

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. But, in semi-urban group only 8 per cent of children belonged to upper extreme, 8 per cent were in below average and two percent 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,

26 2011). Cognitive function and academic performance of school children can be affected by
 27 several factors such as nutritional status, demographics and socio-economic factors
 28 (AnuarZaini et al., 2005; Zalilah, et al., 2000). Hence the present investigation was
 29 undertaken with the objective to assess the demographic profile and cognitive abilities of
 30 urban and semi-urban pre-school children.

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32 2. MATERIAL AND METHODS




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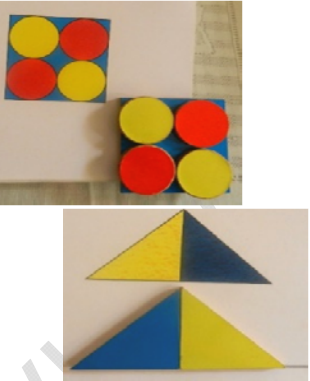



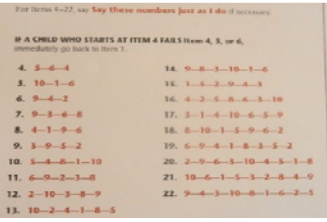
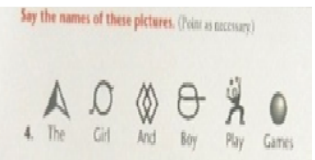
34 A sample size of 100 preschool children (3-6 years) were randomly selected, where 60
 35 children from the age group of 3-4 years, 20 children from 4-5 years, 20 children from 5-6
 36 years from urban and semi-urban pre-schools. Consent of school authorities and parents of
 37 selected children were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

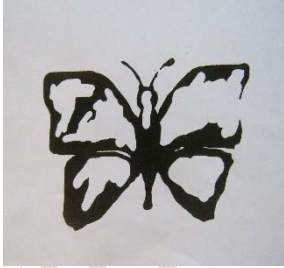

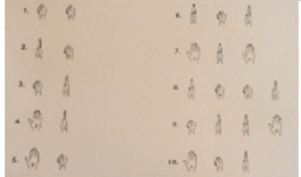
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39 Demographic information was collected from the parents by using questioner and the data
 40 was processed, scored, tabulated and analyzed using simple tools like, frequency and
 41 percentage. Kaufman assessment battery for children, second edition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

47 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	
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	

Sub tests	Description	Raw score (min. - max.)	Pictures
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	
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	0-28	

Sub tests	Description	Raw score (min. - max.)	Pictures
	rebus.		
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 precise sequences of taps on the table with the fist, palm or side of the hand.	0-23	

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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
Caste	Upper caste	20	40	14	28
	OBC	23	46	9	18
	SC/ST	7	14	27	54
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

66 Note: n=Number, %=Percentage

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68 Majority of children enrolled in urban (94 %) and semi-urban group (96 %) belonged to Hindu
69 religion and only 4 per cent of the children from both groups were Muslim and only one child
70 from urban group belonged to Buddhism. Regarding caste, majority (46 %) of children
71 belonged to OBC in urban group and majority (54 %) of children belonged to scheduled
72 caste in semi-urban group followed by 40 per cent of urban group and 28 per cent of semi
73 urban children belonged to upper caste. Only 14 per cent of urban group children belonged
74 to SC/ST and only 18 per cent of semi-urban children belonged to OBC.

75 With respect to family type, about 74 per cent of children from urban and 58 per cent of
76 children from semi-urban were belonged to nuclear family and 26 per cent of urban, 42 per
77 cent of semi-urban children were from joint family. Generally joint families are headed by
78 oldest person of the family having traditional outlook restricting them to adopt modern culture
79 technique and living practices. On the other hand the new generation adopts these culture
80 and practices very easily to pace with the modernization and western culture. These
81 reasons have significantly affected increase of nuclear families. Kashyap (1992), Mehrotra
82 (2002) and Srivastava (2012) have also reported similar findings.

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84 3.2 Distribution of children according to parental education and parental occupation

85 Distribution of children according to parental education and occupational status was given in
86 Table 2. It was noticed that, 50 per cent of mothers of urban children were in the age group
87 of 26- 30 years, followed by 31 - 35 years (28%) and 20 - 25 years (22%). While more than
88 50 per cent of mothers of semi-urban (52%) children were in the age group of 20-25 years,

89 followed by 26-30 years (28%) and very few mothers were in the age group of 31-35 years
 90 (20 %). In case of fathers age, higher per cent of fathers of urban (40 %) and semi urban
 91 (44%) children were in the age group of 31- 35 years, followed by 25 -30 years (30% and
 92 34%, respectively) and very few fathers of urban and semi-urban children were in the age
 93 group of 36 - 40 years (30 and 22 %, respectively).

94 **Table 2. Distribution of children according to parental education and parental**
 95 **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

96 Note: n=Number, %=Percentage

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98 Majority of mothers and fathers of urban children had completed graduation (32% and 54%,
 99 respectively) followed by PUC (28% and 22%, respectively), high school education (22%
 100 and 14%, respectively), post-graduation (12% and 8%, respectively) and nearly equal per
 101 cent of mothers and fathers of urban children had primary schooling (2% respectively) and
 102 only 4 per cent of mothers were illiterate in urban group. In case of semi-urban group,

103 majority of mothers and fathers had completed high school education (46% and 52%,
 104 respectively), and only fathers had completed graduation (22%) but none of the mothers was
 105 graduate, followed by primary schooling (38% and 14%, respectively) and illiterate (10% and
 106 4%, respectively) and none of the mother and father of the semi-urban school children were
 107 in post-graduation group.

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

116 In case of father's, majority of urban father's involved in self-employment category (50%) but
 117 very few per cent of father's from semi-urban area were involved in self-employment
 118 category (22%). In semi-urban area, 32 per cent and 22 per cent of father's were involved in
 119 farming and working as agricultural labours, respectively and 12 per cent of father's from
 120 urban area involved in farming and none of them working as agricultural labour. In urban
 121 area, 18 per cent and 20 per cent of father's were working in private sector and public
 122 sector, respectively and 14 per cent of father's from semi-urban area working in private and
 123 8 per cent of father's working in public sector. It was observed that none of the father in
 124 urban area was unemployed and in semi-urban area only one father is unemployed. The
 125 results are also confirmed with the results of Sharma et al. (2012) and Pettifor et al. (2009).

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127 **3.3 Cognitive abilities of urban and semi-urban pre-school children**

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

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

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Sub tests	Urban (n = 50)	Semi-urban (n = 50)	'Z' value
	Mean \pm SD	Mean \pm SD	
Atlantis	13.42 \pm 2.56	12.60 \pm 2.49	1.63 ^{NS}
Conceptual thinking	9.64 \pm 2.16	8.98 \pm 2.33	1.47 ^{NS}
Face recognition	8.63 \pm 2.11	8.83 \pm 2.21	0.42 ^{NS}
Triangles	13.72 \pm 5.45	14.46 \pm 4.55	0.74 ^{NS}
Word order	11.72 \pm 2.79	9.70 \pm 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 [*]

138 NS-Non Significant

139 ** Significant at 0.01 level

140 * Significant at 0.05 level

141 **3.4 Cognitive processes of urban and semi-urban pre-school children**

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

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

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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}

150 *Short term memory (Gsm), Visual processing (Gv), Long term storage and retrieval (Glr),*

151 *Crystallized ability (Gc)*

152 *NS-Non Significant*

153 **3.5 Categorization of urban and semi-urban preschool children by cognitive indices**

154 Table 5 showed the classification of preschool children by cognitive indices, irrespective of
 155 locality, among urban and semi-urban groups, majority were in the average group (62 % and
 156 68 %, respectively), followed by above average (24 % and 14 %, respectively) and upper
 157 extreme (12 % and 8 %, respectively) and only one child was in below average group. But,
 158 in semi-urban group 8 per cent were in below average and 2 per cent were in lower extreme
 159 category. Evidence suggests that higher levels of stimulation and learning opportunities are
 160 available to urban children as opposed to their counterparts. So, cognitive abilities of urban
 161 pre-school children was higher than the semi-urban pre-school children, in terms of cognitive
 162 subsets, cognitive process and cognitive indices. Similar results were reported by Sanjana et
 163 al. (2017). Where they stated that, regional differences were found in cognitive abilities
 164 between urban and rural children.

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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

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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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UNDER PEER REVIEW