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A Study On Various Factors Affecting Development During The First Two Years Of Life

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Abstract:

The present study was carried out on a sample of 194 children in the age group of 0-2 years. Randomly chosen items under Gross and fine Motor skills, language and socio personal developmental mile stones were analyzed in relation to socio-medical variables to see if there is any impact of these factors on the average age of attainment of each developmental milestone. From the analysis it was found that males in most of the motor milestones were early attainers than females but reverse was found to be true in language and socio-personal milestones. Literacy status of the mother had appositive impact on the attainment of various milestones whereas feeding pattern was not found to have any significant impact on the attainment of these milestones between the two genders. Income too was not found to play any significant role in achieving various developmental milestones.

1.Introduction

Development is the gaining of skills in all aspects of the child's life. The term development is frequently used along with growth and even considered synonymous by some people. But growth and development are not the identical. Therefore it requires a careful examination and proper understanding. Development refers to the increase of functional capacity in perfect form resulting from production of specialised tissues from unspecialised ones. The term development has been variously defined by scientists. Comas (1960) regards development as a quality peculiar to living matter that carries it through the process of progressive evolution to a state of perfect function. Hurlock (1941) considers development as changes in its progressive series which are orderly and coherent and which lead to maturity. It is, in fact, the consequence of cellular differentiation that the character and its specificity results into perfect function. An individual may grow in size but some organs though fully grown in size may fail to develop to perform the specific functions. In both growth and development interactions of several processes with each other are involved. Watson and Lowery (1960) have tried to distinguish between the two processes. They say that growth may mean increase in physical size of the whole or any of its part which may be measured. On the other hand, development indicates an increase in skill and complexity of function. In any case the processes of development and growth are not the same but are interrelated and interdependent. The different types of development are often split into four areas:

Physical development: This refers to the body increasing in skill and performance and includes:

- gross motor development (using large muscles), for example legs and arms fine motor development (precise use of muscles), for example hands and fingers.
- Social and emotional development: This is the development of a child's identity and self-image, the development of relationships and feelings about him or herself and learning the skills to live in society with other people**.**
- Intellectual development: this is learning the skills of understanding, memory and concentration.
- Communication and speech development: this is learning to communicate with friends, family and all others. However, it is important to realize that all the areas of development link together. Just stop and think about the changes that take place in the developing child.

2.Aspects Of Child Development

Child development is not a matter of a single topic, but progresses somewhat differently for different aspects of the individual. Here are descriptions of the development of a number of physical and mental characteristics.

2.1.Physical Growth

Physical growth in stature and weight occurs over the 15–20 years following birth, as the individual changes from the average weight of 3.5 kg and length of 50 cm at full term birth to full adult size. As stature and weight increase, the individual's proportions also change, from the relatively large head and small torso and limbs of the neonate, to the adult's relatively small head and long torso and limbs (Tanner, 1978).

2.2.Speed And Pattern Of Development

The speed of physical growth is rapid in the months after birth, then slows, so birth weight is doubled in the first four months, tripled by age 12 months, but not quadrupled until 24 months. Growth then proceeds at a slow rate until shortly before puberty (between about 9 and 15 years of age), when a period of rapid growth occurs. Growth is not uniform in rate and timing across all body parts. At birth, head size is already relatively near to that of an adult, but the lower parts of the body are much smaller than adult size. In the course of development, then, the head grows relatively little, and torso and limbs undergo a great deal of growth (Tanner, 1978)

2.3.Mechanisms Of Developmental Change

Genetic factors play a major role in determining the growth rate, and particularly the changes in proportion characteristic of early human development. However, genetic factors can produce the maximum growth only if environmental conditions are adequate. Poor nutrition and frequent injury and disease can reduce the individual's adult stature, but the best environment cannot cause growth to a greater stature than is determined by heredity (Tanner, 1978).

2.4.Risk Factors For Poor Child Development

Child development can be negatively influenced by a number of risk factors, many of which have been studied in developing countries Walker et al, 2007. Malnutrition, maternal depression and maternal substance abuse are three of these factors which have

received particular attention by researchers, however, many more factors have been considered (Mora, et al, 1981; Kurstjen & Wolke, 2001; Frank et al, 2001).

2.5.Postnatal Depression

Although there are a large number of studies contemplating the effect of maternal depression and postnatal depression of various areas of infant development, they are yet to come to consensus regarding the true effects. There are numerous studies indicating a negative impact on development, and equally there are many proclaiming no effect of depression on development. A study of 18 month olds whose mothers suffered depressive symptoms while they were 6 weeks and/or 6 months old indicated that maternal depression had no effect on the child's cognitive development at 18 months Piteo, 2012. Furthermore, the study indicates that maternal depression combined with a poor home environment is more likely to have an effect on cognitive development. However, the authors conclude that it may be that short term depression has no effect, where as long term depression could cause more serious problems.

2.6.Maternal Cocaine Abuse

Research has provided conflicting evidence regarding the impact of maternal substance abuse during and after pregnancy on children's development (Frank et al, 2001). Children exposed to cocaine weigh less than those not exposed at numerous ages ranging from 6 to 30 months (Hurt et al ,1995). Furthermore studies indicate that the head circumference of children exposed to cocaine is lower than those unexposed (Hurt et al, 1995; Azuma & Chasnoff, 1993). On the other hand, two more recent studies found no significant differences between those exposed to cocaine and those who were not in either measure (Richardson et al, 1996; kilbride et al, 2000). Maternal cocaine use may also affect the child's cognitive development, with exposed children achieving lower scores on measures of psychomotor and mental development (singer et al, 1994; Chasnoff, 1992)

2.7.Malnutrition

Malnutrition is a large problem in developing nations, and has an important impact on young children's weight and height. Children suffering malnutrition in Columbia weighed less than those living in upper class conditions at the age of 36 months (11.88kg compared to 14kg), similarly, malnourished children were shorter than well-nourished

children, again at 36 months (85.3cm in malnourished children; 94cm in well-nourished children (Mora et al, 1981).Malnutrition has been indicated as a negative influence on childhood IQ (Ivanovic et al, 2004; Liu et al, 2003). Although it is now suggested that this effect is nullified when parental IQ is considered, implying that this difference is genetic (Webb et al, 2005).

2.8.Nutrients

The impact of low iron levels on cognitive development and IQ is a subject still to reach consensus (Grantham & Ani, 2001). Some evidence suggests that well-nourished children with lower levels of iron and folate (although not at such a level to be considered deficient) have a lower IQ than those with higher levels of iron and folate (Arija et al, 2006). Furthermore, anaemic children perform worse on cognitive measures than non-anaemic children (Halterman et al, 2001). These nutrients have been strongly implicated in brain development, along with iodine and zinc (Bryan et al, 2004). Iodine is required for the generation of thyroid hormones necessary for brain development (reavley, 1998). Iodine deficiency may reduce IQ by an average of 13.5 points compared to healthy individual (Bleichrodt & Born, 1994). Zinc deficiency has also been shown to have a negative impact on childhood growth and development(Brown et al, 2002; Bhutta et al, 1999).

2.9.Socioeconomic Status

Socioeconomic status is measured primarily based on the factors of income, educational attainment and occupation. Current investigations into the role of socioeconomic factors on child development repeatedly show that continual poverty is more harmful on IQ (smith, 1997), and cognitive abilities(Schoon, 2012) than short-lived poverty. Children in families who experience persistent financial hardships and poverty have significantly impaired cognitive abilities compared to those in families who do not face this issue (Schoon, 1992). Low income poverty can cause a number of further issues shown to effect child development, such as malnutrition and lead poisoning due to lead paint found on the walls of some houses (Brooks 7 Duncan, 1997). Child blood levels of lead increase as income decreases (Brody,et al, 1994). Income poverty is associated with a 6-13 point reduction in IQ for those earning half of the poverty threshold compared to those earning twice the poverty threshold (Smith, 1997). That being said, children

coming from households featuring continual or temporary poverty still perform lower than children in middle class families(Schoon, 2012).

Parental educational attainment is the most significant socioeconomic factor in predicting the child's cognitive abilities (DeGarmo et al, 2003), those with a mother with high IQ are likely to have higher IQs themselves(Webb et al, 2005; Monzik, 1957). Similarly, maternal occupation is associated with better cognitive achievement. Those whose mothers' job entails problem-solving are more likely to be given stimulating tasks and games, and are likely to achieve more advanced verbal competency (Parcel & menagham, 1990).

Poverty-stricken children are subjected to fewer stimulating recreational activities, often missing out on trips to libraries or museums, and are unable to access a tutor to help with problem academic areas (Bardley et al, 2003).

A further factor in a child's educational attainment involves the school environment, more specifically teacher expectations and attitudes. It has been argued that teachers perceive low-SES children as being less academically able and as such provide them with less attention and reinforcement (McLoyd, 1997).

2.10.Parasites

Diarrhoea caused by the parasitic disease Giardiasis is associated with lower IQ (Ajjampur et al, 2011). Parasitic worms (helminths) are associated with nutritional deficiencies that are known to be a risk to child development (WHO, 1987).

2.11.Poisoning

High levels of lead in the blood is associated with attention deficits (Calderon et al, 2001), while arsenic poisoning has a negative effect on verbal and full IQ. Manganese poisoning due to levels in drinking water is also associated with a reduced IQ of 6.2 points between the highest and lowest level of poisoning (Bouchard et al, 2011). Prenatal exposure to various pesticides including organophosphates, and chlorpyrifos (Rauh, et al, 2011) has also been linked to reduced IQ score. Organophosphates have been specifically linked to poorer working memory, verbal comprehension, perceptual reasoning and processing speed (Bouchard et al, 2011).

2.12.Other Factors

Cognitive development is related to childhood exposure to violence and trauma, including spousal abuse between the parents and sexual abuse (Enlow et al, 2012). Intrauterine growth retardation is associated with learning deficits in childhood, and as such, is related to lower IQ.

3.Objectives

- To know the average age of attaining various gross and fine motor skills in both the genders.
- To study the relation between gender and development.
- To study different feeding and weaning practices and its impact on development.
- To know the impact of literacy and income on the development.
- To study the relation between working status, birth order and birth spacing and its influence on development.

4.Materials And Methods

The present study has been carried out over a period of 2 years (1997-1999) on longitudinal basis with the aim to obtain empirical information about Kashmiri Urban children on growth and development in the first two years of life and compare it with that of other Indian Children. One basic need that was fulfilled by conducting the present study was to obtain much needed developmental norms and patterns of Kashmiri urban children.

4.1.Material Used

A sample of urban children born to normal mothers without any evident medical problem likely to interfere with growth or development from Srinagar city was registered and followed for two years. Children with any morbidity (especially of chronic nature) or other factor likely to affect growth and development were not retained in the study.

4.2.Sampling

A multistage purposive random sampling technique was used to select the children. The urban area of Srinagar city was arbitrarily divided in 4 zones (North, South, East and West). From each zones 5 wards were randomly selected and from each ward between 100-150 households were visited to register newborns (up to ten days old). The initial

plan was to get around 300-350 newborns cohort as a sample to be observed over a period of two years. However, by this technique only a sample of around 150 newborn was obtained and therefore to maintain a sample of minimum of 300 children, the investigator had to contact the hospital discharging section of two main obstetric hospitals of the valley to catch the mother at the time of their discharge having delivered an alive baby. Only such mothers who were hailing from our initial selected group of wards were registered. The whole exercise took 3 months to register the required number of babies.

4.3.Method Used For Assessment Of Development

Assessment of various items of development as described under DDST II broad headings of Gross Motor, Fine Motor, language and Socio-personal

The Denver II contains 125 items but some of these items had to be dropped because it would require keen personal observation. By simply leaving instructions at home to record such items by surrogates (mothers/fathers) would have been biased.

4.3.1.Under 'Gross Motor 'Following Items Have Been Observed/Tested

(1)Lifts Head (2) Sits Head Steady (3) Bear Weight on Legs (4) Chest-up-arm-support (5) Pulls to sit no head lag (6) Rolls over (7) Sits without support (8) Pulls self to stand (9) Get to sitting (10) Stands for two seconds (11) Stands alone (12) Stands holding on (13) Stoop and Recover (14) Walks Well (15) Walks backwards (16) Runs (17) Walks-up-steps (18) Kicks ball forward (19) Jumps.

4.3.2.Under 'Fine Motor 'Following Items Have Been Observed

(1) Grasp Rattle (2) Hands together (3) Reaches Objects (4) Pass Cube (5) Takes 2 cubes (6) Bangs 2 Cubes (7) Puts block in cup (8) Scribbles (9) Dumps Raisin demonstrated.

4.3.3.Under 'Language 'Following Items Were Observed

(1) Vocalizes (2) Oh, Ah, (3) Laughs (4) Squeals (5) Turns to rattling sound (6) Turns to Voice (7) Single Syllables (8) Imitate Speech Sounds (9) Dada Mama- Non Specific (10) Dada Mama Specific (11) Combine Syllables (12) Jabbers (13) Words (14) Combining Words (15) Naming and pointing pictures (16) Pointing body parts (17) Knowing 2 actions.

4.3.4.Under 'Socio-Personal 'Following Items Were Observed/Recorded

(1) Regards face (2) Social smile (3) Regards own hand (4) Works for toy (5) Feeds self (6)Plays-pat-a-cake (7) Indicate Wants (8)Wave (9) Plays ball (10) Initiate Activities (11) Drinks from cup (12) Helps in house (13) Use spoon (14) Feeds Doll (15) Brush Teeth with help (16) Wash hands.

4.4.Tools Used (Testing Kit)

Following items have been used for testing purpose:

Rattle, Yarn, Cubes, Ball,

Pictures of cat, dog, bird, man and horse, Cup, Small bottle, Toy, Spoon, Raisin, Pencil, Copy and Tooth brush.

4.5.Standardization

The various tests were discussed in detail before hand and their assessment was first performed by the investigator with the help of a pediatrician and then applied on trial basis on some children for few days in presence of an expert (Pediatrician). This exercise was repeated several times to become familiar with the use of test and passing an item using the test. This also avoided intra-personal variation. Once cleared by the expert (Pediatrician) the test was applied by the investigator on randomly selected 20 children (outside the sample) to check the consistency. The whole exercise was done prior to actual start of testing of the study group. For collection of other information a pre designed, pre tested schedule was used.

5.Results And Discussion

Milestones	**Males**	**S.D ±**	**Females**		**S.D. ± P.Value**
Lifts Head	.76	.22	.80	.25	>.32 (IS)
Sits head steady	3.75	.72	3.82	.85	>.55 (IS)
Bear wt on legs	4.30	1.05	4.58	1.17	>.08 (IS)
Chest up arm support		3.88	.77	4.11	.80 <.01 (S)
Rolls over	3.71	.81	3.87	3.79	>.19 (IS)
Pull to sit no head lag		4.94	1.23	5.08	1.21 >44 (IS)
Sits without support	6.77	1.12	6.88	1.21	>.51 (IS)

Pulls to stand	9.64	1.24	9.84	1.48	>.31 (IS)
Get to sitting	8.82	1.33	9.03	1.39	>.28 (IS)
Stands 2 Sec	11.02	1.41	11.10	1.52	>.52 (IS)
Stands alone	12.23	1.51	12.38	1.50	>.50 (IS)
Stoop and Recover	13.02	1.42	13.26	1.58	>.28 (IS)
Walks Well	14.03	1.42	14.24	1.86	>.38 (IS)
Walk backwards	16.74	2.09	16.73	1.90	>.98 (IS)
Walk-up-steps	20.62	2.62	20.29	2.61	>.41 (IS)
Kicks ball forward	18.74	2.92	20.63	3.37	<01 (S)
Stands holding on	9.22	1.31	9.27	1.56	>.79 (IS)
Jumps	23.53	1.39	23.70	1.06	>53 (IS)
Throws ball over hand		20.37	3.43	21.62	3.18 >.18 (IS)
Runs	17.74	2.21	18.01	1.82	>.37 (IS)

Table 1: Average Age Of Attaining 'Gross Motor Milestones' In Males And Females

The table reveals that males in most of the Gross motor milestones are early attainers than females, but only two milestones were significantly (P value < .001) different i.e., the mean age for 'chest up arm support' for males which was 3.88 ± .77 months in comparison to females whose mean age of attainment for same milestone was 4.11 ± .80 months. The other is with respect to 'kicking ball forward' the mean age for doing so was earlier in boys (18.74 ± 2.92 months) than girls (20.63 ± 3.37 months). For rest of the items the difference in the mean age of attainment is not so marked to be statistically significant.

Milestones	**Males**	**S.D ±**	**Females**	**S.D. ± P.Value**
1 Grasp Rattle	4.06	1.22	4.06	1.30 >.90 (IS)
2 Hands together	3.36	.70	3.35	.77 >.98 (IS)
3 Regards Raisin	3.99	1.47	4.00	1.42 >97 (IS)
4 Reaches Objects	4.72	1.18	4.74	1.30 >.94 (IS)
5 Rakes Raisin	7.03	1.43	7.08	1.44 >79 (IS)
6 Pass Cube	6.60	1.40	6.42	1.11 >.30 (IS)

7 Takes 2 Cubes	7.14	1.81	7.10	1.83	>89 (IS)		
8 Thumb finger Grasp	9.91	1.61	9.86	1.59	>84 (IS)		
9 Bangs 2 Cubes	11.15	2.16	10.73	1.99	>.17 (IS)		
10	Puts Black in Cup		12.97	2.01	12.66	1.68	>26 (IS)
11	Scribbles		16.53	3.76	16.50	3.27	>94 (IS)
12	Dumps Raisin		18.70	3.73	18.80	3.94	>.88 (IS)
13	Looks for yarn		6.95	1.39	6.82	1.33	>.51 (IS)

Table 2: Average Age Of Attaining 'Fine Motor Milestones' In Males And Females

The table reveals that some items are attained earlier by males and some by females e.g. males 'regard raisin' a little earlier (mean age 3.99+1.47 months) than females (mean age 4.00±1.42 months), 'reach object' at a mean age of 4.72 ±1.18 months as compared to females whose mean age of attainment was 4.74 + 1.30 months, but these differences are insignificant. On the other hand females put 'block in cup' (mean age 12.66 ± 1.68 months) as compared to males (mean age 12.97 + 2.01 months) and banged 2 cubes earlier than males. Again these differences are not significant.

Milestones	**Males**	**S.D ±**	**Females**	**S.D. ±**	**P.Value**
Vocalizes	1.73	.43	1.71	.44	>76 (IS)
Oh Ah	1.83	.59	1.83	.52	>99 (IS)
Laughs	2.92	.53	2.91	.56	>.9O (IS)
Squeals	3.18	.95	3.17	1.02	>.94 (IS)
Turns to Rattling Sound	4.28	1.42	4.19	1.16	>.62 (IS)
Turns to voice	6.05	1.27	5.87	1.14	>.3O (IS)
Single Syllables	6.69	1.04	6.74	.99	>.7O (IS)
Imitate Speech Sounds	9.76	1.47	9.64	1.27	>.54 (IS)
Dada Mama N. Specific	8.98	1.33	8.75	1.05	>.18(IS)
Combine Syllables	8.12	1.30	7.93	1.03	>25 (IS)
Jabbers	9.42	1.84	9.30	1.71	>.62 (IS)
Dada Mama Specific	10.90	2.37	10.69	1.43	>35 (IS)
Combine words	19.54	2.37	19.03	2.26	>.13(IS)
Names Body Parts	20.73	3.16	20.42	3.17	>.7O (IS)
Knows 2 actions	24.00	.00	23.10	2.19	>.15 (IS)

Table 3: Average Age Of Attaining 'Language Milestones' In Males And Females

The above table reveals that in almost all language milestones females were a little early attainers for e.g. the mean age for 'turning to voice' was 6.05 ± 1.27 for males and 5.87 ±1.14 months for females, similarly for saying 'dada mama specific' the mean age for males was 10.90 + 2.37 months and for females 10.69 + 1.43 months but these differences have not shown statistical significance.

Milestones	Males	S.D ±	Females	S.D. ±	P.Value
1 Regard Face	.92	.23	.87	.21	>.15(IS)
2 Smiles	3.05	.96	2.94	1.11	>.46 (IS)
3 Regard own hand	3.17	.69	3.22	.79	>63 (IS)
4 Work for Toy	7.85	1.67	7.91	1.58	>78 (IS)
5 Feed self	7.94	2.13	7.43	1.80	>.08 (IS)
6 Play Pat-a-cake	13.21	4.02	13.86	4.50	>.36 (IS)
7 Indicate wants	13.62	2.47	13.51	1.56	>. 71 (IS)
8 Wave Bye-Bye	13.72	4.51	12.53	4.06	>.10 (IS)
9 Play ball with Examiner	13.57	2.34	13.54	2.06	>.93 (IS)
10 Imitate Activities	14.73	2.05	14.50	1.99	>.44 (IS)
11 Drinks from Cup	14.81	2.44	14.41	2.17	>.27 (IS)
12 Help in house	19.22	3.60	18.66	2.94	>.38 (IS)
13 Use spoon	19.35	3.61	19.07	3.51	>.73 (IS)
14 Feed Doll	19.50	4.74	18.42	3.82	>.50 (IS)
15 Brash Teeth with Help	19.86	3.16	21.18	3.37	>22 (IS)
16 Wash and Dry Hands	20.16	2.99	19.87	2.81	>.61 (IS)

Table 4: Average Age Of Attaining 'Socio-Personal Milestones' In Males And Females

Above table reveals that although girls are earlier attainers in most of the socio-personal items, the differences in the mean ages of attainment are insignificant statistically. The girls 'regard face' at a mean age of .87± .21 months as compared to boys who regarded at .92 ± .23 months. The boys achieved 'social smile' by 3.05 ± .96 month, as compared to girls who achieved at 2.94 + 1.11 months. The other milestones present a similar picture.

	Normal weaning		Delayed weaning		
Milestone	**Mean**	**S.D±**	**Mean**	**S.D +**	**P value**
Sits without support *(GM)	6.61	1.06	7.86	1.15	<.001 (S)
Stands 2 sec* (GM)	10.75	1.21	12.72	1.51	<.001 (S)
Walks Well* (GM)	13.73	1.20	16.09	2.13	<.001 (S)
Kicks Ball Forward* (GM)	19.49	3.21	23.14	2.26	<001 (S)
Turns to Voice** (L)	5.79	1.15	6.78	1.15	<.001 (S)
Dada Mama * (L)	10.50	1.37	12.22	1.47	<.001 (S)
Combine words* (L)	19.11	2.24	20.24	2.55	<.001 (S)
Pass Cube # (F.M)	6.33	.96	7.45	2.03	<.001 (S)
Bangs 2 cubes#* (F.M)	10.72	2.06	12.09	1.81	<.001 (S)
Feeds Self #* (S.P)	6.95	1.05	11.53	1.13	<.001 (S)
Plays pat-a-cake#* (S.P)	13.30	4.12	18.50	4.41	<.003 (S)
Plays ball with examiner#* (S.P)	13.19	1.85	15.66	2.80	<.001 (S)
Drinks from cup#* (S.P)	14.55	2.34	15.18	2.04	>.30 (IS)
Use spoon#* (S.P)	19.01	3.48	21.00	3.87	>.15 (IS)
Wash Hands# (S.P)	20.01	2.89	20.40	3.28	>.77 (IS)

Table 5: Effect Of 'Weaning' Development On Selected Items Of Development

** GM = Gross Motor ** L = Language # FM = Fine Motor #* SP = Socio-personal*

The table shows Mean age ± SD for attainment of various milestones in children upto 2 years of age with relation to weaning practices. In respect of Gross Motor e.g ('sits without support', 'standing two seconds', 'Walking well') the mean age of attainment of the milestones was lower i.e., 6.61 ± 1.06 months, 10.75 ± 1.21 months, 13.73 ± 1.20 months respectively in children who had been weaned appropriately 6-9 months (desired age) as compared to children where weaning started after-12 months (delayed weaning) who's age of attainment was 7.86 ± 1.15 months, 12.72 ±1.51 months, 16.09 ± 2.13 months respectively. The difference was significant statistically also.

The same is true for language milestones also e.g, early weaned babies said 'Dada Mama' at 10.50 + 1.37 months as compared to delayed weaned children who attained the same milestone at 12.22 + 1.47 months.

With regard to fine motor and socio-personal milestones the difference in mean ages of attainment is significant except in one item of socio-personal milestone i.e. 'drinking from cup'. Although the mean age is lower amongst the children with normal weaning but statistically the difference is insignificant.

		E.B.F*		MF**		A.M#		
Milestones		**Mean**	**S.D±**	**Mean**	**S.D±**	**Mean**	**P value**	
Rolls over	(GM)	3.75	.81	3.82	.86	4.50	>.58 (IS)	
Sits Head Steady	(GM)	3.74	.80	3.83	.78	4.50	>48 (IS)	
Sits without support	(GM)	6.75	1.17	6.89	1.17	7.50	>58 (IS)	
Stands 2 sec	(GM)	11.22	1.35	10.96	1.57	10.00	>.35 (IS)	
Walks Well	(GM)	14.09	1.48	14.21	1.83	12.00	>39 (IS)	
Kicks Ball Forward	(GM)	19.48	3.17	19.81	3.40	19.	>.56 (IS)	
Laughs	(L)	2.87	.47	2.96	.62	3.00	>.52 (IS)	
Turns to Voice	(L)	5.97	1.19	5.98	1.23	4.50	>.47 (IS)	
Dada Mama	(L)	10.82	1.34	10.78	1.72	10.00	>.85 (IS)	
Combine words	(L)	19.15	2.35	19.48	2.31	18.00	>.54 (IS)	
Grasp Rattle	(FM)	4.21	1.39	3.89	1.08	4.00	>.21 (IS)	
Hands together	(FM)	3.36	.74	3.35	.75	3.50	>.97 (IS)	
Reaches objects	(FM)	4.78	1.23	4.67	1.26	5.00	>.81 (IS)	
Pass Cube	(FM)	6.49	1.15	6.54	1.39	6.00	>.88 (IS)	
Bangs 2 cubs	(FM)	11.080	2.03	10.79	2.14	12.00	>.57 (IS)	
Smiles	(SP)	3.04	1.02	2.94	1.06	3.00	>.80 (IS)	
Feeds Self	(SP)	7.85	2.06	7.5057	1.91	7.50	>.49 (IS)	
Plays pat-c-cake	(SP)	13.67	3.60	13.35	4.90	14.00	>.9O (IS)	
Plays ball with examiner	(SP)	13.78	2.29	13.33	2.08	12.00	>.30 (IS)	
Drinks from cup	(SP)	14.38	2.27	14.84	2.33	18.00	>.15(IS)	
Use spoon	(SP)	19.33	3.89	19.07	3.21	>.75 (IS)		
Wash Hands	(SP)	20.10	2.98	20.00	2.83	18.00	>77 (IS)	

Table 6: Effect Of 'Feeding Pattern' On Selected Items Of Development

** EBF = Exclusively Breast Fed , ** MF= Mixed Feeding, #AM= Top Feeding*

The table gives Mean ± SD ages of attainment of various milestones in relation to type of feeding in children.

The mean age of achieving Gross Motor Milestones was lower amongst children who had been exclusively on breast milk (E.B.F) children 'rolled at' 3.75 ± .81 months as compared to mixed fed children who rolled at 3.82 ± .86 months. But statistically the difference was insignificant.

In case of language milestones although the difference in mean ages in achieving various milestones was insignificant statistically, but the mean age of attaining milestone was lower in case of a child who was on artificial milk. Since the number was restricted to one only, we cannot draw any conclusions.

With regard to fine motor and socio-personal milestones the differences in mean ages of attainment was again insignificant statistically. Although mean age of attainment were slightly lower amongst mixed fed children like 'reaching object' (FM) the mean age of attainment was lower (4.67 ± 1.26 months) in mixed fed children than breast fed children (4.78 ± 1.23 months). In case of 'drinking from cup' (SP) the mean age was lower for breast fed babies (14.38 ± 2.27 months) than mixed fed babies (14.84 ±2.33 months).

The feeding pattern does not seem to have any significant impact on various developmental milestones. The difference was found to be insignificant statistically in all development milestones.

		Literate		**Illiterate**		**P value**
Milestone		**Males**	**S.D±**	**Females**	**S.D±**	
Rolls over	(GM)	3.52	.66	4.23	.90	<001 (S)
Sits Head Steady	(GM)	3.63	.635	4.05	.94	<.001 (S)
Sits without support	(GM)	6.56	1.01	7.26	1.28	<.001 (S)
Stands 2 sec	(GM)	10.70	1.18	11.73	1.65	<001 (S)
Walks Well	(GM)	13.71	1.15	14.83	2.08	<.001 (S)
Kicks Ball Forward	(GM)	19.46	3.31	20.02	3.17	>.36 (IS)
Laughs	(L)	2.83	.52	3.06	.55	<.001 (S)
Turns to Voice	(L)	5.63	1.12	6.51	1.16	<.001 (S)
Dada Mama	(L)	10.52	1.38	11.23	1.66	<001 (S)
Combine words	(L)	19.00	2.04	19.80	2.68	<.02 (S)

Grasp Rattle	(FM)	3.77	.95	4.55	1.54	< 001 (S)
Hands together	(FM)	3.13	.62	3.72	.78	<001 (S)
Reaches objects	(FM)	4.50	.99	5.11	1.49	<.001 (S)
Pass Cube	(FM)	6.30	.95	6.87	1.62	<.001 (S)
Bangs 2 cubs	(FM)	10.65	2.09	11.46	1.98	<.01 (S)
Smiles	(SP)	2.87	.93	3.19	1.17	<.03 (S)
Feeds Self	(SP)	7.10	1.39	8.73	2.43	<001 (S)
Plays pat-a-cake	(SP)	12.48	3.50	16.68	4.79	<001 (S)
Plays ball with examiner	(SP)	13.28	1.90	14.07	2.60	<.01 (S)
Drinks from cup	(SP)	14.41	2.42	15.05	2.01	>.O9 (IS)
Use spoon	(SP)	18.92	3.60	20.00	3.31	>.25 (IS)
Wash Hands	(SP)	20.44	3.03	19.12	2.37	<03 (S)

Table 7: Effect Of 'Mother's Education On Selected Items Of Development

The table indicates that mother's education has a great impact in achieving Gross motor, fine-motor, language and socio-personal milestones.

In respect of Gross motor the difference was significant in all milestones except in 'kicking a ball' forward. The children of literate mothers achieve the milestone at an earlier age than children of illiterate mothers, e.g children of literate mothers 'sat without support' at 6.56 ± 1.01 months as compared to children of illiterate mothers who sat at 7.26 + 1.28 months. Same is the case for 'standing momentarily' and other milestones.

With regard to language milestones, the children of literate mother achieve the milestone at an early age (e.g 'dada mama' at an mean age of 10.52 ± 1.38 months) as compared to the children of illiterate mothers (11.23 + 1.66 months for the same milestone) the difference was significant statistically also.

The trend was similar in respect of fine motor milestones also. The children of literate mothers achieve all fine motor milestones at an earlier age than children of illiterate mothers.

Mother's literacy status plays a significant role in achieving socio-personal developmental milestones also. The children of literate mother's achieving the mile stones at an earlier age as compared to children of illiterate mothers e.g. 'playing pat-a-cake' the mean age of attainment is lower of children of literate mothers (mean age 12.48

+ 3.50 months) than children of illiterate mother (mean age 16.68 ± 4.79 months). Similarly for 'using spoon' the mean age of children is lower (18.92 ± 3.60 months) who belong to literate mothers as compared to children of illiterate mothers (mean age 20.00 ±3.31 months).

The differences were even between different grades of literacy were some milestones could be achieved even earlier among very highly qualified mothers especially with language and fine motor groups.

		Working		**House wife**		**P value**
Milestone		**Males**	**S.D±**	**Mean**	**S.D±**	
Rolls over	(GM)	3.61	.66	3.84	.87	>.12 (IS)
Sits Head Steady	(GM)	3.63	.56	3.83	.83	>.16(IS)
Sits without support	(GM)	6.63	1.00	6.88	1.21	>.22 (IS)
Stands 2 sec	(GM)	10.46	.05	11.26	1.51	<00 (S)
Walks Well	(GM)	13.65	.97	14.27	1.77	<03 (S)
Kicks Ball Forward	(GM)	19.84	3.41	19.56	3.23	>66 (IS)
Laughs	(L)	2.77	.65	2.96	.51	<04 (S)
Turns to Voice	(L)	5.57	1.08	6.07	1.22	<.O2 (S)
Dada Mama	(L)	10.34	1.40	10.92	1.54	<.03 (S)
Combine words	CD	19.41	2.29	19.26	2.34	>73 (IS)
Grasp Rattle	(FM)	3.69	.72	4.16	1.35	<.03 (S)
Hands together	(FM)	3.10	.42	3.42	.79	<01(S)
Reaches objects	(FM)	4.48	1.12	4.80	1.26	>.14 (IS)
Pass Cube	(FM)	6.26	.83	6.58	1.35	>.15 (IS)
Bangs 2 cubes	(FM)	10.48	1.85	11.08	2.13	>.10 (IS)
Smiles	(SP)	2.85	.86	3.03	1.07	>.31 (IS)
Feeds Self	(SP)	6.69	1.10	7.96	2.09	<00 (S)
Plays pat-c-cake	(SP)	12.47	3.41	13.93	4.48	>.O6 (IS)
Plays ball with examiner	(SP)	13.41	1.64	13.60	2.33	>62 (IS)
Drinks from cup	(SP)	14.24	2.77	14.74	2.13	>23 (IS)
Use spoon	(SP)	18.58	3.16	19.50	3.70	>.30 (IS)
Wash Hands	(SP)	20.53	3.02	19.85	2.8552	>.30 (IS)

Table 8: Effect Of 'Mother's Working Status' On Selected Items Of Development

The data reveals that the overall trend is that the children belonging to working mothers achieve various milestones earlier than those whose mothers were housewives although the difference was insignificant in most of the cases.

The table indicates that mothers working status played a significant role in two Gross motor developmental milestones i.e., in respect of 'standing momentarily' and 'walking well'. The mean age of children for 'standing momentarily' belongs to housewives was 11.26 ± 1.51 months as compared to children of working mothers where mean age of attainment of same milestone was only 10.46 ± .05 months. The difference with regard to 'rolling over', 'sitting without support' and 'sitting head steady', was insignificant.

The difference in respect of language milestones was significant mostly. Only in 'combining words' the difference was insignificant. The children belonging to working mothers achieved the language milestones earlier than children of mothers who were housewives, e.g. 'turning to voice' where in values were 5.57 + 1.08 months in respect of children of working mothers and 6.07 ± 1.22 months for children of housewives. With regard to fine motor milestones the difference was significant in respect of 'grasping rattle' and 'keeping hands together'. In respect of other milestones the significance was insignificant.

With respect to Socio-personal milestones achieved by children of working mother's, a significant difference in mean age of feeding self was found. The children belonging to working mothers achieve this milestone at an earlier age than children whose mother's were housewives.

Milestones	**Low upto***	**LM**	**UM**	**H***	**Above**	**P value**
	20,000				**86,000**	
Rolls over	(GM)	4.25	3.80	3.63	3.77	3.84	>.67 (IS)
Sits Head Steady	(GM)	3.50	3.69	3.68	3.86	3.83	>76 (IS)
Sits without support	(GM)	6.00	6.93	6.70	6.82	6.87	>78 (IS)
Stands 2 sec	(GM)	11.00	11.10	11.02	10.97	11.16	>.96 (IS)
Walks Well	(GM)	14.00	13.84	14.17	14.17	14.19	>.93 (IS)
Kicks Ball Forward	(GM)	18.00	20.18	19.03	19.10	20.06	>48 (IS)
Laughs	(L)	3.25	2.97	2.86	3.03	2.88	>.49 (IS)
Turns to Voice	(L)	8.00	5.75	5.67	6.15	6.01	<05 (S)

Dada Mama	(L)	9.00	10.41	11.01	10.64	10.90>.21 (IS)
Combine words	(L)	18.00	18.86	19.02	19.74	19.36 >52 (IS)
Grasp Rattle	(FM)	4.00	4.02	4.09	3.90	4.12>93 (IS)
Hands together	(FM)	3.50	3.19	3.33	3.43	3.37 >.80 (IS)
Reaches objects	(FM)	4.75	4.86	4.98	4.65	4.63 >.65 (IS)
Pass Cube	(FM)	6.00	6.31	6.51	6.52	6.56>6.56 (IS)
Bangs 2 cubs	(FM)	9.00	10.52	11.02	11.00	11.05>.55 (IS)
Smiles	(SP)	3.50	3.10	2.89	2.93	3.02>.85 (IS)
Feeds Self	(SP)	7.00	7.11	7.81	7.52	7.84>.58 (IS)
Plays pat-ocake	(SP)	12.00	13.12	12.57	13.75	13.92 >.16 (IS)
Plays ball with examiner	(SP)	13.50	13.17	13.83	13.29	13.65>.76 (IS)
Drinks from cup	(SP)	15.00	14.36	14.15	14.74	14.80 >.71 (IS)
Use spoon	(SP)	28.000	18.375	20.200	19.769	18.756>.63 (IS)
Wash Hands	(SP)	18.000	20.40	19.285	19.565	20.634>.29 (IS)

Table9: Effect Of 'Income' On Selected Items Of Development
** LM = Lower Middle ** UM = Upper Middle #H = High*

With regard to Gross motor milestones mostly all children achieve various milestones at almost same age. Although children belonging to low income group achieve the milestone slightly earlier than other children but the number of children is too small to draw any conclusions. In respect of most of the milestones the trend is similar but since the number of children belonging to low income group is too small statistically the difference is insignificant. Significant difference was observed in respect of only one language milestone i.e. 'turning to voice'. Children belonging to upper middle class achieve this milestone earlier at a mean age of 5.67 months as compared to high income group who achieve the same milestone at 6.15 months and above 86, 000 group who achieve it at 6.01 months, the late attainers were children belonging to low income group who attained it at 8.00 months.

The table indicates that overall income does not play any significant role in achieving various developmental milestones.

6.Discussion

Randomly chosen some items under Gross-Motor, Fine Motor, Language and Socio-personal developmental aspects were analyzed in relation to socio-medical variables, to see if there is any impact of these factors on the average age of attainment of each developmental milestone. At the outset it was seen that the males in most of the 'motor milestones' were early attainers than females, although only 2 milestones were statistically significant i.e. 'chest-up-arm support' and 'kicking of ball forward'. An inconsistent pattern in achievement of motor skills in relation to sex of children has also been observed by Muralidharan and Devki (1990). In another study by Phatak (1990) boys had indicated the superiority in attainment of developmental milestone over the girls in an urban sample. In rural sample though boys scored higher than girls in most of the months none of the difference were statistically significant.

With regard to 'language milestones' girls were early attainers but these differences were insignificant statistically. Chattopadhy (1971) also found no difference in the mean age of attainment of various items in 'language development' between two sexes. Pankajam (1990) did not find any relationship between sex and 'language development' of those children who attended pre-school and those who did not attend the school.

Socio-personal milestones were also attained slightly earlier by girls than the boys but these differences were once again insignificant. However, with the 'fine motor milestones' males achieved 'reaching objects', 'regarding raisin', 'raking raisin' and 'dumping raisin' milestones earlier than the females, while females were early attainers with respect to 'grasping rattle', 'hands together', 'passing cube', 'thumb finger grasp', 'scribbling' and 'looking for yarn'. However, again these difference were statistically insignificant. Even using DDST scale to obtain developmental norms did not reveal any marked systematic difference although minor differences were noted. (Franken Burg, 1967).

Looking at the literacy status of the mother it was found that children of literate mothers had attained various milestones in Gross Motor, Fine Motor, Language and Socio-personal earlier than the children of illiterate mothers. The differences in the mean values were significant except for items like 'kicks ball forward' (under gross motor) 'drinking from cup' and 'using spoon' (under socio-personal). In an study on Indian children by Pathak (1990) it was seen that parent's education and family income showed significant relationship with the accelerated and retarded pattern during 2nd year. The higher levels of each of these factors were related to accelerated pattern. Chattopadhy (1971) has

reported that children of educated parents are better in language than that of less educated. Literacy status especially that of mother does play an important role in attainment of various developmental milestones. It has been generally observed that literate mothers have better knowledge about child care, thereby they constantly stimulate their children for an activity and thus enhancing the child's development. Saraswati (1989) while studying cognitive and social development reported that the two developments were related to variables like education of parents, occupation, family size and family income levels.

In relation to feeding and weaning it was interesting to note that children whether breast fed or artificially fed had no difference in attaining the milestones during 1st two years of life. However, those weaned at an appropriate age had attained milestones earlier than those who had delayed weaning except in case of 'drinking from cup' where the difference was insignificant, although the children with appropriate weaning age did attain the milestone earlier.

It has been observed that the children who had been weaned at an appropriate age also had their mothers mostly literate, therefore, had not only better knowledge regarding weaning but also better interaction and exposure with different people making them more concern and informed regarding development. The physical growth and motor development are interwoven and mutually dependent. Delayed weaning means retardation in physical growth and it has subsequent effect on attainment of various developmental milestones.

The children belonging to working mothers showed mean age of attainment of some of the milestones significantly earlier, whereas other items were attained little later. The significantly different items attained earlier were 'Standing momentarily', 'Walking well', 'Laughing', 'Turning to voice', 'Dada Mama', 'Grasping rattle', 'Hands together' and 'Feeding self' and others were insignificantly different. Although most of the items were attained earlier by children of working mothers. Working mothers are usually literate, who provide more and more stimulus to their children thus enhancing their development. Going out of houses brings lots of interaction to mother thereby adding more knowledge and care which again helps them to stimulate their children.

Further it was observed that overall income does not play any significant role in achieving various developmental milestones. The mean ages between different income groups with respect to attainment of gross motor, fine motor, socio-personal and language development were hardly different from each other.

7.Summary And Conclusion

The present study is a longitudinal study which has been carried over a period of two years covering urban children with the aim to obtain empirical information about development during the first two years of life. A sample of 350 children was selected randomly and followed every 3 months for a period of 2 years for study of Development pattern amongst Kashmiri children. Various items of developmental milestones as described under DDST II were carried out to assess development of children under study. The final analysis has been made on 194 children who complied throughout the study and had a regular follow up.

The present study has analyzed various developmental milestones of children under four major groups e.g. Gross Motor, Fine Motor, Language and Socio-personal. In Language 15 items, Under Gross-Motor 20 items, under Fine-motor 13 items, and in respect of Socio-personal 16 items were studied. In gross-motor development, it was observed that the age of attainment of milestones was definitely late than the age of attaining the same milestones under Denver Development Screening Test (DDST). The usual age of 'lifting head' for a short span of time in first month viz., .78 ± .23 months and keeping 'head steady' at 3.97 ± .79 months was comparable to the reported Indian figures of 1-2 months and 4 months respectively. In respect of 'sitting without support' the age of achievement i.e. 6.83 ± 1.17 months compared well with WHO-ICMR study and 'standing without support' at the age of 12.31 ± 1.50 months was also comparable to WHO-ICMR study.

On the whole, average age for attainment of Gross-Motor milestones were comparable to the age of attainment of milestones reported by PBST. It was interesting to note that various gross motor milestones attained in the present study during second year of life were more close to PBST values than the milestones achieved in the first year of life. Comparing the fine-motor milestones of the present study with DDST, it was again seen that our children attained most of the milestones little late than the ages reported in DDST and the mean age of attainment being almost similar to PBST values. However, the difference in the mean ages were not as obvious as under Gross-Motor milestones. The attempt to 'Grasp rattle' was at 4.06 ± 1.26 compared to 3.5 months and 'reaching an object' was at 4.73 ± 1.24 months compared to 4 months. In case of attempt to 'scribble' there was great age difference in attainment age i.e., our children scribbled at 16.5 ± 3.51 months compared to age of 13.5 months.

With regard to socio-personal development, our children attained milestones quite late in comparison to DDST but the ages still correspond to average age of attainment under PBST. Studies at AIIMS well baby clinic have shown that infants 'regards face' by one month and gave 'social smile' at the end of second month, which is comparable to the average age of our children. In case of 'imitating activities' our children are slightly late (14.6 ± 2.02 months) compared to children from AIIMS (12 months).

In respect of language milestones, the average age of attainment for different items appearing during first 12-15 months showed definite delay in our children when compared with Indian studies. During second year of life most of the language milestones are comparable with the average ages seen amongst Baroda children. Once compared with western standards, there is no uniform pattern, some items are attained at earlier age whereas others are delayed. Our children 'vocalized' at 1.72 ± .44 months as compared to 1.4 months, 'turn head to rattle sound' by 4.24 ± 1.29 months in comparison to 3.9 months as reported by Phatak. In case of saying 'Dada-Mama' our children achieve this milestone by 10.79 ± 1.53 months as compared to 9 months and utter two words by 15.04 months in comparison to 14 months.

The age at which a given percent of population can pass an items showed large variation for their attainment in the present study. When compared to one of the Western study Frankenburng it was observed that in certain items the age at which 25% of our children could pass an item, at the same age comparatively 75% to 90% of Western children could pass these items, thereby confirming that our children definitely attain milestones at a later age than Western children. In few items one could see that the age at which 50% of our children had passed a test, it corresponded to the age at which 90% of the Western pattern could pass the same test. For some items even though in the initial few months, percentage of children passing a particular item at a given age was comparable to Western study, yet later on it took them more time in terms of age to attain the next item of the items.

The data was further analyzed in relation to various socio-medical variables, to see if there is any impact of these factors on the average age of attainment of randomly chosen few developmental milestones from Gross-Motor, Fine Motor, Language and Socio-personal groups.

At the outset it was seen that the males in most of the 'Gross motor' milestone were early attainers than females although only 2 milestones were statistically significant i.e. 'chest-up-arm support' and 'kicking of ball forward'. With regard to 'language' and 'socio-

personal' milestones girls were early attainers but the difference did not prove to be significant statistically. However, in case of 'fine motor' milestones males achieved some items i.e., 'reaching objects', 'regarding raisin', 'taking raisin' and 'dumping raisin' earlier than the females, while as females were early attainers with respect to 'grasping rattle', 'hands together', 'passing cube', 'thumb finger grasp', 'scribbling' and 'looking for yarn'. But these differences were insignificant.

With regard to literacy status of mother it was found that children of literate mothers had attained various Gross Motor, Fine Motor, Language and Socio-personal milestones earlier than the children of illiterate mothers. The differences in the mean values were significant except for items like 'kicking ball forward', 'drinking from cup' and 'using spoon'.

In relation to feeding and weaning it was interesting to note that children whether breast fed or artificially fed had no difference in attaining the milestones. However, those weaned at an appropriate age(6-9 months) had attained milestones earlier than those who had delayed weaning and these difference were significant statistically except for the item 'drinking from cup', where the difference was insignificant, although the children with appropriate weaning age did attain the milestone earlier.

The children belonging to working mothers showed mean age of attainment of some of the milestones significantly earlier, whereas other items were attained little later. The significantly different items attained earlier were 'Standing Momentarily', 'Walking Well', 'Laughing', 'Turning To Voice', 'Dada Mama', 'Grasping Rattle', 'Hands Together' and 'Feeding Self and others were insignificantly different. Although most of the items were attained earlier by children of working mothers.

Development has shown a great deal of variation with average age of attainment in various items of milestones. Majority of these ages are comparable to Indian values where as for some items our children are late attainers but this in no means indicates that they are abnormal children. The age range of achievement of all milestones lies within 3rd and 97th percentile values. Better initial birth weight (growth), gender difference (male child) maternal literacy and working mothers along with appropriate weaning practices of children was advantageous for attainment of developmental milestones.

To improve and sustain better growth and development of our children it is recommended that better antenatal and post-natal services with improved child caring and rearing practices coupled with maternal sensitization to child's physical and psychological needs, better home environment with learning opportunities and

improvement in female literacy would go a long way in improving the growth and development of these children. This involves a multi-discipilinary approach of improvement of health care services, empowerment of women, encouraging female literacy and improvement of socio-economic status through integrated programme directed towards mother and children. Extension services from home science department can play an important role in planning, organizing, and implementing various activities/programes directed in this direction.

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