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**Suvarna Maigur**
Department of Human Development and Family Studies, College of Community Science, University of Agricultural Sciences, Dharwad, Karnataka, India

**Manjula Patil**
Department of Human Development and Family Studies, College of Community Science, University of Agricultural Sciences, Dharwad, Karnataka, India

**Corresponding Author:**
**Suvarna Maigur**
Department of Human Development and Family Studies, College of Community Science, University of Agricultural Sciences, Dharwad, Karnataka, India

# Influence of familial factors on breakfast eating and cognitive skills of higher primary school children

**Suvarna Maigur and Manjula Patil**

**Abstract**
A breakfast is considered as a vital meal of the day. Breakfast is an important factor in the health of children as the body is low in reserve energy and there is need for frequent supply of needed energy for a day. A study was conducted to examine the influence of familial factors on breakfast consumption and cognitive skills of higher primary school children at the University of Agricultural Science dharwad (2021-22). Study sample comprised of 60 children from rural and 60 children from urban in Dharwad district who attended higher primary school. Breakfast consumption was assessed by using self-structured questionnaire. Socio economic status developed by Aggarwal *et al*. (2005) was assessed by family economic status. The cognitive skills of children were assessed by using Wechsler's Intelligence Scale for School Children (WISC-III). Results revealed that, type of family and food habits of family had significant influence in urban irregular breakfast consumers. There was significant association in size of family and socio-economic status of family, regular and irregular breakfast consumers in both rural and urban areas. Thus study results indicate that, Health and education ministries should collaborate and provide intervention programmes to children and formulate policies and strategies to foster the role of teachers and parents in reducing breakfast skipping among children.

**Keywords:** Health and education, skipping, frequent supply

## Introduction
A breakfast is considered as a vital meal of the day. Breakfast is an important factor in the health of children as the body is low in reserve energy and there is need for frequent supply of needed energy for a day. An ideal time of breakfast is between 8.00 AM – 10.00 AM. Children who habitually consume breakfast are more likely to lead better cognition, memory and school attainment. Several observation studies have observation studies have reported that between 20 per cent and 30 per cent of children and adolescents skip breakfast (Louise 2015) [6] which effect on cognition of the children. Socio demographic and economic transitions affecting many developing countries, including Jordan, are producing crucial changes in meals and nutritional habits that will have a serious effect on the general health of adolescents in the immediate future (Haddad *et al* 2009). The children belong to poor economic status, low parents education and unemployed fathers skip more breakfast due to the reason of 'no appetite' followed by absence of favorite food (Azad *et al.* (2013) [2]. Students whose mothers had a low level of education and students with a low value of breakfast consumption had a higher likelihood of skipping breakfast. Mothers' high value of breakfast and encouragement of children to eat breakfast were directly related to an increase in children's perceived importance of breakfast consumption.

## Materials and Methodology
The base line survey was carried to select school children of age between 10-13 years. Around 60 children were selected from four villages of Dharwad taluk as rural samples. Around 60 children were selected from four different locations of Dharwad city as urban samples and total sample comprised of 120 children. Home visits were made to collect child's general information, breakfast consumption pattern and socio economic status to select these children parent's prior permission was obtained.

## Tools used for assessment
### Structured schedule for breakfast consumption
The schedule is used to assess the child's breakfast consumption information based on the number of days of breakfast consumption per week, children were categorised as regular and irregular breakfast consumers.

Children who consumed breakfast for more than 5 days in a week they were considered as regular breakfast consumers, if less than 5 days, they were considered as irregular breakfast consumers (Hazzaa *et al.* (2019) [4].

**Socio Economic Status**

Socio economic status developed by Aggarwal *et al*. (2005) [1] was used. This scale consists of 22 statements which assess parent's education, occupation, location, and type of family, number of children, possessions of agricultural land, domestic animals, and social status of the family. The scores are given for different dimensions and added to obtain total score which was classified as follows:

| Classification | Score range |
|---|---|
| Upper higher | >76 |
| High | 61-75 |
| Upper middle | 45-60 |
| Lover middle | 31-45 |
| Poor middle | 16-30 |
| Very poor | <15 |

**Wechsler's Intelligence Scale for School Children (WISC-III)**

The Wechsler's Intelligence scale for school children (WISC-III) is an individually administered clinical instrument for assessing the cognitive abilities of 6-16 years old children. This scale consists of 13 subtests, each measuring different aspects of intelligence. They are organized into two groups as performance subtests and verbal subtests as below

| Performance Tests | Verbal Tests |
|---|---|
| Picture completion | Information |
| Coding | Similarities |
| Picture arrangements | Arithmetic |
| Block design | Vocabulary |
| Object assembly | Comprehension |
| Symbol search | Digit span |
| Mazes | |

In addition to the verbal performance and full scale IQ scores, four factors based index scores were also calculated.

| Factor-I Verbal comprehension | Factor-II Perceptual organization | Factor-III Freedom from distractibility | Factor-IV Processing speed |
|---|---|---|---|
| Information<br>Similarities<br>Vocabulary<br>Comprehension | Picture organization<br>Picture arrangement<br>Block design<br>Object assembly | Arithmetic<br>Digit span | Coding symbols search |

**Scoring and IQ index**

Each subtest has specific scoring pattern. Guidelines are given in manual in detail. On the raw scores, equivalent scaled scores are calculated and by totaling sum of scaled scores for verbal and per performance and full scaled scores are calculated. With the respective items of the scaled scores for four factors ie., verbal comprehension, perceptual organization, freedom from distractibility and for processing speed are calculated, finally for sum of scaled scores IQ are calculated and classifies as,

| Composite score rang | Classification |
|---|---|
| 130 and above | Extremely high |
| 120 – 129 | Very high |
| 110 – 119 | High Average |
| 90 - 109 | Average |
| 80 – 89 | Low average |
| 70 – 79 | Very low |
| 69 and below | Extremely low |

**Results and discussion**

**Distribution of rural and urban children by familial characteristics**

Figures in the table 1, reveals that, type of family among rural children, about 50.00 per cent of children resided in joint family followed by 33.34 per cent were belonged to nuclear family. In case of urban children, equal per cent (46.70) of them belonged to nuclear and joint family. With respect to size of family among both rural and urban children, majority were having small (4-6 members) in a family followed by large (7 and above members) family. With respect to food habits of the family in both rural and urban children, shows that, majority of them were belong to families having vegetarian food habits followed by non-vegetarian food habit family. With regard to socioeconomic status among rural children, around 66.70 per cent of them belonged to upper middle class followed by 20.00 per cent were belonged to lower middle socio-economic class. In case of urban children, about 78.30 per cent of them belonged to upper middle socio economics status followed by 18.30 per cent of children were found in higher socioeconomic status. It was observed that, with respect to regular intake of breakfast among rural children, around 68.30 per cent of them were having breakfast regularly and remaining 31.70 per cent were irregular consuming the breakfast. In case of urban children, 66.70 per cent of children were having breakfast regularly and about 33.30 per cent were irregular in breakfast consumption. Priya *et al*. (2010) [9] reported that, majority of children were regular breakfast eaters. Another study conducted by Siong *et al.* (2018) [12] revealed that, the overall prevalence of 75.60 per cent of them being regular breakfast eaters, which 11.7 per cent were breakfast skippers and 12.7 per cent were irregular breakfast eaters.

**Table 1:** Distribution of rural and urban children by familial characteristics N = 120

| Familial Characteristics | Category | Rural (n=60) | | Urban (n=60) | |
|---|---|---|---|---|---|
| | | N | % | N | % |
| Type of family | Nuclear | 20 | 33.34 | 28 | 46.70 |
| | Joint | 30 | 50.00 | 28 | 46.70 |
| | Extended | 10 | 16.66 | 4 | 6.60 |
| | Total | 60 | 100.00 | 60 | 100.00 |
| Size of family | Small (4-6) | 36 | 60.00 | 38 | 63.30 |
| | Large (7 and above) | 24 | 40.00 | 22 | 36.70 |
| | Total | 60 | 100.00 | 60 | 100.00 |
| | Vegetarian | 38 | 63.30 | 35 | 58.30 |
| | Non vegetarian | 22 | 36.70 | 25 | 41.70 |

| | | | | | |
|---|---|---|---|---|---|
| Food habits of family | Total | 60 | 100.00 | 60 | 100.00 |
| Socio-economic status | Upper high | - | - | - | - |
| | High | 8 | 13.30 | 11 | 18.30 |
| | Upper middle | 40 | 66.70 | 47 | 78.30 |
| | Lower middle | 12 | 20.00 | 2 | 3.30 |
| | Poor middle | - | - | - | - |
| | Very poor | - | - | - | - |
| | Total | 60 | 100.00 | 60 | 100.00 |
| Consumption of breakfast | Regular | 41 | 68.30 | 40 | 66.70 |
| | Irregular | 19 | 31.70 | 20 | 33.30 |
| | Total | 60 | 100.00 | 60 | 100.00 |

**Table 2:** Association between cognitive indices of regular and irregular breakfast consumers by type of family N=120

| Type of family | Rural (n=60) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Regular BC | | | Modified $\chi^2$ | Irregular BC | | | Modified $\chi^2$ |
| | High average | Average | Total | | Average | Below average | Total | |
| Nuclear | 10(52.64) | 9(47.36) | 19(100.00) | $1.66^{NS}$ | 8(72.73) | 3(27.27) | 11(100.00) | $0.73^{NS}$ |
| Joint | 12(54.56) | 10(45.45) | 22(100.00) | | 4(50.00) | 4(50.00) | 8(100.00) | |
| Total | 22(53.65) | 19(46.34) | 41(100.00) | | 12(63.15) | 7(36.84) | 19(100.00) | |
| **Urban (n=60)** | | | | | | | | |
| | High average | Average | Total | | High average | Average | Total | |
| Nuclear | 16(80.00) | 4(20.00) | 20(100.00) | $0.12^{NS}$ | 2(16.66) | 10(83.34) | 12(100.00) | $3.08^{*}$ |
| Joint | 9(45.00) | 11(55.00) | 20(100.00) | | 1(12.50) | 7(87.50) | 8(100.00) | |
| Total | 25(62.50) | 15(37.50) | 40(100.00) | | 3(15.00) | 17(85.00) | 20(100.00) | |

NS -Non Significant * significant level of 0.05

**Table 3:** Association between cognitive indices of regular and irregular breakfast consumers by size of family N=120

| Size of family | Rural (n=60) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Regular BC | | | Modified $\chi^2$ | Irregular BC | | | Modified $\chi^2$ |
| | High average | Average | Total | | Average | Below average | Total | |
| Small(4-6) | 5(31.25) | 11(68.75) | 16(100.00) | $1.91^{NS}$ | 10(62.50) | 6(37.50) | 16(100.00) | $4.83^{*}$ |
| Large(7and above | 14(56.00) | 11(44.00) | 25(100.00) | | 2(66.67) | 1(33.33) | 3(100.00) | |
| Total | 19(46.34) | 22(53.65) | 41(100.00) | | 12(63.16) | 7(36.84) | 19(100.00) | |
| **Urban (n=60)** | | | | | | | | |
| | High average | Average | Total | | High average | Average | Total | |
| Small(4-6) | 18(72.00) | 7(28.00) | 25(100.00) | $1.34^{NS}$ | 1(7.14) | 13(92.85) | 14(100.00) | $6.39^{*}$ |
| Large(7and above) | 7(46.67) | 8(53.33) | 15(100.00) | | 2(33.33) | 4(66.67) | 6(100.00) | |
| Total | 25(62.50) | 15(37.50) | 40(100.00) | | 3(15.00) | 17(85.00) | 20(100.00) | |

NS -Non Significant * significant level of 0.05

**Table 4:** Association between cognitive indices of regular and irregular breakfast consumers by food habits of family N=120

| Family food pattern | Rural (n=60) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Regular BC | | | Modified $\chi^2$ | Irregular BC | | | Modified $\chi^2$ |
| | High average | Average | Total | | Average | Below average | Total | |
| Vegetarian | 9(45.00) | 11(55.00) | 20(100.00) | $1.08^{NS}$ | 11(73.34) | 4(26.66) | 15(100.00) | $4.46^{NS}$ |
| Non vegetarian | 10(47.61) | 11(52.38) | 21(100.00) | | 1(25.00) | 3(75.00) | 4(100.00) | |
| Total | 19(46.35) | 22(53.65) | 41(100.00) | | 12(63.15) | 7(36.84) | 19(100.00) | |
| **Urban (n=60)** | | | | | | | | |
| | High average | Average | Total | | High average | Average | Total | |
| Vegetarian | 13(65.00) | 7(35.00) | 20(100.00) | $0.96^{NS}$ | 1(6.66) | 14(93.34) | 15(100.00) | $1.88^{*}$ |
| Non vegetarian | 12(60.00) | 8(40.00) | 20(100.00) | | 2(40.00) | 3(60.00) | 5(100.00) | |
| Total | 25(62.50) | 15(37.50) | 40(100.00) | | 3(15.00) | 17(85.00) | 20(100.00) | |

NS -Non Significant * significant level of 0.05

**Table 5:** Association between cognitive indices of regular and irregular breakfast consumers by socio economic status N=120

| Socio economic status | Rural (n=60) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Regular BC | | | Modified $\chi^2$ | Irregular BC | | | Modified $\chi^2$ |
| | High average | Average | Total | | Average | Below average | Total | |
| High | 2(33.33) | 4(66.67) | 6(100.00) | $1.14^{NS}$ | 1(50.00) | 1(50.00) | 2(100.00) | $2.59^{*}$ |
| Upper middle | 15(57.69) | 11(42.30) | 26(100.00) | | 9(64.29) | 5(35.71) | 14(100.00) | |
| Lower middle | 2(22.23) | 7(77.77) | 9(100.00) | | 2(66.67) | 1(33.33) | 3(100.00) | |
| Total | 19(46.65) | 22(53.65) | 41(100.00) | | 12(63.16) | 7(36.84) | 19(100.00) | |
| Urban (n=60) | | | | | | | | |
| | High average | Average | Total | | High average | Average | Total | |
| High | 6(66.67) | 3(33.33) | 9(100.00) | 2.14* | 1(50.00) | 1(50.00) | 2(100.00) | 0.74* |
| Upper middle | 20(66.67) | 11(33.33) | 31(100.00) | | 2(11.76) | 16(88.24) | 18(100.00) | |
| Total | 25(64.50) | 15(37.50) | 40(100.00) | | 3(15.00) | 17(85.00) | 20(100.00) | |

NS -Non Significant * significant level of 0.05

**Association between cognitive indices of regular and irregular breakfast consumers by type of family** With regard to type of family, significant association was found among urban irregular ($x^2$=3.08) breakfast consumers. It is noted that, nuclear family children have better cognitive skills scores compared to joint family children (table 2). The reason might be that, nuclear family children find more individual care to develop interpersonal activity. Vishnukumar *et al.* (2017) [10] revealed that, children from joint family skipped breakfast more per cent of than the nuclear family.

**Association between cognitive indices of regular and irregular breakfast consumers by size of family**
Table 3. Showed that, family food pattern was significantly associated with urban irregular breakfast consumers ($x^2$ = 1.88). Children from both rural and urban irregular breakfast consumers, majority of children were belonged to average level of cognitive skills.

**Association between cognitive indices of regular and irregular breakfast consumers by food habits of family**
With regard to size of family, significant association with rural($x^2$=4.83) and urban($x^2$=6.39) irregular breakfast consumers. Children from small family had higher cognitive skills scores compared to children from large family (table 4). The reason may be due the availability of learning facilities. The findings of the present study also was in conformity with Mohammad *et al.* (2014) [11] who found that, less number of members in housing ($p$<0.001) is associated with less skipping of breakfast. Study by Hesham *et al*. (2011) [5] showed that the children of large family size had significantly lower IQ scores.

**Association between cognitive indices of regular and irregular breakfast consumers by socio economic status**
It is noted that socio economic status there was significant association between urban regular and irregular ($x^2$=2.14 and 0.74) and rural irregular ($x^2$=2.59) breakfast consumers but non-significant association in rural regular breakfast consumers (table 5). The reason may be due to high SES among the families that provide age appropriate stimulatory learning materials for enhancing the cognitive skills of the child. These results are in line with the results of the study conducted by Mohammad *et al.* (2014) [11] who shows that, the lower SES was ($p$<0.001) associated with skipping breakfast. Breakfast skipping was also prevalent in lower socio-economic class. This may be because of the unavailability of food because of poor economic conditions. Priya (2010) [9] study has revealed that, skipping breakfast impairs attention and short-term memory, to a more prevalent behavior among low-income and minority school children. Another study conducted by Hazzaa *et al.* (2019) [4] revealed significant differences between daily versus non-daily breakfast consumers family income (p = 0.001) with a clear positive trend between daily breakfast intake and increased family income.

## Conclusion
Type of family, size of family and food habits of family had significant influence and differences in rural and urban irregular breakfast consumers. Children from nuclear family, small family and non-vegetarian food habits family had exhibited high level of cognitive skills scores. There was significant association and differences in socio-economic status of regular and irregular breakfast consumers of both rural and urban areas, where, children from upper class had better cognitive scores than other category children. Hence, there is a dire need for guidance, counselling and awareness programmes to higher primary school children to enhance regular breakfast consumption which in turn improves their regular breakfast consumption. Conducting intervention programs is useful in reducing breakfast skipping problems among children.

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