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# Breakfast skipping and its relationship with academic performance in Ethiopian school-aged children, 2019

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## Abstract

Breakfast skipping and its relationship with academic achievement among primary school children were investigated in this study. A cross-sectional study was conducted among 848 primary school children. Breakfast skipping was analyzed using a 2-item questionnaire. A 19-item Social Academic and Emotional Behavior Risk Screening questionnaire was used to collect data on children's behavior. The prevalence of breakfast skipping was found to be 38.1%. Living in a rural area (AOR = 5.2; 95% CI: 3.54, 7.71); having illiterate parents (AOR = 6.66; 95% CI 3.0, 14.7); having parents with a primary education level (AOR 5.18, 95% CI: 2.25, 11.94); living with guardians or other relatives (AOR = 4.06; 95%CI: 2.1, 7.9); and having lower academic achievement (AOR = 2.76; 95% CI: 1.44, 5.29) were factors associated with skipping breakfast.

In conclusion, breakfast skipping has been identified as a significant public health concern that requires an immediate response from stakeholders. It is recommended to intervene based on the identified factors.

**Keywords:** Breakfast skipping, Children, Ethiopia, Sub-Saharan

## Introduction

Breakfast is frequently referred to as the “most important meal of the day.” However, there is little agreement on what constitutes breakfast. Researchers defined it as the “first meal of the day that breaks the fast after the longest length of sleep and is consumed within 2 to 3 hours of awaking”; and it can be eaten anywhere [1, 2]. Breakfast eating is thought to be a significant element in children's cognitive health and academic achievement, but skipping breakfast is detrimental to both psychological and cognitive capabilities [1, 3].

Breakfast is suggested as part of a balanced diet because eating breakfast linked with the healthier macro and micronutrient intakes, BMI, and lifestyle [4]. Furthermore, children's attendance and absenteeism may be connected to daily breakfast eating. However, in developing nations, the impacts of such supply on academic attainment remain unknown [5–9]. The World Health Organization recognizes that young people who develop healthy eating habits early in life are more likely to maintain maturity and to have reduced risk of chronic diseases [9, 10].

Schoolchildren in many underdeveloped nations face a variety of health and dietary issues. Furthermore, schools frequently lack basic utilities, all of which can have an impact on a child's capacity to study [11]. Children who skipped breakfast were more likely to start drinking alcohol and smoking cigarettes, have bad behavioral

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and psychological difficulties, be absent from school frequently, and be less likely to exercise [8, 12, 13]. The percentage of people who skip breakfast has been reported to range between 1.7 and 30.0%. 39% of 13-year-olds skipped breakfast every school day, while the percentage rose to 45% among 15-year-olds. Furthermore, 2.5% of students skipped breakfast on all school days, while 14.0% skipped breakfast on at least one school day. The categories most likely to skip breakfast were those with a lower socioeconomic standing, non-whites, and females [14–16].

According to a few studies, 1.9% of students in selected government and private secondary schools in Addis Ababa never have breakfast during the week [17–21]. Another study from Ethiopia's southern region found that 42.3% of people miss breakfast. The most common reasons for skipping breakfast were a loss of appetite, a lack of food, and a lack of time to eat [10]. Despite the fact that 41% of Ethiopians are under the age of 15, there is a paucity of information on breakfast skipping and its major contributing variables among schoolchildren. As a result, the purpose of this study was to look into the prevalence and correlates of breakfast skipping, as well as its relationship with academic performance, among school-aged children in Ethiopia's Gedeo zone.

## Methods and materials

From February to March 2019, a cross-sectional institutional study was undertaken in Gedeo zone public primary schools. The Gedeo zone is located in Ethiopia's South Region, 359 km from Addis Ababa. For the academic year 2018/2019 G.C., there were 225, 697 students registered in 241 elementary schools. During the data collecting period, the study sample consisted of school pupils aged 7 to 19 who were enrolled in a public primary school. Children who were gravely unwell, on the other hand, were not allowed to participate.

The sample size was calculated using a single population proportion formula with a margin of error of 5, 95% confidence interval, and a prevalence of breakfast skipping of 42.3% [10]. With a design effect of two and a 10% non-response rate, the sample size was 848. A multi-stage sampling procedure was used. The 241 schools were grouped together to form school clusters. Then, using a lottery system, 11 school clusters were chosen and the schools within the cluster considered as school stratum. Since schools was similar to each other in several aspects with the difference in the total number of students attending each stratum of schools, proportional allocation was used. The updated total number of students at each school strata and at each class (grade 1 to 8) was checked before the actual data collection period. The number of responders from the designated classes was

determined via proportional allocation. Finally, using the list of students' names as a sampling frame, study participants were chosen by lottery method.

Eleven teachers collected data under the supervision of four degree clinical nurses. A standardized questionnaire with socio-demographic, school bullying, Social, Academic, and Emotional Behavior Risk Screening (SAE-BRS), and Parent/Guardian socio-demographic characteristic items was administered by the interviewer. Pre-testing of the questionnaire was done on 5% of the total sample size.

Breakfast skipping data was gathered using a two-item questionnaire that had been used in a prior study. Breakfast consumption on weekdays and weekend days was questioned about in the survey. The responses range from "never have breakfast" to "always have breakfast." The overall score was divided into two categories: rarely having breakfast (never and 1-3 times per week) and frequently having breakfast (4-7 times per week) [22].

The 2019 first term average score points from student roster reports were used to measure academic achievement. The student's academic achievement was divided into two categories based on the data's mean (69.08%): poor (scoring 69.08%) and good (score 69.08%). To measure students' social, academic, and emotional conduct, the 19-item Social, Academic, and Emotional Behavior Risk Screening (SAEBRS) was employed. Subscales for Social, Academic, and Emotional Behavior are included in the instrument. With a dependability score of 0.93, the tool is suitable for elementary school [23, 24]. A total SAEBS score of 0 to 36 is deemed "at risk," whereas a score of 37 to 57 is regarded "not at danger." [25].

Epi-data version 3.1 was used to code and enter the data, which was then exported to SPSS version 20 for analysis. Tables and graphs were used to summarize the data. We ran both bivariate and multivariate logistic regression analyses. In bivariate regression, we used the enter approach, and in multivariate regression, we used the Backward regression method. A *p*-value of less than 0.05 was considered statistically significant, and the strength of the link was determined using an adjusted odds ratio with a 95% confidence interval.

## Results

### Socio-demographic

A total of 848 school-aged children participated in the survey, with a response rate of 98%. Seventy percent (70.4%) of the children were between the ages of ten and fourteen. The average age of the participants was 12.2, with a standard deviation of 2.4 years. The ethnicity of the majority of the study participants was Gedeo (75.9%). More than 70 % of school-age children ( $n=611$ , 72.1%) lived with both their fathers and mothers, with 555

(65.4%) living in rural areas. More over half of the parents of children ( $n=480$ , 56.6%) were illiterate, and 454 (53.5%) were farmers (Table 1).

#### Breakfast consumption history

4.1% of study participants never ate breakfast throughout the week, 7.8% had one day per week, 12.8% had two days, 13.4% had three days, and 61.9% had four to seven days per week. Similarly, 4.7% of children reported never having breakfast on weekends, 14.6% reported having breakfast on only one weekend day, and 80.6% reported

having breakfast on both weekend days. The prevalence of breakfast skipping was 38.1% (CI: 34.9, 41.3%).

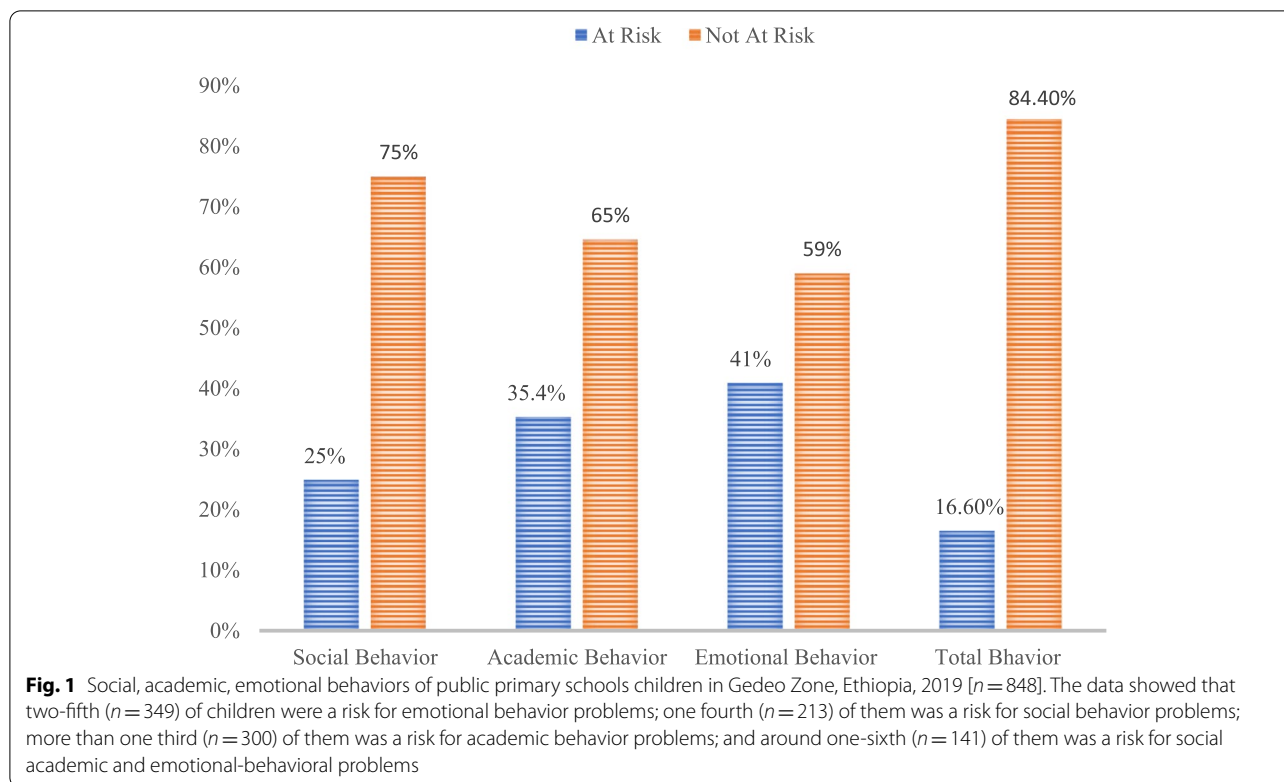
#### Social, academic and emotional behavior

Regarding children behavior, two-fifth ( $n=349$ , 41.1%) of them were a risk for emotional behavior problems; one fourth ( $n=213$ , 25.1%) of them were a risk for social behavior problems; more than one third ( $n=300$ , 35.4%) of them were a risk for academic behavior problems; and around one-sixth ( $n=141$ , 16.6%) of them was a risk for all behavioral problems (Fig. 1).

**Table 1** Socio-demographic characteristics of public primary schools children in Gedeo Zone, Ethiopia, 2019 [ $n=848$ ]

Variable		Frequency(n)	Percent (%)
Age	5-9	106	12.5
	10-14	608	71.7
	15-19	134	15.8
Sex	Male	474	55.9
	Female	374	44.1
Religion	Orthodox Christian	169	19.9
	Muslims	32	3.8
	Protestant	626	73.8
	Catholic	21	2.5
Class Level study / Grade	Grade 1	101	11.9
	Grade 2	99	11.7
	Grade – 3	102	12.0
	Grade-4	96	11.3
	Grade-5	109	12.9
	Grade-6	112	13.2
	Grade-7	112	13.2
	Grade-8	117	13.8
Ethnic Background	Gedeo	644	75.9
	Oromo	65	7.7
	Amhara	60	7.1
	Sidama	41	4.8
	Others <sup>a</sup>	38	4.5
Respondents Living Arrangement	With both parents	611	72.1
	With mother or Father only	186	21.9
	With grandparents or other relatives	51	6.0
Children's current address	Rural	555	65.4
	Urban	293	34.6
Family Educational Status father/mother	Unable to read and write	480	56.6
	Elementary School Complete	203	23.9
	Secondary School Complete	92	10.8
	Diploma and Above	73	8.6
Family occupation	Government Employee	84	9.9
	Merchant or/and other self-employee	164	19.3
	Farmer	454	53.5
	Others <sup>b</sup>	146	17.2

<sup>a</sup>Others<sup>a</sup> Wolaita, Gurage and Burji. Others<sup>b</sup> daily laborers, jobless and house wife



**Factors associated with breakfast skipping**

Breakfast skipping was linked to parents’ educational level, living in rural areas, living with one parent only; living with grandparents, and poor academic accomplishment, according to multivariable logistic regression.

Children with illiterate and primary education parents were 6 and 5 times more likely, respectively, to skip breakfast (AOR =6.65; 95% CI: 3.00, 14.74) and (AOR 5.18, 95% CI: 2.25, 11.94). Breakfast was more likely skipped by children who lived with grandparents or other relatives than by children who lived with both parents (AOR = 5.2; 95% CI: 3.54, 7.70).

Breakfast skipping was 5 times more likely among children who lived in rural areas (AOR = 4.96; 95% CI: 2.07, 7.79). Lower academic attainment was associated with a nearly threefold increase in the likelihood of skipping breakfast (AOR = 2.76; 95% CI: 1.44, 5.29). Furthermore, children who lived with only their father or mother were nearly 3.5 times (AOR = 3.63; 95% CI: 2.40, 5.47) more likely than children who lived with both parents to skip breakfast (Table 2).

**Discussion**

The prevalence of breakfast skipping was found to be 38.1% in the current study (CI: 34.9 to 41.3%). The result of the current study is in line with other study [26]. This

consistency may be due to sharing of the same study population with the same age group was used, as well as the use of the same assessment method. According to certain school-based study findings, the general rate of breakfast skipping is between 10 and 66% [8, 27–34]. But, this finding is much higher than study results in America (10 - 30%) [35], Saud Arabia (19.6%) [36], Iran (18 - 26%) [37], Brazil (7%) [38] and Canada (10%) [39]. Differences in socio-cultural practice, dietary preferences, and the concept of breakfast intake could be the cause of the disparity. On the other hand, the findings are consistent with Chinese research (38.7%) [40], Dutch (38%) [41] as well as the Canadian Child Hunger Survey (42%) [42]. While this study is lower than in Sidama, Ethiopia and Rives state, Nigeria [43, 44].

Children living with illiterate parents or guardians were more than six times more likely to skip breakfast than children living with well-educated parents or guardians (AOR = 6.66, 95% CI: 3.0, 14.75). Similarly, children with elementary school completing parents/guardians were 5 times more likely to skip breakfast (AOR = 5.18, 95% CI 2.25, 11.9). Different studies also reported a similar findings [2, 37, 43, 45–47]. The possible justification for this is that illiterate parents are less likely to understand the cognitive and physical benefits of regular breakfast consumption for their children. That is, parent education programs have the potential to alter the eating behaviors

**Table 2** Factors of Breakfast skipping among public primary schools children in Gedeo Zone, Ethiopia, 2019 [ $n = 848$ ]

Variables		Breakfast Consumption		COR	AOR
		Often	Seldom		
Children Living circumstances	With Both Parents	437	174	1.00	1.00
	With mother or father only	65	121	4.675 (3.29, 6.63)	3.3 (2.15, 5.19)**
	With grandparents or other relatives	23	28	3.05 (1.71, 5.45)	5.8 (2.8, 11.8)**
Children's' current address	Rural	280	275	5.01 (3.52, 7.12)	4.7 (3.14, 7.21) **
	Urban	245	48	1.00	1.00
Children's' Family jobs	Government Employee	22	62	1.00	1.00
	Merchant or/and other self-employee	124	40	0.909(.49, 1.66)	0.69(.351, .38)
	Farmer	261	193	2.08 (1.22, 3.51)	1.4(.81, 2.6)
	Others <sup>a</sup>	78	68	2.45 (1.36, 4.41)	1.8 (.99, 3.9)
Children's' Age group	5-9	80	26	1.00	1.00
	10-14.	369	239	1.99 (1.24, 3.19)	1.9 (0.7, 3.3)
	15-19	76	58	2.35 (1.34, 4.11)	2.7(.99, 5.5)
Academic Behavior	At Risk	99	201	7.08 (5.18, 9.7)	6.79 (4.6, 9.97)
	Not at Risk	426	122	1.00	1.00
Parent guardian Educational status	Illiterate	253	227	6.38 (3.1, 13.1)	5.3 (2.28, 12.36)*
	Elementary School Complete	134	69	3.66 (1.72, 7.79)	4.02 (1.65, 9.8) *
	Secondary School Complete	74	18	1.7(.72, 4.12)	1.06(.37, 2.9)
	Diploma and Above	64	9	1.00	1.00
Children's Academic achievement	Poor to Fair (less than 50 to 59%)	244	229	2.8 (2.083, 7.7)	2.57(1.77, 3.7) *
	Satisfactory to Excellent (60-79%, 80-89% & 90 - 100%)	281	94	1.00	1.00

Note \* =  $P < 0.001$ ; \*\*  $P < 0.001$ ; COR- crude odds ratio AOR-Adjusted odds ratio 1: reference category; others<sup>a</sup>: daily laborers, house wife and jobless

that young children develop and increase the healthy behaviors they engage in throughout life. Besides studies reported that education might have more impact on the nutritional status of the next generation if school curricula focused on directly improving health and nutritional knowledge of parents [48]. Though previous studies recommend a possible interventions thorough provision of free breakfast at schools and regular education for parents about healthy dieting in children to decrease breakfast skipping [49–51].

Rural children were 5 times more likely than urban children to skip breakfast (AOR = 5.20, 95% CI 3.54, 7.71). An increased level of breakfast skipping in the rural communities is shown, particularly in Ethiopia, because the rural populations have adopted a breakfast-free lifestyle due to food insecurity and food shortages [52]. This finding is consistent with the findings of other studies [53]. The other justification for the rural prevalence of breakfast declining faster than urban is probably because rural students have more stress, such as fear of failing and financial issues [54].

Furthermore, children who lived with a father or mother were only 3.5 times (AOR = 3.63; 95% CI: 2.40, 5.47) more likely than their peers to skip breakfast.

Similarly, children who lived with grandparents or other relatives were four times (AOR = 4.06, 95% CI 2.07, 7.97) more likely than children who lived with both parents to skip breakfast. It's possible that relatives other than primary parents were less worried about children, particularly in Ethiopia. Single parents, on the other hand, may be financially strapped and unable to provide a consistent breakfast for their children. Similar results have been reported [2, 34, 37, 45].

Finally, low academic achievers were three times more likely than higher achievers to forgo breakfast. Other investigations have come to similar conclusions [8, 10, 16]. This can be explained by the apparent benefits of having daily breakfast consumption on increasing school attendance and reducing absenteeism [5–9].

### Conclusions and future directions

Breakfast skipping was discovered to be relatively common in this study. Breakfast consumption has been linked to poor academic performance. Parental illiteracy and primary education, children's address, children living with only their mother or father, children living with grandparents, and low academic achievement were all significant predictors.



As a result, it is preferable to implement and work on children's and education acts by raising awareness about the benefits of daily breakfast for children, especially among parents in rural areas, and cooperating to support children with low academic standing, living with a single parent, and without primary parents. It is also critical to implement school health and nutrition initiatives and collaborate with key stakeholders such as child care providers and other professionals who work with young children and their families to improve children's eating habits. Furthermore, it is also suggested that future research address the effect of breakfast consumption on children's academic and cognitive performance through a follow-up study.

### Limitations

The current study was limited to assessing a lack of food and a lack of time to eat, both of which could be modifiable determinants in the causative pathway of breakfast skipping. Another limitation of this study is that, due to the cross-sectional nature of the study design, it does not show any cause-effect relationship. Furthermore, the nutritional state of the children and their learning difficulties were not assessed in this study.

### Abbreviations

AOR: Adjusted odds ratio; BMI: Body Mass Index; IRB: Institutional Review Board (IRB); CI: Confidence interval; SNNPR: South Nation's Nationality Peoples Region.

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### Authors' contributions

LA and SY came up with the idea for the paper, and they were in charge of data collecting, statistical analysis, and paper writing. LA, NM, TS, RH, WM, DT, AW, MN and SY contributed equally to the manuscript's preparation and drafting. The Manuscript was revised and the work was critically reviewed by all of the authors. The final manuscript was read and approved by all authors.

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### Availability of data and materials

This published article contains all of the data generated or analyzed during this investigation. The current study's data sets are available upon reasonable request from [Lulu Abebe, email: [luluasayo1154@gmail.com](mailto:luluasayo1154@gmail.com); Mobile: +251970975865, Dilla university, Dilla and the corresponding author].

## Declarations

### Ethics approval and consent to participation

The Institutional Review Board (IRB) of Dilla University's College of Medicine and Health Sciences granted ethical approval. Permission was sought from the respective research site education office and school administrations. After all permission requests were granted, a letter alerting parents or guardians of participating students about the study's purpose, risks, and benefits was delivered to them, and written informed consent was obtained from their legal guardian/legally authorized representative and an assent was taken from each student. Furthermore, the results' secrecy was protected by giving identity numbers at registration. Throughout the research, confidentiality was maintained. And all necessary methods were carried out in accordance with relevant guidelines and regulations of institutional and Declaration of Helsinki.

### Consent for publication

Not applicable.

### Competing interests

We declare that there is no any financial or non-financial conflict of interest.

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