Original Research Article

Cognitive abilities of urban and semi-urban pre-school children of Dharwad, Karnataka, India

ABSTRACT

Aims: The study has been conducted with the objective to assess the demographic profile and cognitive abilities of urban and semi-urban pre-school children of Dharwad District, Karnataka, India**.**

Study design: Demographic information was collected from the parents by using questioner. Kaufman assessment battery for children, second edition (KABC-II) was used to assess the cognitive abilities of children.

Place and Duration of Study: Department of Food Science and Nutrition, College of Community Science, University of Agricultural Science, Dharwad, Karnataka, India. The experiment was conducted between July 2017 and July 2018.

Methodology: A sample size of 100 preschool children (3-6 years) were randomly selected, where 60 children from the age group of 3-4 years, 20 children from 4-5 years, 20 children from 5-6 years from urban and semi-urban pre-schools. Kaufman assessment battery for children, second edition (KABC-II) was used to assess the cognitive abilities of children, it is a theory based clinical instrument. It is an individually administered tool, which measures the processing and cognitive abilities of preschool children and adolescents from 3-18 years.

Results: With respect to cognitive abilities, in urban group, 12 per cent of children belonged to upper extreme, only 2 per cent of children belonged to below average group and none of them belonged to lower extreme group. However, in semi-urban group only 8 per cent of children belonged to upper extreme, 8 per cent were in below average and two per cent were in lower extreme group.

Conclusion: Urban pre-school children cognitive abilities was higher than the semi-urban pre-school children, in terms of cognitive subsets, cognitive process and cognitive indices.

Keywords: Education, occupation, cognitive abilities and preschool children

1. INTRODUCTION

Cognitive development is one of the most essential aspects of growth in a child. It encompasses both mental and emotional growth of children. Young children are not only growing physically during early childhood, they are also growing mentally. Children of this age continue to advance their skills through observing and interacting with the world around them. They try to learn how to process, store, elaborate and use information. The brain

development is faster in the early years of life compared to the rest of the body (Benton, 2010), which may make it more vulnerable to dietary deficiencies.

Cognitive function can be defined as the person's capacity to acquire and use information to adapt to environmental demands and the process involves many skills including attention, creativity, memory, perception, problem solving, thinking, and the use of language (Neisser, 2011). Cognitive function and academic performance of schoolchildren can be affected by several factors such as nutritional status, demographics and socio-economic factors (Anuar Zaini et al., 2005: Zalilah, et al., 2000). Hence the present investigation was undertaken with the objective to assess the demographic profile and cognitive abilities of urban and semi-urban pre-school children.

2. MATERIAL AND METHODS

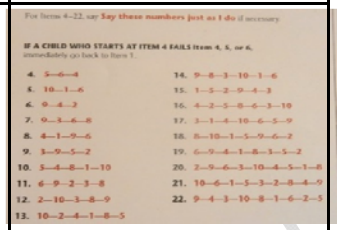
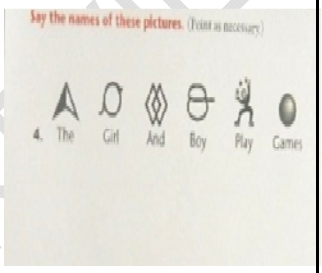
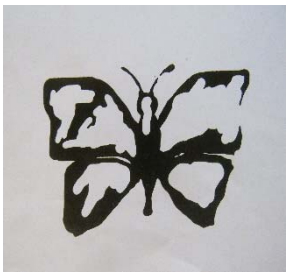
A sample size of 100 preschool children (3-6 years) were randomly selected, where 60 children from the age group of 3-4 years, 20 children from 4-5 years, 20 children from 5-6 years from urban and semi-urban pre-schools. Consent of school authorities and parents of selected children were obtained prior to inclusion of children in the investigation.

Demographic information was collected from the parents by using questioner and the data was processed, scored, tabulated and analyzed using simple tools like, frequency and percentage. Kaufman assessment battery for children, second edition (KABC-II) (Kaufman and Kaufman, 2004) was used to assess the cognitive abilities of children, it is a theory based clinical instrument. It is an individually administered tool which measures the processing and cognitive abilities of preschool children and adolescents from 3-18 years. The primary objective of this study was to assess the demographic profile and cognitive abilities of urban and semi-urban pre-school children.

2.1 Description of sub tests of KABC-II

Sub tests	Description	Raw score (min. - max.)	Pictures
Word order	The child touches a series of silhouettes of common objects in the same order as the examiner said the names of the objects; more difficult items include an interference task (colour naming) between the stimulus and response.	0-31	
Conceptual thinking	The child views a set of 4 or 5 picture and identifies the one picture that does not belong with the other. Some items present meaningful stimuli and others use abstract stimuli.	0-28	

Sub tests	Description	Raw score (min. - max.)	Pictures
Face recognition	The child attends closely to photographs of one or two faces that are exposed briefly and then selects the correct face or faces, shown in a different pose, from group photograph.	0-21	
Triangles	The child assembles several identical foam triangles (blue on one side, yellow on the other) to match a picture of an abstract design; for easier items, the child assembles a set of colourful plastic shapes to match a model constructed by the examiner or shown on the easel.	0-29	 
Atlantis	The examiner teaches the child nonsense names for fanciful pictures of fish, plants and shells. The child demonstrates learning by pointing to each picture (out of an array of pictures) when it is named.	0-76	 
Expressive vocabulary	The child says the name of a pictured objects.	0-45	
Riddles	The examiner says several characteristics of a concrete or abstract verbal concept and the child points to it (early items) or names it (later item)	0-51	

Sub tests	Description	Raw score (min. - max.)	Pictures
Number recall	The child repeats a series of numbers in the same sequence as the examiner said them, with series ranging in length from 2 to 9 numbers, the numbers are single digits, except that 10 is used instead of 7 to ensure that all numbers are one syllable.	0-22	
Rebus	The examiner teaches the child the word or concept associated with each particular rebus (drawing), and the child then “reads” aloud phrases and sentences compose of these rebus.	0-28	
Gestalt closure	The child mentally “fills in the gaps” in a partially completed “inkblot” drawing and names (or describes) the object or action depicted in drawing.	0-37	
Verbal knowledge	The child selects from an array of six pictures the one illustrates the meaning of a vocabulary word or the answer to a general information prompt.	0-50	
Hand movements	The child copies the examiner’s sequences of taps on the table with the fist, palm or side of the hand.	0-23	

3. RESULTS AND DISCUSSION

3.1 General information of urban and semi-urban pre-school children

General information of preschool children (N = 100) enrolled for study was given in Table 1. Among the 100 preschool children enrolled for the study, 25 (50%) were boys and 25 (50%) were girls from both urban and semi urban preschools. It was observed that higher per cent of study subjects were from the age group of 3 to 4 years (60%) followed by 4.1 to 6 years (40%) from both preschools. According to the ordinal position, It was noted that higher per cent of children from both urban (66%) and semi-urban area (56%) were first born, followed by second born in urban (34%) and in semi- urban area (26%). There was no third born children in urban, whereas in case of semi-urban area about 18 per cent of children were third born.

Table 1. General information of urban and semi-urban pre-school children (n=100)

Variables	Classification	Urban (n=50)		Semi-urban (n=50)	
		n	%	n	%
Gender	Boys	25	50	25	50
	Girls	25	50	25	50
Age (years)	3 - 4	30	60	30	60
	4.1 - 5	10	20	10	20
	5.1 - 6	10	20	10	20
Ordinal position	1st	33	66	28	56
	2nd	17	34	13	26
	3rd	0	0	9	18
Religion	Hindu	47	94	48	96
	Muslim	2	4	2	4
	Christian	0	0	0	0
	Buddhism	1	2	0	0
Family type	Nuclear	37	74	29	58
	Joint	13	26	21	42
Mother's age (years)	20-25	11	22	26	52
	26-30	25	50	14	28
	31-35	14	28	10	20
Father's age (years)	25-30	15	30	17	34
	31-35	20	40	22	44
	36-40	15	30	11	22

Note: n=Number, %=Percentage

Majority of children enrolled in urban (94%) and semi-urban group (96%) belonged to Hindu religion and only 4 per cent of the children from both groups were Muslim and only one child from urban group belonged to Buddhism.

With respect to family type, about 74 per cent of children from urban and 58 per cent of children from semi-urban were belonged to nuclear family and 26 per cent of urban, 42 per cent of semi-urban children were from joint family. Generally joint families are headed by oldest person of the family having traditional outlook restricting them to adopt modern culture technique and living practices. On the other hand, the new generation adopts these culture and practices very easily to pace with the modernization and western culture. These reasons have significantly affected increase of nuclear families. Kashyap (1992), Mehrotra (2002) and Srivastava (2012) have also reported similar findings.

3.2 Distribution of children according to parental education and parental occupation

Distribution of children according to parental education and occupational status was given in Table 2. It was noticed that, 50 per cent of mothers of urban children were in the age group of 26- 30 years, followed by 31 - 35 years (28%) and 20 - 25 years (22%). While more than 50 per cent of mothers of semi-urban (52%) children were in the age group of 20-25 years, followed by 26-30 years (28%) and very few mothers were in the age group of 31-35 years (20%). In case of fathers age, higher per cent of fathers of urban (40%) and semi urban (44%) children were in the age group of 31- 35 years, followed by 25 -30 years (30% and 34%, respectively) and very few fathers of urban and semi-urban children were in the age group of 36 - 40 years (30 and 22%, respectively).

Table 2. Distribution of children according to parental education and parental occupation (n=100)

Variables	Classification	Urban (n=50)		Semi-urban (n=50)	
		n	%	n	%
Mother's education	Illiterate	2	4	5	10
	Primary schooling	1	2	19	38
	High school education up to 10th	11	22	23	46
	Pre-university education (PUC)	14	28	3	6
	Graduation	16	32	0	0
	Post-graduation	6	12	0	0
Father's education	Illiterate	0	0	2	4
	Primary schooling	1	2	7	14
	High school education up to 10th	7	14	26	52
	Pre-university education (PUC)	11	22	4	8
	Graduation	27	54	11	22
	Post-graduation	4	8	0	0
Mother's occupation	House wife	23	46	11	22
	Self-employment	11	22	7	14
	Farming	0	0	12	24
	Agricultural labour	0	0	16	32

	Service in private sector	9	18	2	4
	Service in central/state/public sector	7	14	2	4
Father's occupation	Unemployment	0	0	1	2
	Self-employment	25	50	11	22
	Farming	6	12	16	32
	Agricultural labour	0	0	11	22
	Service in private sector	9	18	7	14
	Service in central/state/public sector	10	20	4	8

Note: n=Number, %=Percentage

Majority of mothers and fathers of urban children had completed graduation (32% and 54%, respectively) followed by PUC (28% and 22%, respectively), high school education (22% and 14%, respectively), post-graduation (12% and 8%, respectively) and nearly equal per cent of mothers and fathers of urban children had primary schooling (2% respectively) and only 4 per cent of mothers were illiterate in urban group. In case of semi-urban group, majority of mothers and fathers had completed high school education (46% and 52%, respectively), and only fathers had completed graduation (22%) but none of the mothers was graduate, followed by primary schooling (38% and 14%, respectively) and illiterate (10% and 4%, respectively) and none of the mother and father of the semi-urban school children were in post-graduation group.

With respect to occupational status of the parents, it was observed that majority of mothers in urban area were house wives (46%) compared to semi-urban mother's (22%). None of the mother involved in farming and agricultural labour in urban area but majority of mothers from semi-urban area involved in farming (24%) and worked as agricultural labour (32%). More number of mothers from urban area involved in self-employment category (22%) compared to semi urban mothers (14%). In urban area, 18 per cent and 14 per cent of mothers were working in private sector and public sector, respectively and nearly equal per cent of semi-urban mothers were working in private and public sector (4%).

In case of father's, majority of urban father's involved in self-employment category (50%) but very few per cent of father's from semi-urban area were involved in self-employment category (22%). In semi-urban area, 32 per cent and 22 per cent of father's were involved in farming and working as agricultural labours, respectively and 12 per cent of father's from urban area involved in farming and none of them working as agricultural labour. In urban area, 18 per cent and 20 per cent of father's were working in private sector and public sector, respectively and 14 per cent of father's from semi-urban area working in private and 8 per cent of father's working in public sector. It was observed that none of the father in urban area was unemployed and in semi-urban area only one father is unemployed. The results are also confirmed with the results of Sharma et al. (2012) and Pettifor et al. (2009).

3.3 Cognitive abilities of urban and semi-urban pre-school children

Table 3 depicts the mean scores of subsets of cognitive abilities of pre-school children. It was observed that, urban group children had higher mean scores in all the subsets compared to semi-urban group except for face recognition and triangles. The 'Z' value of word order, number recall, rebus, pattern reasoning, showed a statistically significant difference between urban and semi-urban group at $p \leq 0.01$, $p \leq 0.01$ and $p \leq 0.05$, $p \leq 0.05$, respectively, But in case of atlantis, conceptual thinking, face recognition, triangles, expressive vocabulary and riddles, no significant difference was observed.

Table 3. Cognitive abilities of urban and semi-urban pre-school children (n=100)

Sub tests	Urban (n = 50) Mean ± SD	Semi-urban (n = 50) Mean ± SD	'Z' value
Atlantis	13.42 ± 2.56	12.60 ± 2.49	1.63 ^{NS}
Conceptual thinking	9.64 ± 2.16	8.98 ± 2.33	1.47 ^{NS}
Face recognition	8.63 ± 2.11	8.83 ± 2.21	0.42 ^{NS}
Triangles	13.72 ± 5.45	14.46 ± 4.55	0.74 ^{NS}
Word order	11.72 ± 2.79	9.70 ± 3.38	3.26**
Expressive vocabulary	10.28 ± 3.18	10.00 ± 3.34	0.43 ^{NS}
Riddles	10.80 ± 2.86	10.24 ± 2.45	1.05 ^{NS}
Number recall	13.90 ± 2.45	11.90 ± 2.07	2.79**
Rebus	11.00 ± 3.78	8.65 ± 2.78	2.24*
Pattern reasoning	12.60 ± 2.84	10.50 ± 1.08	2.19*

NS-Non Significant
** Significant at 0.01 level
* Significant at 0.05 level

3.4 Cognitive processes of urban and semi-urban pre-school children

Cognitive process was measured by Cattell-Horn- Carroll (CHC) model and the result was presented in Table 4. Urban group had higher mean scores in all cognitive process *i.e.* sequential, simultaneous learning and knowledge (17.28, 32.64, 17.82 and 21.06, respectively) compared to semi-urban groups (14.46, 32.6, 16.26 and 20.24, respectively). Even though urban had higher mean scores than semi-urban group, difference was not statistically significant.

Table 4. Cognitive processes of urban and semi-urban pre-school children (n=100)

Cognitive process (Cattell-Horn- Carroll model)	Urban (n = 50) Mean ± SD	Semi-urban (n = 50) Mean ± SD	'Z' value
Sequential/Gsm	17.28 ± 8.52	14.46 ± 6.94	1.82 ^{NS}
Simultaneous/Gv	32.64 ± 7.56	32.6 ± 6.18	0.03 ^{NS}
Learning/Glr	17.82 ± 7.36	16.26 ± 5.95	1.17 ^{NS}
Knowledge/Gc	21.06 ± 5.01	20.24 ± 4.80	0.84 ^{NS}

Short term memory (Gsm), Visual processing (Gv), Long term storage and retrieval (Glr), Crystallized ability (Gc)
NS-Non Significant

3.5 Categorization of urban and semi-urban preschool children by cognitive indices

Table 5 showed the classification of preschool children by cognitive indices, irrespective of locality, among urban and semi-urban groups, majority were in the average group (62% and 68%, respectively), followed by above average (24% and 14%, respectively) and upper extreme (12% and 8%, respectively) and only one child was in below average group. But, in semi-urban group 8 per cent were in below average and 2 per cent were in lower extreme category. Evidence suggests that higher levels of stimulation and learning opportunities are available to urban children as opposed to their counterparts. So, cognitive abilities of urban pre-school children was higher than the semi-urban pre-school children, in terms of cognitive subsets, cognitive process and cognitive indices. Similar results were reported by Sanjana et al. (2017). Where they stated that, regional differences were found in cognitive abilities between urban and rural children.

Table 5. Categorization of urban and semi-urban preschool children by cognitive indices (n=100)

Categories of cognitive indices	Urban (n = 50)		Semi-urban (n = 50)	
	n	%	n	%
Upper extreme (> 131)	6	12	4	8
Above average (116 - 130)	12	24	7	14
Average (85 - 115)	31	62	34	68
Below average (70 - 84)	1	2	4	8
Lower extreme (< 69)	0	0	1	2

Note: n=Number, %=Percentage

4. CONCLUSION

Parents educational status and occupational status was higher in urban group compared to semi-urban group, Urban pre-school children cognitive abilities was higher than the semi-urban pre-school children, in terms of cognitive subsets, cognitive process and cognitive indices. Results depicted that good educational status and economic profile of parents showed better cognitive abilities of children.

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