tool consisting of two sections

Section 1: Items on demographic proforma like age of mothers, religion, cast, parity, employment, educational level, number of family member, native place of mother and per capita income.

Section2: Consisting of a 20 knowledge question on identification of developmental milestones which was derived from developmental checklists of birth to five years and with some modification, the primary form of the revised questionnaire was reviewed by 4 experts (2 consultant pediatricians, 2 community medicine specialists). Each item consists of one correct answer and each correct answer carries two marks.

Criterion Measure:

The criterion measure used in the study was knowledge score on developmental milestones. The knowledge score refers to the total obtained score on knowledge items in structured questionnaire by mothers.

Research Variables:

Independent Variable –

The independent variables of the present study were age, religion, cast, education, occupation,

The questions were related to the following aspects

Area of knowledge regarding developmental milestone		ITEMS
Component -1	Physical growth	**7**
Component -2	Language Development and Social Development	**6**
Component -3	Gross and fine motor development	**7**

Total Items = 20, Maximum score = 40, Minimum score = 0

Level of knowledge		Score	Percentage
A	Good	≥26	≥65%
B	Average	14-25	36-64%
C	Poor/Below average	≤13	≤35%

gender of child, parity, native place of mother, per capita income etc.

Dependent Variable –

The dependent variables of the present study is knowledge regarding growth and development of child among young mothers in selected area.

Inclusion criteria:

All mothers above 18 years of age, having child below 5 years of age, giving written informed consent to participate in the study and who is available during the period of data collection, were included in the study.

Exclusion criteria:

Mothers who were not willing to participate, Mothers of newborn with congenital abnormalities and Mothers who cannot understand Gujarati, Hindi and English.

Reliability of the Tool:

Reliability was computed by Cronbach's Alpha. The reliability of the Questionnaire "r" was 0.709, and with that reliability of tool was ensured.

Ethical issue:

Written informed consent was taken from the mothers who agreed to participate in the study.

Statistical methods used:

Student t-test was applied for uni-variate quantitative. Pearson's correlation coefficient (r)and multiple regression were applied to find out the relationship between mothers knowledge score and various potential predictors. Difference would be said to be significant when p-value <0.05. Data was analyzed using IBM SPSS Statistics version 22 (evaluation copy).

Results:

Variable	Frequency	Percentage
Age (Year)		
≤20	11	5.6%
21-25	87	44.6%
26-30	75	38.5%
31-35	22	11.3%
Religion		
Hindu	135	69.2%
Muslim	60	30.8%
Caste		
General	32	16.4%
OBC (Other Backward Classes)	88	45.1%
SEBC (Socially & Educationally Backward Classes)	55	28.2%
ST (Scheduled Tribes)	20	10.3%
Gender Of Child		
Male	132	67.7%
Female	63	32.3%
Number of children (Parity)		
1	92	47.2%
≥2	103	52.8%
Socio Economic Status		
Class I	36	18.5%
ClassII	23	11.8%
ClassIII	48	24.6%
ClassIV	74	37.9%
ClassV	14	7.2%
Maternal Education		
Illiterate	34	17.4%
primary	86	44.1%
Secondary	23	11.8%
Higher secondary	8	4.1%
Graduate	40	20.5%
Post graduate	4	2.1%
Maternal Employment		
Employed	34	17.4%
Unemployed	161	82.6%
Native Place Of Mother		
Rural	86	44.1%
Urban	109	55.9%

Table 2: Minimum, maximum, mean and standard deviation of knowledge score of mothers regarding growth and development of Childs according to areas of development (n=195)

Areas of Knowledge	Minimum	Maximum	Mean	Std. Deviation
Component-1	0	14	7.53	3.077
Component-2	0	10	4.34	3.366
Component-3	0	14	7.34	3.491
Total score	0	36	19.21	6.147

Table 3 : Frequency and Percentage distribution of mother's level of knowledge regarding growth & development of child's (n=195)

Level of knowledge	Frequency	Percentage
Good	26	13.3%
Average	148	75.9%
Poor/Below average	21	10.8%

Table 4: Mean, standard deviation and unpaired t-test between different variables and Knowledge score of Mothers

Variable		n	Mean± SD	t-test	df	Mean Diff.	95% CI	p-value
Religion	Hindu	135	20.22±6.81	-4.509*	190.9	-3.29	-4.73--1.85	<0.001
	Muslim	60	16.93±3.36					
Cast	General	32	26.88±5.51	-9.242	193	-9.17	-11.13--7.21	<0.001
	Others	163	17.71±5.05					
Education	Literate	161	19.74±6.24	-2.655	193	-3.03	-5.29-0.78	0.009
	Illiterate	34	16.71±5.04					
Employment	Employed	34	27.29±6.96	-7.882*	38.6	-9.79	-12.30--7.28	<0.001
	Unemployed	161	17.50±4.36					
Gender of child	Male	132	19.09±6.05	0.392	193	0.37	-1.49-2.23	0.696
	Female	63	19.46±6.38					
No. of child	One	92	19.13±7.63	-0.166*	143.2	-0.15	-1.95-1.65	0.868
	Two or more	103	19.28±4.46					
Native place of mother	Rural	86	20.98±6.34	3.678	193	3.16	1.47-4.85	<0.001
	Urban	109	17.82±5.64					

*The assumption of equality of variances was not being met; therefore Welch t-test was applied for these variables.

A total of 195 homes of children aged below 5years were visited for the study. As shown in Table 1, most mothers (94.4%) were above 20 years of age and 55.9% of mother had native place in urban. Out of the 195 mothers, 135(69.2%) of mothers were Hindu and 60(30.8%) of were Muslim and 18.5% of mothers belonged to the upper socio-economic class (class I) of Modified Prasad's classification. Most families (52.8%) had two or more children and two- third of families had last male child. Almost 82.6% of mothers literate and mostof mothers were housewife.

Above table 3 explains mother's knowledge regarding growth and development of child. As presented in table 3, most of mothers 148(75.9%) had average knowledge followed by 26(13.3%) had good and 21(10.8%) had poor score.

Table 5: Correlations between Total knowledge score of mothers and different variables (n=195)

Variable	Pearson's correlation coefficient (r)	p-value
Total score and Age	0.364	<0.001
Total score and No. of family member	-0.404	<0.001
Total score and Per capita income	0.365	<0.001
Total score and Year of education	0.695	<0.001

Table 6: Summary statistics, correlations and results from the regression analysis

Variable	Mean	SD	Correlation with total score	Multiple regression weights	
				b	B
Total score	19.21	6.147			
Year of study	7.63	5.843	0.629***	0.433***	0.411
Caste	0.16	0.371	0.554***	4.186***	0.253
Age	25.78	3.628	0.364***	0.421***	0.248
SES	0.45	0.499	-0.229***	2.281***	0.185
Occupation	0.17	0.380	0.606***	2.905**	0.180
No. of family member	6.08	2.370	-0.404***	-0.351**	-0.135

*** p<0.001, **p<0.05 (Adjusted R2=0.598, F (6, 188) = 49.068, p<0.001), b= Unstandardized coefficient, B= Standardized coefficient

As demonstrated in table 4, the Hindu mothers were associated with mean knowledge scores of 20.22 (±6.81). By comparison, the Muslim mothers were associated with numerically smaller mean knowledge scores of 16.93 (±3.36). To test the hypothesis that the Hindu mothers were associated with statistically significantly different mean knowledge scores, an independent samples t-test was performed. The knowledge scores distributions were sufficiently normal for the purposes of conducting a t-test (i.e., skew <|2.0| and kurtosis <|9.0|).[4] The independent samples t-test was associated with a statistically significant effect, t(190.9)=-4.509, p=<0.001.Thus, the Hindu mothers were associated with a statistically significantly larger mean knowledge scores than the Muslim mothers.

Similarly, the mean knowledge scores were also significantly higher in mothers belonging to general caste, literate mothers, employed mothers and rural native place mothers than others caste mothers, illiterate mother, unemployed mother and urban native place mothers respectively. Also, the independent sample t-test of mother knowledge scores did not have a statistically significant difference with respect to no. of child and gender of child.

Above table 5 depicted regarding correlations between total knowledge score of mothers and different variables. From the correlations table, it can be seen that the correlation coefficient (r) between total knowledge score and year of education was 0.695, indicating a moderate relationship and $p < 0.001$ indicates that the coefficient is significantly different from 0.

Regarding other variables like age, no. of family member and per capita income correlation with total score was found low relationship and $p < 0.001$ indicated that the coefficient is significantly different from 0.

Correlation and multiple regression analyses were conducted to examine the relationship between

mother knowledge score and various potential predictors. Table 6 summarizes the descriptive statistics and analyses different variables for their correlation. Each of the variables was positively and significantly correlated with the total score, indicating that those with higher scores on these variables tend to have higher mother knowledge score. Socio Economic Status and no. of family members were negatively correlated with mother knowledge score.

The multiple regression model with all six predictors produced adjusted $R^2 = 0.598$, $F(6, 188) = 49.07$, $p < 0.001$. As observed in Table 6, the year of study, caste, age, socio economic status and occupation had significant positive regression weights, indicating mothers with higher scores on these variables were expected to have higher knowledge total score, after controlling for the other variables in the model. The no. of family members has a significant negative weight, indicating that those mothers with higher no. of family members were expected to have lower knowledge score (a suppressor effect).

Working model to predict mothers Knowledge score and it apply to the next mother

Knowledge score = 4.966 + 0.433 (year of study) + 4.186 (caste) + 0.421 (age in years) + 2.281 (SES) + 2.905 (occupation) - 0.351 (no. of family members).

Discussion:

Milestone developmental knowledge among mothers is having its own importance in nurturing child, helps in early identification of developmental delay and could be in turn early addressed upon. This research supports other studies conducted on mothers on the finding that majority have inadequate knowledge about child development.[6-10] The present study postulated that mothers had more developmental knowledge in area of physical development than other area. This fact was supported by other researchers.[11,12]

The current study found that the Hindu mothers were associated with mean knowledge scores of 20.22±6.81 which higher than the Muslim mothers and unpaired t-test between these was statistically significant ($p<0.001$). General caste mothers were higher mean knowledge score and statistically significant than others caste mothers. Cross-cultural studies and research on minority and immigrant populations in Western countries have shown that mothers from different cultures have different patterns of knowledge of child development.[13-16]

This study observed that educated mother were associated with mean knowledge scores of 19.74±6.24 which higher than illiterate mothers and unpaired t-test between these was statistically significant ($p<0.001$). Similar positive association between good developmental knowledge and status of mother education found in study conducted by Dabar et al., Kumar et al., Chaudhri et al. and Ertem et al.[17-21] In contrast to this finding study conducted by Rehman et al. and Puhan et al., no association found between developmental knowledge and status of mother education.[7,8] The probable reason for this discrepancy can be the different scales and different populations used in studies.

This study found that, employed mothers were associated with higher mean knowledge scores (27.29±6.96) than unemployed mothers and unpaired t-test between these was statistically significant ($p<0.001$). Similar finding noticed in study conducted by Dabar et al., Rebekkal et al.and Kerrie proulx.[17,22,23]

This study found that, child's gender was not significantly correlated with mother's knowledge regarding developmental milestone. This suggests that mothers of girls focused on developmental milestone in a similar number of as mothers of boys. Similar finding noticed in study conducted by Harold alderman and Kerrie proulx.[22,24]

The current study found that, number of child was not significantly correlated with mother's knowledge regarding developmental milestone. This suggests that mothers have one child focused on developmental milestone in a similar number of as mothers have more than one child. In contrast to this finding study conducted by Ertem et al. and Safadi et al. found that mothers who have less number of child had associated with higher developmental

knowledge score.[11,20] The probable reason for this discrepancy can be the different populations (two cities of turkey) used in studies and the choice for fewer children may be related to increased modernization and also to the desire of the mother to give more time to her children and influence their development.

This study found that, rural native place mothers were associated with higher mean knowledge scores (20.98±6.34) than urban native place mothers and unpaired t-test between these was statistically significant ($p<0.001$).In contrast to this finding study conducted by Ertem et al., and Anwar Alkhazrajy & Rifaat Salah Aldeen, no association found between developmental knowledge and place of mothers.[20,21] The probable reason for this discrepancy can be the in rural area joint family is our cultural practice and elder people in the family taken care of the mother and new arrival. They were well experienced and had knowledge of the growth and development of infant. They used to teach and support the mother regarding child rearing practice.

Based on the findings of the Pearson's correlation coefficient analyses, mothers had high per capita income associated with high developmental knowledge score. Similar finding noticed in study conducted by Kolobe and Dabar et al.[17,25]

The finding of correlation indicated that knowledge score of mothers regarding developmental milestone had positively associated with age of mothers. Similar finding noticed in study conducted byAnwar Alkhazrajy & Rifaat Salah Aldeen, Kolobe THA and Ertem et al.[20,21,25] In contrast to this finding study conducted by Rehman et al.,Safadi et al. and Puhan et al. found that no association between mother's age and developmental knowledge score.[7,8,11]

The current study found that maximum 148 (75.9%) mothers had average knowledge regarding child developmental milestone which confines with results of study conducted by Deepika David et al. and Meshram et al. reported to be 79% and 71.67%.[12,26]

Conclusion:

We conclude from the study that the most of mothers were average knowledge about development milestones and knowledge regarding motor development higher than cognitive milestone. Age of mother, religion, caste, level of education, employment status, socio economical status and native place of mother were associated with good knowledge score of mothers regarding child development. It is a good opportunity to address gaps of knowledge of mother regarding child development milestones by reemphasizing focus under RBSK (Rashtriya Bal Swasthya Karyakram) program.

Declaration:

Funding: Nil

Conflict of Interest: Nil

References :

1. Park. K. Park's textbook of preventive and social medicine. 23rd ed. Jabalpur: Bhanot publisher; 2007. 541p.
2. RBSK - Governnment of India [Internet]. [cited 2018 Oct 5]. Available from: http://nhm.gov.in/nrhm-components/rmnch-a/child-health-immunization/rashtriya-bal-swasthya-karyakram-rbsk/background.html
3. David D, Toppo MKJ, Saini MK. A study to assess the knowledge of mothers' regarding developmental milestones of infants. Int J Curr Res. 2014;6:5.
4. Schmider E, Ziegler M, Danay E, Beyer L, Bühner M. Is it really robust? Reinvestigating the robustness of ANOVA against violations of the normal distribution assumption. Methodol Eur J Res Methods Behav Soc Sci. 2010;6(4):147–51.
5. Mukaka M. A guide to appropriate use of Correlation coefficient in medical research. Malawi Med J J Med Assoc Malawi. 2012 Sep;24(3):69–71.
6. Rikhy S, Tough S, Trute B, Benzies K, Kehler H, Johnston DW. Gauging knowledge of developmental milestones among Albertan adults: a cross-sectional survey. BMC Public Health. 2010 Apr 8;10:183.
7. Rehman A, Kazmi S, Munir F. Mothers' Knowledge about Child Development. Pak Pediatr J. 2016 Sep 30;40:176–81.
8. Puhan M, Panda A, Devi S. A Study to assess the Effectiveness of Planned Teaching Programme on Knowledge Regarding Developmental Milestones of Children between 0-2 Years among Mothers at Chirvaltola Basti, BBSR, Odisha. Int J Nurs Educ Res. 2017 Mar 4;5(1):87–90.
9. Shrestha M, Ulak M, Strand TA, Kvestad I, Hysing M. How much do Nepalese mothers know about child development? Early Child Dev Care. 2017 Mar 23;0(0):1–8.

10. Habibi E, Sajedi F, Afzali H, Hatamizadeh N, Shahshahanipour S, Glascoe F. Early childhood development and iranian parents' knowledge: A qualitative study. Int J Prev Med. 2017;8(1):84.
11. Safadi RR, Ahmad M, Nassar OS, Alashhab SA, AbdelKader R, Amre HM. Jordanian mothers' knowledge of infants' childrearing and developmental milestones. Int Nurs Rev. 2016 Mar 1;63(1):50–9.
12. Deepika David, Mrs. Khushlata J. Toppo, Mrs. Kamla Saini. A STUDY TO ASSESS THE KNOWLEDGE OF MOTHERS' REGARDING DEVELOPMENTAL MILESTONES OF INFANTS. Int J Curr Res. 2014 Jul 20;6(7):7524–8.
13. Sistler AK, Gottfried NW. Shared development knowledge between grandmother and mother. Fam Relat Interdiscip J Appl Fam Stud. 1990;39(1):92–6.
14. Pachter LM, Dworkin PH. Maternal Expectations About Normal Child Development in 4 Cultural Groups. Arch Pediatr Adolesc Med. 1997 Nov 1;151(11):1144–50.
15. Bornstein MH, Cote LR. "Who is sitting across from me?" Immigrant mothers' knowledge of parenting and children's development. Pediatrics. 2004 Nov;114(5):e557-564.
16. Huang KY, Caughy MO, Genevro JL, Miller TL. Maternal knowledge of child development and quality of parenting among White, African-American and Hispanic mothers. J Appl Dev Psychol. 2005 Mar;26(2):149–70.
17. Dabar D, Das R, Nagesh S, Yadav V, Mangal A. A Community-based Study on Growth and Development of Under-Five Children in an Urbanized Village of South Delhi. J Trop Pediatr. 2016 May 3;fmw026.
18. Kumar R, Aggarwal AK, Kaur M, Iyengar SD. Factors influencing psychosocial development of preschool children in a rural area of Haryana, India. J Trop Pediatr. 1997;43(6):324–9.
19. Chaudhari VP, Srivastava RK, Desai VK. Domestic environment and morbidity of under five children. Indian J Pediatr. 2008 May 1;75(5):514–5.
20. Ertem IO, Atay G, Dogan DG, Bayhan A, Bingoler BE, Gok CG, et al. Mothers' knowledge of young child development in a developing country. Child Care Health Dev. 2007 Nov;33(6):728–37.
21. Anwar Alkhazrajy L, Rifaat Salah Aldeen E. Assessment of Mothers Knowledge Regarding the Developmental Milestone among Children Under Two Years in Iraq. Am J Appl Sci. 2017 Sep 1;14:869–77.
22. Kerrie Proulx. Study of Parental Knowledge, Attitudes and Practices Related to Early Childhood Development [Internet]. Ghaobata,Gaudalcanal: United Nations Children's Fund; 2014 Dec p. 63. Available from: http://www.unicefpacific.org
23. Rebekkal, J.M., Dr. Mangala Gowri, P. and Mary Minolin. Assess the effectiveness of infant assessment guide on knowledge during antenatal period and practice during postnatal period regarding growth and development of infant. Int J Dev Res. 2017 Aug;07(08):14649–52.
24. Harold Alderman. No Small Matter: The Impact of Poverty, Shocks, and Human Capital Investments in Early Childhood Development [Internet]. The World Bank, 1818 H Street NW, Washington, DC 20433, USA; 2011. 208 p. Available from: http://www.worldbank.org
25. Kolobe TH. Childrearing Practices and Developmental Expectations for Mexican-American Mothers and the Developmental Status of Their Infants. Phys Ther. 2004 May 1;84(5):439–53.
26. Meshram K, Maurya A, Kumari D. Effectiveness of Planned Teaching on Knowledge Regarding Developmental Milestones among the Mothers of infant in selected Rural area of Wardha District. Int J Nurs Educ Res. 2017 May 19;5(2):160–4.