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Breakfast Practices Among Indonesian Adults: Urban and Rural Differences and Its Associated Factors

Praktik Sarapan pada Orang Dewasa Indonesia: Perbedaan Perkotaan dan Pedesaan dan Faktor yang Berkaitan

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ABSTRACT

Backgrounds: Adults in Indonesia have challenges due to the high prevalence of obesity. Factors that contributed to obesity included unhealthy eating practices. Skipping breakfast habits are linked to health issues such as non-communicable diseases (NCDs). Breakfast practices also reflected the social and cultural dynamics in urban and rural. Socioeconomic and demographic factors could cause differences in breakfast practices between urban and rural areas in Indonesia.
Objectives: This research aimed to examine the differences in breakfast practices among Indonesian adults in urban and rural areas based on various characteristics and to explore the association between socioeconomic and demographic characteristics with breakfast practices.
Methods: This was a cross-sectional study using secondary data from the Indonesia Food Barometer (IFB) in 2018. A total of 770 adults (26–45 years old) were examined to observe the differences in breakfast practices (skipping breakfast, eating together, buying food, cooking food, and activities during meals) in urban and rural areas. Logistic regression analysis was also employed to examine the association between skipping breakfast and modern breakfast practices with socioeconomic and demographic variables.
Results: Chi-square analysis showed significant differences between urban and rural areas in eating alone, eating outside the home, and buying food during breakfast (p-value <0.001). Factors related to skipping breakfast were education level and type of residence (all p-value <0.001), while occupation (p-value = 0.004) and type of residence (p-value <0.001) were related to modern breakfast practices.
Conclusions: There were differences in breakfast practices between urban and rural. Skipping breakfast and modern breakfast practices were more prevalent in urban areas.

INTRODUCTION

Indonesia faced a demographic bonus in 2030, where most of the population consisted of working-age adults. This phenomenon also indicated that the population will begin ageing by 2040, as the elderly population has a higher health risk and vulnerability[1]. One health issue in Indonesia was obesity caused by overnutrition. Overnutrition could have led to the loss of Disability-Adjusted Life Years (DALYs) among working-age adults, contributing to Non-Communicable Diseases (NCDs). The 2018 Indonesian Basic Health Research *(Riset Kesehatan Dasar/Riskesdas)* revealed a progressive rise in the prevalence of overweight among adults, increasing from 11.5% in 2013 and reaching 13.6% in 2018[2]. A comparable trend was observed in the prevalence of obesity, with urban areas exhibiting a higher prevalence compared to rural areas[2]. Furthermore, the implications of adults burdened with obesity led to work limitations, particularly in physically demanding occupations. Reduced mobility and physical endurance hindered employees' abilities to perform certain tasks, necessitating adjustments to job roles or accommodations[3]. The implications mentioned were caused by poor diet among adults[4,5].

The Global Burden of Diseases Study confirmed the role of poor eating habits as a risk for DALY loss[4]. Various factors have influenced poor eating, such as sociodemographic-economic conditions and eating practices, especially breakfast-related practices[5]. Breakfast consumption has been significantly associated

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with diet quality and NCDs[6–8]. Breakfast had been considered a crucial daily meal, breaking the longest fasting period after a meal, especially the overnight fasting period[6]. One lesson from the Balanced Nutrition Guidelines (PGS) was that breakfast was an essential habit for maintaining health[9]. Eating practices, including social and cultural factors like eating with a companion, skipping meals, buying food, and eating outside, had significantly impacted food intake[10]. The importance of breakfast practices was nutritionally linked to diet quality[11].

Another factor contributing to breakfast practices in society was the distinction between urban and rural areas[12,13]. A high population density and infrastructure development typically characterize urban areas. These areas often have advanced amenities, such as paved roads, public transportation, and various commercial, cultural, and recreational facilities. Urban might have diverse populations and are often marked by a more modern and cosmopolitan lifestyle. While for rural areas, on the other hand, are characterized by a lower population density and are often situated away from major cities or urban centers. These areas may have less developed infrastructure and fewer amenities[13,14]. Urban and rural were some of the most significant forces influencing food practices and nutritional changes[13,15]. Higher urbanization affected food consumption and nutrition changes, impacting consumption habits and practices. Urban areas affected agricultural land, food availability and costs, and the overall environment where food was produced[16]. Previous[19] studies on eating practices in urban and rural areas in East Java, Indonesia, showed that urban adults are more likely to skip breakfast and have lower diet quality scores than rural areas[17]. Breakfast practices were of consuming morning meals, encompassing the evolving nature of these routines in contemporary societies[6,7]. The social and physical environment shapes behaviors such as eating out and consuming food prepared away from home, contributing to health and well-being. In Malaysia, the proportion of the 'eating out' phenomenon was positively correlated with modernization[18,19]. The previous framework demonstrated the concept of traditional and modern eating practices. People living in urban areas adopted more modern diets than those in rural areas[20].

The term of "modern breakfast practices" referred to a diverse array of dietary behaviors influenced by modernization that had an important role similar to traditional norms. These practices might involve changes in food choices, preparation methods, and the overall cultural context of breakfast[21]. A study conducted by Sproesser et al[20] explaining the term modern eating practices was not only about what people ate but also how people ate. More modern eating can be explained by being more likely to have such eating practices: eating alone, buying food, eating outside, and also screen time or doing other activities during eating. Uncovering the factors influencing modern breakfast practices was crucial for gaining insights into the shifting landscape of dietary habits, especially within sociodemographic characteristics[20]. This research sought to bridge this gap by delving into the intricate relationships between socio-demographic and economic characteristics and the adoption of modern breakfast practices. Modern breakfast practices might result in a higher likelihood of eating alone, eating outside the home, buying food, and eating with screen time[18,22].

The findings of this study were intriguing, prompting an examination and emphasis on other eating habits during breakfast to determine whether urban and rural areas yielded different results. In conclusion, this research endeavored to unravel the interplay between sociodemographic characteristics and breakfast-eating practices in Indonesian various characteristics, who live in urban and rural. By elucidating these connections, the study aimed to contribute valuable insights for government, health professionals, and individuals striving to promote healthier dietary habits during breakfast.

METHODS

The data used for this quantitative analysis was derived from the Indonesia Food Barometer (IFB) 2018. The IFB 2018 study was conducted with a cross-sectional study design, employing a mixed-model approach that relied on both qualitative instruments (such as one-on-one interviews and focus groups) and quantitative surveys[23,24]. The main quantitative data of the primary research was utilized in this investigation. In this study, adult Indonesians from urban and rural regions in Indonesia were surveyed about their breakfast practices. The IFB 2018, which took place in six provinces and included 48% of Indonesia's entire population (Jakarta, West Java, East Java, West Sumatera, Bali, and South Sulawesi), reflected the Indonesian population. Systematic random sampling was employed in the primary research of IFB 2018 data to ensure representation[24,25]. The research used a cluster approach and multistage random sampling with proportionate-to-population size (PPS) to select subjects. The sample size was calculated based on the formula for multivariate analysis using the rule of thumb[26]. For this research, all samples that met the inclusion and exclusion criteria were included. The previous study provided 1665 subjects, but this study used 770 subjects as total samples that met the study criteria. The study criteria were adults age 26-45 years old living in 6 provinces in Indonesia and not lactating or being pregnant. Urban was defined as capital city of the province, which had greater population than rural. Rural for this study were district from six provinces.

The wealth index used housing conditions and ownership of household belongings. Eleven variables were employed to develop the score, including house wall material, floor material, sources of electricity, sources of fuel for cooking, as well as ownership of the car, bicycle, motorcycle, refrigerator, mobile phone, television, and radio. The score was calculated based on the factor score of principal component analysis with varimax rotation. The scores were ranked and divided into tertiles. The lowest tertile (T1) represented a low health index, and the highest tertile (T3) represented the highest wealth index[25]. For modernized breakfast practices, scoring was used, with eating alone, eating outside the home, buying, and eating with other activities each given 0 scores. Conversely, eating together, eating

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at home, cooking, and only eating was each given 1 score. To classify modernized breakfast practices, those below the median were categorized as more modernized, and vice versa. The differences in the proportion of each independent variable were analyzed using the Chi-square test ($p<0.05$). Significant results regarding eating breakfast and modernized breakfast eating were then further analyzed using logistic regression. The data were analyzed using IBM SPSS Statistics version 25.

The questionnaire and methodology of IFB were submitted to the Human Ethical Committee of the Faculty of Medicine, Universitas Indonesia to obtain an ethical clearance (reference number 927/UN2. F1/ETIK/2017). A written informed consent was obtained from each of the study subjects. While for practices at breakfast study, the ethical clearance was proposed to the Ethic Commission under the Faculty of Medicine Universitas Indonesia (No. Protocol: 23-05-0639 dated 05 June 2023, No. Ethical Approval: KET-743/UN2.F1/ETIK/PPM.00.02/2023 dated 23 May 2023).

RESULTS AND DISCUSSIONS

This study had almost the same gender composition percentage in urban and rural areas. In both types of residents, rural and urban areas had a higher proportion of women than men. Based on the age group, the 26-35-year-old age group in both regions had the highest percentage among the other two age groups. The trend of young adults was found in both urban and rural areas, although the percentage in rural areas was lower than in urban areas. Regarding education level, 70% of adults in urban areas had a high level of education, while in rural areas, a low education level reached 50% of adults. It showed that the trend in education levels in urban areas is relatively higher than in rural areas. The percentage of workers and non-workers in both urban and rural areas was almost the same, but the percentage of non-workers in urban areas was higher than in rural areas. For the wealth index, the percentage of respondents with the lowest wealth was mostly in rural areas. Meanwhile, in urban areas, respondents with a wealth index in tertile 3 (the most wealth) had the highest percentage. It means that urban areas had better wealth than rural areas.

They also demonstrated that a higher percentage of urban adults fell into tertile 3 of the wealth index, while rural adults exhibited a higher percentage in tertile 1 (representing the poorest economic status) for their wealth index. This finding aligns with the typical disparities observed in the characteristics of urban and rural populations, where rural areas had lower education and lower income than urban areas[27,28]. The sociodemographic characteristics of the subjects in this study quite reflected the data of Indonesian adults in 2018. BPS data[29] showed that most Indonesian adults had a middle income, which might have resulted from the different standards used to determine income levels. The results of this study can be generalized to a similar population with unusual eating habits, including skipping meals and snacking often, and frequent consumption of commercially prepared meals, like takeout, pre-packaged, or restaurant meals, where some food-related behaviors caused poor diet[30]. The characteristics of respondents, such as socio-economic and demographics, played a role in eating practices; besides that, rapid urbanization was frequently seen as one of the most significant forces that influenced changes in food practices and nutrition[13]. The results of different characteristics among Indonesian adults living in rural and urban areas can be seen in Table 1.

Table 1. Socio-economic and demographic characteristics of Indonesian adult

Socio-economic and Demographic Characteristics	Rural (n=315)	Urban (n=455)	Total (n=770)
	n (%)	n (%)	n (%)
Gender			
Male	154 (48.9)	225 (49.5)	379 (49.2)
Female	161 (51.1)	230 (50.5)	391 (50.8)
Age			
26-35 years old	190 (60.3)	264 (58.0)	454 (59)
36-45 years old	125 (39.7)	191 (42.0)	316 (41)
Education level[1]			
Low education level	159 (50.5)	139 (30.5)	298 (38.7)
High education level	156 (49.5)	316 (69.5)	472 (61.3)
Job			
Working	213 (67.6)	285 (62.6)	498 (64.7)
Not working	102 (32.4)	170 (37.4)	272 (35.3)
Wealth index[2]			
Tertile 1	142 (45.1)	114 (25.1)	256 (33.2)
Tertile 2	75 (23.8)	124 (27.3)	199 (35.8)
Tertile 3	98 (31.1)	217 (47.7)	315 (40.9)

[1] Educational level, low educational level: never go to school, elementary school, junior high school; high educational level: senior high school, diploma, graduate, post-graduate

[2] Wealth Index: according to the tertile of wealth index. Tertile 1 was the poorest

Among Indonesian adults living in urban and rural areas, approximately 10.5% of respondents from rural areas skipped breakfast. In urban areas, the incidence of skipped breakfast was higher compared to rural areas, with urban breakfast skippers (20.9%) constituting twice the percentage of rural breakfast skippers. Regarding

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breakfast practices, urban and rural results showed significant differences. The percentage of rural and urban adult respondents who skipped breakfast was lower than those who ate breakfast. However, the percentage of adults who skipped breakfast in urban areas was higher than in rural areas. This phenomenon could result from high work pressure, lack of time, and urbanization in urban areas, which sometimes lead people to not prepare food, making them more likely to skip breakfast[31].

Regarding eating practices, such as eating with a companion or eating together, they were found to have a lower percentage than eating alone in urban and rural areas. However, the highest proportion of respondents who consumed breakfast alone was found in urban areas (68.9%). Eating companions were also significantly different between urban and rural areas. People tended to eat breakfast alone. This breakfast practice might be because the number of respondents eating alone at breakfast was higher if they worked, so it might have been influenced by working status[32]. Besides that, the modernized process in urban areas often leads to a desocialization of meals[22]. Most of the types of dining companions in rural areas were families; this might have been because of the strong tradition in rural areas of eating together as a family. Meanwhile, eating alone was more common in urban areas, because of the impact of urbanization, which caused people to be individual[33,34].

Eating at home was the number one place for breakfast in both urban and rural areas, with over 82% of the respondents having breakfast at their houses. However, urban respondents had a higher tendency to eat outside the home than rural counterparts. Most of the subjects in this study still exhibited traditional patterns, with a high proportion of people eating at home dominating the results. However, not all adults who consumed meals at home ate home-prepared foods. Some of them, especially in urban areas, bought meals rather than cook. The results showed that cooking breakfast among rural adults reached 76.2%, while 40.3% of urban adults bought their breakfast. Even though the results were not significantly different, the literature mentions that urban dwellers tend to spend more money on convenience foods compared to their rural counterparts[17]. Urban areas had closer access to food retail outlets, street vendors (particularly in poorer areas), and marketing campaigns. Ultimately, urban residents were more exposed to highly processed and non-traditional foods than rural residents[17]. The results also found that striking places for urban residents to buy food were in modern markets compared to rural areas. The affordability of eating breakfast outside the home was higher in urban areas, possibly influenced by their jobs, as urban workers, mostly white-collar employees, typically had higher salaries. High income or good wealth could lead to the affordability to provide various foods[35]. The work environment in breakfast practices was also important, as respondents in urban areas reported a higher percentage of eating at work than in rural areas.

Other differences between urban and rural breakfast practices were also found in their meal preparation. Among them, 40% of respondents who lived in urban were had their breakfast with buying or by purchasing, while over 75% of respondents from rural areas cooked their breakfast. The chi-square analysis found that urban and rural had significant differences in meal preparation. Gender had a significant impact on eating practices. In meal preparation, most women were more likely to handle most of the cooking in the home. Their propensity to make meals at home rather than dine out was impacted by this position. Men, who usually have a lesser role domestic food preparation, were more inclined to purchase ready-made meals outside the home than women[36]. As a further result, the difference between urban and rural was in rural, the contribution of the wife on breakfast was striking, while in urban, the husband also helps with cooking. It was similar to the result from Sung Lee[37], that most of the women in rural areas prepared meals for family more than male. Rural women were also more likely to use traditional cooking techniques to integrate local ingredients[37]. Modernized adults living places is associated with a shift in the spatiality of food preparation and consumption out-of-home[22].

Rural areas engaged in different mealtime activities compared to urban respondents. Urban respondents primarily focused on eating during breakfast, with fewer engaging in additional activities compared to rural areas. Even though there was no difference, the type of activity while eating in rural and urban areas differed. The results showed that rural adults engaged in eating activities to a greater extent than urban adults in percentage. Even though the analysis found no statistical difference between rural and urban areas, the trend of eating with other activities in urban areas involved the use of screens such as smartphones and watching television, whereas in rural areas, most of the respondents chatted or talked with others during their breakfast, showing that rural areas had more social interaction with their cohabitants than urban areas. This finding is consistent with other studies which identified TV and smartphone usage as the most common activities among respondents during mealtimes, followed by doing some work[38]. In addition, using smartphones when eating increases caloric intake[38]

Based on proportion analysis using chi-square analysis, significant differences were found in breakfast practices in urban and rural areas (p-value <0.05), specifically in breakfast, eating companions, and meal preparation. Except for eating location and activities while eating, there was no significant difference in the proportion of respondents who lived in rural and urban areas. The results of the chi-square analysis of breakfast practices in urban and rural areas can be seen in Table 2.

Table 2. Breakfast practices among Indonesian adult

Practices at Breakfast	Rural n (%)	Urban n (%)	Total n (%)	p-value[a]
Eating Breakfast	n=315	n=455		

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Practices at Breakfast	Rural n (%)	Urban n (%)	Total n (%)	p-value[a]
Skip	33 (10.5)	95 (20.9)	128 (16.6)	<0.001*
Eating	282 (89.5)	360 (79.1)	642 (83.4)	
Eating Companion	n=282	n=360		
Alone	162 (57.4)	248 (68.9)	410 (63.8)	0.003*
Together	120 (42.6)	112 (31.1)	232 (36.2)	
Eating Location	n=282	n=360		
Eating outside home	33 (11.7)	62 (17.2)	95 (15)	0.051
Eating at home	249 (88.3)	298 (82.8)	547 (85)	
Meal Preparation	n=282	n=360		
Buy	67 (23.8)	145 (40.3)	212 (33)	<0.001*
Cook	215 (76.2)	215 (59.7)	430 (67)	
Activity while Eating	n=282	n=360		
With other activities	154 (54.6)	176 (48.9)	330 (51.5)	0.150
Just eating	128 (45.4)	184 (51.1)	312 (48.5)	

[a] Data was analyze using chi-square
*p-value <0.05 = significantly different

In the associated factors of eating breakfast and modern breakfast practices among Indonesian adults, chi-square was used to analyze socio-economic and demographic characteristics. Based on the results of bivariate analysis, it was observed that socio-economic and demographic variables were associated with breakfast eating only in regarding the type of residents (p-value <0.05). Meanwhile, gender, age, educational level, job, and wealth index did not show a significant relationship. Types of residents, such as urban and rural, apparently were associated with breakfast eating among adult respondents. In line with previous research regarding breakfast eating among adult respondents in Indonesia, adults in urban areas had a higher tendency to skip breakfast. It was consistent with prior results for respondents in Indonesia, showing that urban areas had a higher percentage of respondents who skipped breakfast than rural areas[39,40]. Factors impacting urban locales showed a proclivity towards the prevalence of skipped breakfast, a phenomenon primarily tethered to temporal constraints in the morning engendered by occupational commitments. Existing research has explained that the rationale behind abstaining from breakfast consumption, as reported in prior studies, encompassed temporal restrictions during the morning hours, financial impediments, and diminished appetite[41]. These bivariate results would have then been further analysed for regression analysis. Besides the type of resident, another variable that would have been studied for associated factors is educational level. This explanation can be seen in Table 3.

Table 3. Bivariate analysis of socio-economic and demographic characteristics with eating breakfast

Variable (n)	Skip Breakfast (n=128)	Eating Breakfast (n=642)	p-value
	n (%)	n (%)	
Gender			
Male (379)	66 (51.6)	313 (48.8)	0.562
Female (391)	62 (48.4)	329 (51.2)	
Age			
26-35 years old (454)	76 (59.4)	378 (58.9)	0.917
36-45 years old (316)	52 (40.6)	264 (41.1)	
Educational Level			
Low educational level (298)	59 (46)	239 (37.2)	0.060
High educational level (497)	69 (54)	403 (62.8)	
Job			
Working (498)	83 (64.8)	415 (64.6)	0.965
Not working (272)	45 (35.2)	227 (35.4)	
Wealth Index			
Low wealth index (256)	44 (34.4)	212 (33)	0.759
High wealth index (514)	84 (65.6)	430 (67)	
Type of Resident			
Rural (315)	33 (25.8)	282 (43.9)	<0.001*
Urban (455)	95 (74.2)	360 (56.1)	

*Analyzed using chi-square, p-value <0.05
[1] Educational level, low educational level: never go to school, elementary school, junior high school; high educational level: senior high school, diploma, graduate, post-graduate

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[2] Wealth Index: The low wealth index was the wealth index in tertile 1 (poorest), while for higher index consisted of tertile 2 and tertile 3

In modern breakfast practices, the association with socioeconomic and demographic characteristics showed that gender, education level, occupation, and type of resident had a significant proportion between more modern breakfast practices and less modern breakfast practices. More modern breakfast practices entail trends like dining out and individualized eating, resulting in more solitary meal experiences, buying breakfast and engaging in other activities while eating, such as using a smartphone and watching TV. Based on Table 4, the likelihood of more modern breakfast practices most occurred in men, younger ages, higher education levels, workers, higher wealth index, and urban areas. Gender, age, education level, occupation and residency type underwent multivariate analysis, revealing that employment and lifestyle were two factors associated with modern breakfast practices.

Table 4. Bivariate analysis of socio-economic and demographic characteristics with modernized breakfast practices

Variable (n)	More Modernized Breakfast Practice[a] (n=115)	Less Modernized Breakfast Practice[b] (n=527)	p-value
	n (%)	n (%)	
Gender			
Male (313)	70 (61.9)	243 (46.1)	0.004*
Female (329)	45 (39.1)	284 (53.9)	
Age			
26-35 years old (378)	76 (66.1)	302 (57.3)	0.083
36-45 years old (264)	39 (33.9)	225 (42.7)	
Educational Level[1]			
Low educational level (239)	30 (26.1)	209 (39.7)	0.006*
High educational level (403)	85 (73.9)	318 (60.3)	
Job			
Working (415)	91 (79.1)	324 (61.5)	<0.001*
Not working (227)	24 (20.9)	203 (38.5)	
Wealth Index[2]			
Low wealth index (212)	34 (29.6)	178 (33.8)	0.348
Higher wealth index (430)	81 (70.4)	349 (66.2)	
Type of Resident			
Rural (282)	32 (27.8)	250 (47.4)	<0.001*
Urban (360)	83 (72.2)	277 (52.6)	

*Analyzed using chi-square, p-value <0.05
[a]More modern breakfast practices: below median as cut off (scoring based on coding for breakfast practice: eating alone=0; eating outside home=0; Buying food=0; and eating with activity=0. Scoring 1 for the opposite of those eating practices)
[b]Less modern breakfast practices: above median as cut off (scoring based on coding for breakfast practice: eating alone=0; eating outside home=0; Buying food=0; and eating with activity=0. Scoring 1 for the opposite of those eating practices)
[1] Educational level, low educational level: never go to school, elementary school, junior high school; high educational level: senior high school, diploma, graduate, post-graduate
[2] Wealth Index: The low wealth index was the wealth index in tertile 1 (poorest), while for higher index consisted of tertile 2 and tertile 3

Socio-economic and demographic trends and similarities in modern breakfast practices might be explained by gender roles in food preparation. Most women tended to handle most of the cooking at home. This position influenced their preference for eating at home rather than dining out. Men, typically less involved in-home food preparation, showed a stronger tendency to buy ready-to-eat food outside the home than women[42–44]. Most of the women in this study were housewives who did not work outside the home, while most of the female and male respondents were workers. Regarding education levels, this might have been correlated with income, as they could afford various activities such as buying healthier food or eating at restaurants[5,45].

The results of factors related to breakfast and socio-economic and demographic characteristics, namely education level and type of lived, can be seen in Table 5. The results indicated individuals with a low education level had a significantly lower likelihood of having breakfast than those with a high educational level, with a highly significant p-value (< 0.001). It aligns with the lower OR (0.574) and the CI range, indicating the significance of this effect. As for the type of resident, individuals residing in rural areas had a significantly higher likelihood of having breakfast compared to those living in urban areas, with a highly significant p-value (< 0.001). It aligns with the higher OR (2.547) and the CI range, indicating the significance of this effect. The Nagelkerke R Square indicates a modest explanatory power of the model in explaining variability in breakfast eating (4.9%).

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Table 5. Associated factors of breakfast eating in Indonesian adults

Variables	Breakfast Eating				
	B[a]	SE[b]	Wald	p-value	OR (95% CI)[c]
Educational Level[1]					
Low educational level	-0.555	0.203	7.499	<0.001*	0.574 (0.386 – 0.854)
High educational level	-	-	-	-	Ref**
Type of Resident					
Rural	0.935	0.223	17.519	<0.001*	2.547 (1.644 – 3.947)
Urban	-	-	-	-	Ref**

*Analyzed using logistic regression, p-value <0.05; R^2 = 0.049
**Reference group
[1] Educational level, low educational level: never go to school, elementary school, junior high school; high educational level: senior high school, diploma, graduate, post-graduate
[a]b-coefficient, [b]standard error, [c]odd ratio (95% confidence interval)

For associated factors in modern breakfast practices, as could be seen in Table 6, employment and type of resident were one of the related factors. The results suggested that individuals whose workers, were markedly more likely to have modern breakfast practices compared to those non-workers, and this difference was statistically highly significant with a p-value of less than 0.05. It is by an odds ratio of 2.410 and the confidence interval range, underscoring the significance of this observation. Conversely, concerning the type of resident variable, individuals residing in rural areas exhibited a significantly lower probability of having modern breakfast practices in comparison to their urban counterparts, with a highly significant p-value (< 0.001). It corresponds with the odds ratio of 0.426 and the confidence interval range, emphasizing the importance of this finding. The Nagelkerke R Square indicated a modest level of explanatory power in the model, explaining approximately 9.6% of the variability in modern.

Table 6. Associated factors of modernized breakfast practices in Indonesian adults

Variables	Modernized Breakfast Practices				
	B[a]	SE[b]	Wald	p-value	OR (95% CI)[c]
Gender					
Male	-0.134	0.259	0.269	0.604	0.874 (0.526 – 1.453)
Female	-	-	-	-	Ref**
Age					
26-35 years old	-0.381	0.224	2.894	0.089	0.683 (0.440 – 1.060)
36-45 years old	-	-	-	-	Ref**
Educational Level[1]					
Low educational level	0.437	0.241	3.282	0.070	1.600 (0.976 – 2.625)
High educational level	-	-	-	-	Ref**
Job					
Working	0.880	0.303	8.446	0.004*	2.410 (1.332 – 4.362)
Not Working					Ref**
Wealth Index[2]					
Low wealth Index	-0.112	0.248	0.204	0.652	0.894 (0.550 – 1.453)
Higher wealth index	-	-	-	-	Ref**
Type of Resident					
Rural	-0.854	0.238	12.893	<0.001*	0.426 (2.67 – 0.679)
Urban	-	-	-	-	Ref**

*Analyzed using logistic regression, p-value <0.05; R^2 = 0.096
**Reference group
[1] Educational level, low educational level: never go to school, elementary school, junior high school; high educational level: senior high school, diploma, graduate, post-graduate
[2] Wealth Index: low wealth index was wealth index in tertile 1 (poorest), while for higher index consist of tertile 2 and tertile 3
[a]b-coefficient, [b]standard error, [c]odd ratio (95% confidence interval)

Based on this study, most urban workers were white-collar workers who had high salaries. High income can cause varied food availability[35]. As previously explained[5,45], employment was correlated with income, which can lead to modern eating patterns. High salaries were also related to education level. Education emerges as a pivotal variable in delineating the dietary knowledge of individuals who partake in breakfast, the level of education correlates with increased awareness of nutritional information. As a result, numerous studies have established a connection between individuals with higher levels of education and an enhanced

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understanding of the significance of dietary habits[46]. The trend towards urban and rural areas might have been due to urban communities living in densely populated areas, which often have a greater variety of foods[13]. The growth of supermarkets and fast-food chains in developed countries is still mainly centered in areas with greater urbanization[47]. Urban access has increased to a wider variety of foods compared to rural communities, but as a result, they are also more likely to consume fast food or processed food or go out to eat[48].

The strength of this study was the use of PPS in the sampling method. The use of PPS in this study also ensured the representativeness of subjects from two study sites. This study is also a new study in Indonesia that captured the differences in practices at breakfast among rural and urban adults. Additionally, this study elucidated new insights regarding the factors associated with modern breakfast practices a breakfast consumption among Indonesian adults. Therefore, this study had limitations. The definition related to breakfast among Indonesians is different. Some people reported that having their first intake even if it was above 11 a.m. was considered as breakfast. Therefore, we used the time range of mealtime (5-10 a.m.)[6] to define breakfast and skipped breakfast. This study also considered 300 calories as the minimum energy intake for breakfast definition. This study covers eating practices in 2018. Trends may have shifted, particularly in the aftermath of the covid pandemic. Future research could examine changes in trends in breakfast eating practices, such as conducting longitudinal studies, which may be needed in the future.

CONCLUSIONS

In summary, there were different breakfast patterns between urban and rural areas. Eating alone, eating outside the home, and buying food for breakfast tended to occur more in urban areas. Statistically significant differences in the proportion of breakfast practices among urban and rural adults were found in eating breakfast, eating location, eating companion, and meal preparation. Different socioeconomic characteristics such as gender, job, educational level, and wealth index might have impacted the differences in breakfast practices between urban and rural areas. Regarding the associated factors of breakfast eating and modern breakfast practices, the related factors were education level and type of resident for breakfast, and for modern breakfast practices, work, and type of resident. Living in rural areas and having a high educational level might have increased the likelihood of eating breakfast. While for modern breakfast practices, living in urban areas and being employed might have resulted in more modern breakfast practices. Both types of residence had impacts on breakfast. Promotion and education regarding breakfast eating and breakfast practices in urban and rural areas can be steps for stakeholders and the government to improve good breakfast practices so that unhealthy eating patterns that lead to obesity might be reduced.

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CONFLICT OF INTEREST AND FUNDING DISCLOSURE

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest. This research is supported by self-funding.

AUTHOR CONTRIBUTIONS

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