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A cross sectional study to assess the knowledge of adults about developmental milestones of children in Pedhawaltair, Andhra Pradesh

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Abstract
Introduction: Developmental delay occurs when a child exhibits a significant delay in the acquisition of milestones or skills, in one or more domains of development (*i.e.*, gross motor, fine motor, speech/language, cognitive, personal/social or activities of daily living).
Objectives: To Assess the Knowledge of Adults about Motor, Language and Socio Adaptive milestones of children (1-5 years) and its association with Demographic Variables.
Materials and Methods: Type of study – Cross sectional study, Study population and area- Urban health center field practice area is 16 kms away from the college at Pedhawaltair. It has a population of 21418 with Adult population were 7200 persons. Sample size – 384. Study tool: Pretested Prevalidated semi structured questionnaire was developed which was divided in to 4 section, Demographic variables,9 questions on Motor, 6 questions on Fine motor,10 questions on language and 9 questions on Social adaptive milestones.
Results: In 34 questions regarding milestones, 20.17 ± 4.38 questions were answered correctly in that 9,6,10 and 9 questions were from gross motor, fine motor, Language and social Adaptive development respectively, out of which on an average 5.89, 3.70, 6.34, 5.02 questions were answered correctly. Knowledge was significantly associated with Age, Females, Married, Homemakers/Skilled workers/ unskilled workers, Joint family members.
Conclusion: 66.15% of the adults were having average knowledge score and 29.95% respondents having good knowledge score (>65%) and 3.91% of the adults have poor knowledge.

Keywords: Milestones, gross motor, fine motor, language

Introduction
"Milestone" is considered as any important significant event in life. "Developmental Milestone" is a descriptive term used to denote a set of functional skills or specific tasks that most children can do at a certain age range [1]. Developmental delay occurs when a child exhibits a significant delay in the acquisition of milestones or skills, in one or more domains of development [2].
Globally, 52·9 million children younger than 5 years had developmental disabilities in 2016. India contributes to 11.56 million (21.85%) of the total burden [3].
Main Developmental delays reported are sensory impairments (hearing and vision loss), epilepsy or seizures, cerebral palsy, attention deficit hyperactivity disorder (ADHD), autism spectrum disorder (ASD), intellectual disability, other learning disorders [4].
Children with developmental delays and disabilities are at greater risk of suboptimal health, educational attainment, and wellbeing than children without such disabilities [5].
In India, Main causes of developmental disabilities were found to be under-nutrition, iodine deficiency, iron deficiency and inadequate cognitive stimulation [6].
First five-years in a child growth is a crucial period particularly for the development of the brain [7]. And the brain is much more vulnerable to environmental influences than suspected including nutrition, quality of interaction, care and stimulation [8]. Developmental milestones, for instance neck control sitting without support, crawling, standing, walking is generally understood to be vital stages of neurological development [9].
The value of early identification of children with developmental delays has been well documented [10].
Research also says that Parents' knowledge and awareness of child development influence their expectations, interactions with their children and the construction of the learning environment of the child [11].

On the other hand, evidence suggests that parents with poor knowledge of child development overestimate the development rate, potentially leading to inappropriate expectations, intolerance, impatience, stress [12]. Additionally, Lack of adult supervision, can increase the risk of social or behavioural problems in children [13].
Furthermore, paediatricians often rely on parents for developmental milestone history; when parents are aware of such developmental steps, interaction with a paediatrician becomes more effective [14].
Assessing a child's development is a team effort, in which family plays an important role. In the family Adults who can be Parents, Caretakers, observers will be either taking care or will be observing the child during development.
And Care implies not only providing children with proper food and shelter but also their growth, psychological, emotional and social development. This sort of upbringing helps in developing a physically, psychologically, emotionally and socially fit personality [2]. Hence, they must have adequate knowledge regarding the correct age of development of each Milestone of the child for early Identification of development disorders and to seek early intervention

Hence the study was conducted with the objectives

1. To Assess the Knowledge of Adults about Motor, Language and Socio Adaptive milestones of children (1-5 years)
2. To find the association between Demographic variables (Age, Sex, Income, Education, Occupation, Religion, Parity) with Knowledge score.

Materials and Methods

Type of study- Cross Sectional study
Study period -November 25th 2020 to January 10th 2021.
Study area - The study was conducted among Adults of Urban health center field practice area of community medicine department of Gayathri Vidya parishad Medical college, Visakhapatnam, Andhra Pradesh. Urban health center field practice area is 16 kms away from the college at Pedhawaltair. Study population- Pedhawaltair has a population of 21418 with Adult population of 7200 persons.

Sample size

Z α is the standard normal deviate, which is equal to 1.96 at 95% confidence interval.
p is the Good knowledge score taken as 50.68% from previous study [15].
e = Absolute precision taken as 5%
1-p = (1-50.68)
N = Total number of Adults in the area were 7200

$$Sample\ size(n) = \frac{\frac{z^2 X\ p(1-p)}{e^2}}{1+\frac{z^2 X\ p(1-p)}{e^2 N}}$$

$$Sample\ size(n) = \frac{\frac{(1.96)^2 X\ 50.68(100-50.68)}{(5)^2}}{1+\frac{(1.96)^2 X\ 50.68(100-50.68)}{(5)^2\ 7200}}$$

Study tool: Pretested Prevalidated semi structured questionnaire was developed which was divided in to 4 section,

Section 1: Demographic variables like Age, Gender, Religion, Parity, employment, educational level, Number of family members, Percapita income.

Section 2: Consisted of 15 questions, these 15 questions were based on knowledge on Motor milestones of the child from birth to 5 years, which included both Gross motor and fine motor milestones.

Section 3: Consisted of 10 questions which included language milestones of the child from birth to 5 years.

Section 4: Consisted of 9 questions which included social adaptive development Mile stones from birth to 5 years.
All the questions regarding milestones were open ended questions and in all the questions it was specified to provide the answer in months of the child.

Correct Answers: Correct Answers for each question regarding month of development of each milestone were determined by referring standard books (Red Flag Sign) and also by consulting 3 other experts in the field. Correct answers were in the form of range of minimum to maximum age in months and maximum age (months) was considered in such a way that if babies fail to develop a particular milestone even at the maximum age for that particular milestone then it should be considered developmental delay of the child(Red flag sign), for example "When does baby lying on stomach, will try to lift head and shoulders with good control " answer was 3 – 6 months, because if baby doesn't develop Neck reflex even at 6 months then there is definitely a developmental delay.
Knowledge score- There were totally 34 questions in 3 sections regarding milestones and each question has maximum and minimum range and if the answer is within the range then it carries 1 mark and incorrect carries 0 mark.
Good Knowledge (>65%) – more than equal to 22
Average (36%-65%)- 12-21 score
Poor- Below average (<35%) – less than or equal to 11

Research Variables

Independent Variable: The independent variables of the present study were age, religion, caste, education, occupation, Parity, Per capita income etc.

Dependent Variable: The dependent variables of the present study is knowledge regarding Motor, Language and Socio adaptive milestones of children less than 5 years.

Inclusion criteria

1. Adults who have access to Smart phone and Internet.
2. Adults above 18 years of age.
3. Adults who were permanent residents of the area
4. Adults who have given informed consent to participate in the study

Exclusion criteria

- Adults above 60 years, due to age related memory loss etc.

Validity and Reliability of the study tool: The study tool was assessed and modified by 2 expert paediatricians and 2 community medicine faculty for Content, Appearance, Clarity and construct validity. Reliability was computed by

Cronbach's Alpha (r) that is 0.802 by doing a pilot study on 20 adult participants from the same village and these were excluded from the data which was analysed.

Ethical issue: The study participants were included only after obtaining written informed consent from them and the study was conducted after obtaining ethical clearance from Institutional ethical committee of Gayathri Vidya parishad Medical college.

Data Collection: Due to Lockdown and as we have to obey the Government norms of social distancing, Instead of interviewing by face to face interview method, data was collected by using Google form by online survey method. The prepared questionnaire was entered in Google Form Format and the link was sent either by e-mail or through personal Whats app to the selected participants and while sending the google form, we have requested them to fill the complete form and to send by January 5th. The Google Form automatically verified that all questions had to be filled completely before submission and could not be submitted more than once. Reminder messages and mails were also given to them every 2 days. I have sent them the correct range of age for each developmental milestone through mail on January 5th to all the submitted Participants. Some of the participant's doubts were also clarified by WhatsApp and email.

Data analysis: All data from the Google Form was converted in to Excel Sheet, From the Excel sheet the Data was analysed, using Microsoft Excel Version 2019 Software for calculating knowledge score of each individual and T test was used to know the association between knowledge score and Demographic variables and $P<0.05$ was considered as statistically significant. Data was presented using Tables.

Observations and Results

Table 1: Demographic characteristics of respondents

Demographic Variables	Number	Percentage
Age		
<20	16	4.17
20-29	94	24.48
30-39	167	43.49
40-49	93	24.22
50-59	14	3.65
Gender		
Male	210	54.69
Female	174	45.31
Religion		
Hindu	311	80.99
Muslim	28	7.3
Christian	45	11.72
Marital status		
Un Married	60	15.63
Married	283	73.70
Divorced	25	6.51
Widow	16	4.17
Number of children		
No children	118	30.73
1	130	33.85
2	114	29.7
>2	22	5.72
Socio Economic status		
Class I	98	25.52
Class II	65	16.93
Class III	102	26.56
Class IV	119	30.99
Education of Participants		
High School	115	29.95
Graduate	204	53.13
Post Graduate	65	16.93
Occupation of Participants		
Home Maker	142	36.98
Skilled	14	3.65
Semiprofessional	93	24.22
Professional	135	35.16
Type of Family		
Nuclear	210	54.69
Joint	40	10.42
Extended Nuclear	134	34.90
Children with Special Needs		
Yes	16	4.17
No	368	95.83
Total	384	100

As shown in Table 1, a total of 384 Adults participated in the study, and in whom Majority that is 167 (43.49%) adults were in the age group of 30-39 years followed by 20-29 yrs. 54.69% of participants were Males. Majority that is 73.7% were Married. 33.85%, 29.7%, 5.72% of the adults were having one, two and more than two children respectively. Majority of the respondents belong to socio economic status scale of class IV (30.99%) and class III (26.56%). All the participants were educated above high school and majority (53.13%) were graduates. Majority were Home makers (36.98%) and Professionals (35.16%). 4.17% (16) of the participants were having the burden of taking care of children with special needs.

Table 2: Knowledge Score about Child Development among Respondents

Level of Knowledge	Score	No. (Percentage)
Good	More than or equal to 21(>65%)	115(29.95)
Average	12-21(36-65%)	254(66.15)
Poor/Below Average	11 or less than 11(<35%)	15(3.91)

As shown in Table 2, Majority that is 254(66.15%) of the adults were having average knowledge score followed by 115 (29.95%) respondents who were having good knowledge score (>65%) and only few that is 15(3.91%) of the adolescents have poor knowledge.

Table 3: Level of Knowledge about 4 developmental milestones among the Respondents

Level of knowledge according to estimate of age	Correct (Mean±SD)	Over estimate (Mean±SD)	Under Estimate (Mean±SD)
Gross Motor (9 questions)	5.89±0.43	1.72±0.38	1.065±0.19
Fine Motor (6 questions)	3.70±1.53	0.92±0.94	1.41±0.96
Language (10 questions)	6.34±1.08	1.69±0.76	1.97±0.61
Social Adaptive (9 questions)	5.02±1.34	0.9±0.93	3.08±0.85
Total	20.17±4.38	4.86±3.01	7.32±2.61

Out of the total 34 questions regarding milestones, on an average 20.17 questions were answered correctly with a standard deviation of 4.38 and in that 9,6,10 and 9 questions were from gross motor, fine motor, Language and social Adaptive development respectively, out of which on an average 5.89, 3.70, 6.34, 5.02 questions were answered correct respectively.

Table 4: Maximum, Minimum, Mean and Standard Deviation of Knowledge of respondents regarding 4 domains of growth and development of Child.

Knowledge regarding Milestones	Maximum	Minimum	Mean	Standard Deviation
Gross Motor Milestones (9)	9	1	5.89	0.43
Fine Motor (6)	6	1	3.70	1.53
Language Milestones (10)	10	3	6.34	1.08
Social Adaptive Milestones (9)	8	1	5.02	1.34
Total (34)	33	6	20.17	4.38

Out of 34 questions regarding milestones, Maximum score was 33 and minimum score was 6, with mean of 20.17 questions answered correctly. In Gross motor, fine motor and Language, the Maximum score was 9 out of 9,6 out of 6,10 out of 10 respectively. In Socio Adaptive Milestones, the Maximum score was 8 out of 9.

Table 5: Association between Demographic variables and their knowledge score regarding milestones.

Variable		N	Mean +SD	T test	Df	Mean Difference	95% CI	p-value
Age	<30(86)	86	18.75+4.92	3.86	382	-2	-3.01--0.98	0.001
	>30(298)	298	20.75+4.01					
Gender	Male	210	15.14+4.35	22.55	382	-10.07	-10.94- -9.19	0.001
	Female	174	25.21+4.36					
Religion (Anova test)	Hindu	311	20.17+4.38	F value =0.079	b/w – 2 with in 383	MSquare b/wF 1.505 within 19.08		0.924
	Muslim	28	19.83+4.36					
	Christian	45	20.11+4.29					
Marital status	Married/ Divorced/ Widow	324	26.17+4.38	19.56	382	12.02	10.81-13.22	0.0001
	Unmarried	60	14.15+4.32					
Number of children								
	1	130	23.10+4.32	11.00	264	5.86	4.81-6.9	0.0001
	≥2	136	17.24+4.36					
Education	High School	115	20.14+4.36	0.1235	382	-0.06	-1.02-0.89	0.9018
	Graduate/post Graduate	269	20.20+4.36					
Socio Economic Status	Upper (Class I)	265	20.18+4.34	0.1046	382	0.05	-0.89-0.99	0.92
	Middle (Class II, III, IV)							
	Lower (Class IV)	119	20.13+4.32					

Occupation	Unskilled/Skilled/ Home Maker	156	24.2+ 4.36	17.81	382	8.06	7.17-8.94	0.001
	Professional/Semi professional	228	16.14+4.35					
Type of Family	Nuclear	210	15.21+4.23	22.87	382	-9.92	-10.77-9.06	0.0001
	Joint and Extended Nuclear Family	174	25.13+4.23					
Children with Special Needs				1.86	382	2	-0.19- 4.12	0.064
	Yes	16	21.17+4.21					
	No	368	19.17+4.22					

As shown in Table V, with respect to Age, Participants with age more than 30 years were significantly having better knowledge compared to younger participants (<30), Females, Married, Parents with single child were having significantly better knowledge. Homemakers/Skilled workers/ unskilled workers were having significantly better knowledge than Professionals and semiprofessionals. Joint and extended nuclear family members were also having significantly better knowledge compared to nuclear family members. Demographic variables in relation to Religion, Education, Socio-economic status and adults having children with special needs did not show significant difference in respect to knowledge score of milestones.

Table 5: Source of Information about Developmental Milestones

Source of Information	Never No. (%)	Sometimes No. (%)	Always No (%)	Total No (%)
Doctor	138(35.94)	212(55.21)	34(8.85)	384(100)
Friends and Family	63(16.41)	278(72.40)	43(11.20)	384(100)
Books and Parenting Magazines	70(18.23)	269(70.05)	45(11.72)	384(100)
Internet Websites/Social media Broad cast	144(37.50)	208(54.17)	32(8.33)	384(100)
Television shows	364(94.79)	18(4.69)	2(0.52)	384(100)
Parenting Course	363(94.53)	21(5.47)	0	384(100)

As shown in table 6, 8.85%, 11.2%, 11.72%, 8.33% and 0.52% of the respondents were always getting information regarding milestones from Doctors, Friends/Family, Books/Magazines, Internet/Social Media and Television shows respectively and 55.21%, 72.40%, 70.05%, 54.17%, 4.69%, 5.47% were some-times getting information regarding milestones from Doctors, Friends/Family, Books/Magazines, Internet/Social Media and Television shows respectively.

Discussion

The present study was conducted to know the knowledge of adults regarding milestones of children from one to five years, as they act either as Parents or caregivers during the development of children. Hence knowledge of them about all the developmental domains of milestones is important, as it enhances effective care and early identification of developmental delay and hence can seek Professional / Paediatrician help early.

Out of the 384 adults who participated in the study, Majority were from 20-39 (67.97%) years of age, lesser compared to study conducted by Joshi *et al.* (100%) [6], A. Karuppannan et.al study (94.8%) [15], A Alshehri *et al.* study [11] (86.8%) and in Abdulrahman S. Aldayel *et al.* [16] study only 32.8% were from 19-35 years.

In the Present study, 54.69% of participants were males, More Male Participants, in the present compared to Abdulrahman S. Aldayel *et al.* [16] study (34.6%).

Majority of the respondents belong to socio economic status scale of class IV (30.99%) and class III (26.56%) similar to Joshi *et al.* study [6] (37.9% & 24.6%), Abdulrahman S. Aldayel *et al.* study (70.4%) [16].

All the participants were educated above high school, quiet high compared to Abdulrahman S. Aldayel *et al.* [16] study (74.1%), 60.3% in A. Karuppannan et.al study [15] and 26.2% in Joshi *et al.* study [6].

4.17% (16) of the participants were having the burden of taking care of children with special needs similar to Abdulrahman S. Aldayel study (5.3%) [16].

In the present study, 29.95% respondents were having good knowledge score (>65%), good number compared to 13.3% in Joshi *et al.* study [6] and Abdulrahman S. Aldayel *et al.* [16] study (2.4%), Ricky *et al.* study (1.6%) [17] and lesser compared to A. Karuppannan *et al.* study (50.68%) [15], Deepika David *et al.* study (62%) [2].

Majority (66.15%) of the adults were having average knowledge score and the adults with average score were lesser compared to Joshi *et al.* study (75.9%) [6], Meshram *et al.* (71.67%)[18] and higher compared to Deepika David *et al.* study(26%)[2] and Abdulrahman S. Aldayel *et al.* study(14.2%)[16].

Only few that is 3.91% of the adults have poor knowledge less compared to Joshi *et al.* study (10.8%) [6], Deepika David *et al.* study (12%) [2], Abdulrahman S. Aldayel *et al.* study (80%) [16], Albertan Adults (98.4%) [17].

The average questions answered correctly were 20.17 questions in the present study similar to Joshi *et al.* study (19.21 questions) [6].

In the Present study, out of 34 questions regarding milestones, Maximum score was 33 and minimum score was 6, with mean of 20.17 questions answered correctly, In Joshi *et al.* study [6], Maximum score was 36 and Minimum score was zero and 19.21 questions were answered correctly. In Deepika David *et al.* [2] study, Maximum score was 40 and mean score was 19.89.

In the Present study, Participants with age more than 30 years were significantly having better knowledge compared to participants with less than 30 years similar to Joshi *et al.* study [6], Abdulrahman A Alshehri *et al.* [11], Anwar Alkhazrajy [19] and Ertem *et al.* [20] study and in Abdulrahman S. Aldayel [16] *et al.*, Rehman *et al.* [21], Safadi *et al.* [22] and Puhan [23] *et al.* study there was no significant association with Age.

In the Present study Females were having significantly

better knowledge similar Abdulrahman S. Aldayel *et al.* study [16].Married Participants were having significantly better knowledge similar to Abdulrahman A Alshehri *et al.* study [11].

Homemakers/Skilled workers/ unskilled workers were having significantly better knowledge than Professionals and semiprofessionals similar to Joshi *et al.* [6] study and Abdulrahman A Alshehri *et al.* [11] study.

Joint and extended nuclear family members were also having significantly better knowledge compared to nuclear family members unlike Joshi *et al.* [6] study where a smaller number of family members were having more knowledge and in Abdulrahman S. Aldayel [16] *et al.* study no significant association was found.

In the present study, Education did not show any impact on knowledge score, similar to Rehman *et al.* [21] and Puhan *et al.* [23] study but in Joshi *et al.* [6], Abdulrahman A Alshehri [11] *et al.*, Dabar *et al.* [24], Kumar *et al.* [25], Chaudhri *et al.*[26], Ertem *et al.*[20] studies education was significantly associated with knowledge score.

In the present study, in relation to Religion, Education and Socio economic status there was no significant difference found unlike Joshi *et al.*[6] study where Hindus, Literates and Low income individuals were having significantly better knowledge. In Kolobe [27] and Dabar *et al.* [24] study socio economic status was having impact on knowledge score and in Abdulrahman S. Aldaye[16] *et al.* study no association was found.

In the Present study there was no significant difference in knowledge among adults having children with special needs similar to Abdulrahman S. Aldaye *et al.* [16] study.

In the Present study, Parents with single child were having significantly better knowledge similar to Ertem [20] *et al.* and Safadi [11] *et al.* study but unlike Joshi *et al.* [6] study. Single child parents were having better knowledge, as they may be spending more time with the children.

In the Present study, Doctors, Friends/Family, Books/Magazines, Internet/Social Media were the resources of knowledge similar to Deepika David *et al.* [2], Ricky *et al.* [17] study where Doctors/Paediatricians, books and nurses were resources but in Iraqi study [19], Main source of knowledge was from Mothers Experience.

Results of the study clearly indicate that there is need to conduct educational sessions about Developmental Milestones to all the adults who have the role in child care, so that early assessment and seeking help in case of developmental delay will lead to better child outcome.

Conclusion

66.15% of the adults were having average knowledge score and 29.95% respondents having good knowledge score (>65%) and 3.91% of the adults have poor knowledge. In 34 questions regarding milestones, 20.17 ± 4.38 questions were answered correctly in that 9,6,10 and 9 questions were from gross motor, fine motor, Language and social Adaptive development respectively, out of which on an average 5.89, 3.70, 6.34, 5.02 questions were answered correctly. Knowledge was significantly associated with Age, Females, Married, Homemakers/Skilled workers/ unskilled workers, Joint family members.

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