ORIGINAL ARTICLE

Disparities in sugar-sweetened beverage expenditures: insights from Indonesian urban and rural households

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ABSTRACT

Excessive consumption of sugar-sweetened beverages (SSBs) poses a significant health risk because of their poor nutritional content. This study investigates SSB expenditure among Indonesian households with the goal to analyse disparities and determinants in urban and rural areas. Using the data from March 2022 national socio-economic survey, percentages and means were calculated, and binary probit analysis was performed. The results indicate that the majority of Indonesian households (73.59%) purchase sugary drinks, with slightly higher proportions and mean SSB expenditures observed in rural compared to urban households. Household SSB expenditure at the national level exhibits linear associations with quintiles of household food expenditure and size, a consistent pattern observed in both rural and urban areas. Notably, household composition, including a larger number of children, female adults, and elderly individuals, correlates with reduced SSB expenditures in urban households, while no such trend is observed in rural counterparts. Despite similar access to sugary drinks in rural and urban areas, urgent attention is needed to enhance health literacy among rural households. Interventions through formal education institutions or community-driven initiatives are crucial to address this important health concern and foster healthier beverage choices across the diverse Indonesian landscape.

Key words:
sugar-sweetened beverages; household expenditures; urban and rural disparities.

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INTRODUCTION

The rising trend in the consumption of sugary drinks worldwide has raised significant concerns about public health and nutrition. Excessive consumption of sugar-sweetened beverages (SSB), known for their high caloric contents but low nutrient levels, poses a threat to people's health by contributing to unhealthy weight gain and obesity.[1–3] With a typical single sugary drink containing approximately 40 grams of additional sugars, equivalent to 10 teaspoons of sugar, and providing around 200 calories, the research evidence links the increasing consumption of SSB to various non-communicable diseases (NCD), such as hypertension, diabetes mellitus, strokes, and ischemic heart diseases.[2–5]

As the medical costs of treating NCDs are high and lead to increased poverty and health disparities, the prevention of NCDs through the maintenance of a healthy diet and lifestyle is crucial.[6–8] The World Health Organization (WHO) recommends reducing added sugar consumption to less than 10% of daily energy intake for both adults and children to mitigate the risk of chronic diseases, including obesity and dental caries.[9] In designing targeted interventions that aim to prevent and control SSB intake within communities, identifying the determinants of SSB consumption and expenditures is crucial.

Various studies have highlighted the influence of socioeconomic characteristics, including age, education, wealth index, and type of residence, as well as social and physical environmental factors, on SSB consumption and expenditures.[1, 2, 10–14] Notably, individuals in urban areas with lower incomes, and those living in smaller households tend to consume and spend more on SSB than their counterparts.[2, 10–12] For children and adolescents, parental knowledge about SSB and the availability of these beverages in homes significantly influence their SSB consumption.[14] Furthermore, the disparities in SSB consumption show that individuals with a lower socioeconomic status are more prone to consuming SSBs.[1,14] Given the interplay among the various factors in SSB consumption, an analysis of SSB expenditures and their determinants at the household level might be useful in gaining a more comprehensive understanding of this health issue.

Recognizing the unique consumption patterns and attitudes toward SSB expenditures in different geographic areas and socioeconomic contexts is crucial. Environmental characteristics, such as the type of residence, may be linked to the intake of sugary drinks due to their availability and affordability in specific areas. While fast-food restaurants and markets selling SSBs are more prevalent in urban areas, contributing to increased access, lower-income urban communities could face affordability issues and limited access to health education, resulting in higher rates of SSB consumption.[15] Urban lifestyles, influenced by factors such as work environments, commuting habits, and social norms, contribute to distinct beverage consumption patterns. Conversely, in rural areas, cultural preferences, traditional dietary patterns, and social dynamics shape SSB consumption differently.

Understanding these factors is essential for designing targeted interventions. However, studies analyzing the disparities in SSB consumption between rural and urban areas are limited, with most focusing on understanding the determinants of SSB consumption and the implications of SSB taxes in improving public health.[9] This study aims to analyze the disparities in SSB expenditures in rural and urban areas in Indonesia, and to examine household socioeconomic characteristics that determine household spending on SSBs.

While SSB expenditures can serve as a proxy to measure SSB consumption, analyzing them at the household level is

crucial due to the significant role of families in individuals' health, including SSB intake. Additionally, this research will contribute evidence on SSB consumption in low-income countries that will address the current prevalence of studies being more concentrated in high-income countries than in their low-income counterparts.[14] Indonesia, classified as a low-income country, is in the early stages of formulating policies and creating environments that promote a healthy lifestyle. While high-income countries are grappling with an increase in NCDs, low-income countries face the burdens of diseases, specifically communicable diseases, malnutrition, and the emerging challenges of NCDs and obesity.[16] This situation increases the urgency to provide more evidence for tackling health and nutrition problems in low-income countries.

Some studies have examined the determinants of SSB intake and expenditure, but these studies did not specifically analyze the disparities between rural and urban areas. While studies by Laksmi et al. (2018) and Sartika et al. (2022) identified the proportion of SSB intake among Indonesian adolescents and identified several socioeconomic characteristics related to SSB consumption, they did not find any urban and rural disparities.[17, 18] In contrast, studies by Daeli and Nurwahyuni (2019) and Sanjaya and Sadono (2022), using different datasets, highlighted the geographical context of SSB expenditures within households in urban areas or inside the Java-Bali regions that tended to spend more on SSBs compared to households in rural areas or outside the Java-Bali regions.[10, 12] However, neither study analyzed the disparities in the determinants of household SSB expenditures, leaving a gap in understanding household decisions regarding SSB spending.

This study aims to contribute additional knowledge on the disparities in SSB expenditures in Indonesia and to shed light on the socioeconomic context of SSB expenditures in the population. Ultimately, the findings will aid in developing SSB policies tailored to Indonesia's diverse regions by addressing these disparities comprehensively.

METHOD

Sample and Data

This study utilized data obtained from the national socioeconomic survey known as Survei Sosial Ekonomi Nasional (SUSENAS).[19] SUSENAS, conducted by Statistics Indonesia, periodically collects data on various areas of life fulfillment, including clothing, food, housing, education, and health. The SUSENAS survey is conducted biannually, specifically in March and September. This dataset is a primary source for calculating various measurements, including poverty rates, expenditure disparities, and food security levels.

This research exclusively utilized the SUSENAS March 2022 Dataset, specifically focusing on the consumption and core modules. The consumption module surveyed each family regarding the quantity and monetary expenditures on food by its members in the preceding week. In addition, households were queried regarding their non-food expenditures. The core module provides a comprehensive overview of the socioeconomic, health, and demographic characteristics of households and their members. The total sample size consisted of 339,584 households.

Within the classification of individual consumption according to the purpose (COICOP), the following types of SSBs are included: packaged fruit juice, bottled tea water, fizzy drinks containing CO_2 (11111055/059), health drinks, energy drinks (01223-01225), and sweetened condensed milk (01143005). The estimation of

SSB expenditures is derived from the cumulative sum of these three categories of expenditure. The total food expenditure is calculated based on the sum of all household food expenditures. For this spending analysis, we utilized data pertaining to household conditions obtained from the core modules, including factors such as household size, education, shares of household members based on age and sex, and refrigerator ownership. Table 1 presents the definitions of the variables utilized in this study. Independent variables chosen to analyze the dependent variable represented the household members' characteristics, including size, composition (children, teenagers, female adults, and elderlies), socioeconomic conditions (education and household expenditures), and physical environment (refrigerator ownership) that may influence households' decision to spend money on sugary drinks.

Table 1. Variable Definitions

Variable	Measurement unit	Description
Dependent		
Proportion of SSB expenditure	Proportion (0-100)	SSB expenditures relative of total food expenditure
Household with SSB expenditure	Category (1=Yes; 0=No)	Proportion of SSB more than 0
Independent		
Quintile of total food household expenditure	Category (1=20; 2=40; 3=60; 5=80; 5=100)	Total food expenditure is classified by quintile
Mean years of schooling in household	Category (1= ≤9 years; 2= 9-12; 3= ≥12)	Average length of schooling attended by household members aged 15+
Household size	Category (1=1-2; 2=3-4; 2=5-6; 3=7+)	Number of members living in the household
Number of children	Category (1=0; 2=1; 3=2; 3=3+)	Number of household members aged 0-5 years
Number of teenagers	Category (1=0; 2=1; 3=2; 3=3+)	Number of household members aged 6-18 years
Number of elderlies	Category (1=0; 2=1; 3=2; 3=3+)	Number of household members aged 65+ years
Number of women adults	Category (1=0; 2=1; 3=2; 3=3+)	Number of women household member aged 18+ years
Have a refrigerator	Category (1=yes; 0=no)	Have a refrigerator

Statistical Analysis

Descriptive statistics, such as percentages and means, are used to assess the disparity and distribution of households with SSB expenditures based on the sociodemographic characteristics of the household.[20] A binary probit model is used to estimate the determinants of household SSB consumption.[21] It will model the probability of two possible outcomes of household SSB expenditures. In this study, we specify the outcome variable Y = 1 for households that have SSB expenditures and Y = 0 for households that do not have such sweet consumption expenditures. STATA 17 is used for data processing and the weights recommended by Statistics Indonesia for the survey data are used. In addition to examining the national data, the analysis of household SSB expenditures and their determinants is also performed by type of residence, which is urban and rural to provide information about the disparities in households' SSB expenditures.

RESULTS

Distribution of Household SSB Expenditures and Their Determinants

Table 2 displays the consumption of SSB by households, based on socioeconomic and demographic characteristics and differentiated by urban and rural areas. More than half of these households spend money on SSBs, with rural households' spending being slightly higher than that of urban households. The percentage of SSB expenditures among rural residents is 3%–4% higher than that of urban residents across all categories of food expenditure quintiles, particularly rural households with three to four members. Moreover, the proportion of households having SSB expenditures in rural areas is consistently greater than in urban areas across all levels of household mean years of schooling.

In childless households, 70%, regardless of their residences, spend money on sugary drinks. Meanwhile, around 80% (a 10% increase) of households with a child have SSB expenditures. In rural areas, there was even a notable decrease in the percentage of households with SSB expenditures with one child, dropping from 80% to approximately 72% for families with more than two children. There is also a positive trend in households with teens aged 6–18 years. Around 60% of households without teenagers spend money on SSBs, but this percentage increases to almost 80% in households with teenagers. In rural regions, households with three or more teenagers exhibit a marginal decline in percentage (about 2%) compared to households in urban areas.

Table 2. Distribution of the percentage of households positive for SSB expenditure by residence

Variables	n	% household with SSB expenditure		
		All	Urban	Rural
Quintile of total food household expenditure				
Q1	67,956	52.75	50.88	54.61
Q2	67,878	70.16	68.41	72.13
Q3	67,939	76.1	74.86	77.64
Q4	67,911	79.83	78.24	82.17
Q5	67,900	84.71	84	86.24
Mean years of schooling in household				
<=9 years	152,971	70.46	69.51	71.18
9-12 years	133,852	76.65	75.83	78.11
>12 years	52,761	73.94	73.36	76.37
Household size				
1-2 person/s	83,974	52.33	52.01	52.77
3-4 persons	167,020	76.99	76.57	77.59
5-6 persons	73,148	82.03	82.16	81.85
>7 persons	15,442	83.05	83.68	82.34
Number of children (aged 0-5)				
Childless	239,067	70.88	70.84	70.95

Variables	n	% household with SSB expenditure		
		All	Urban	Rural
A Child	82,314	80	79.31	80.84
Two children	16,527	77.77	77.12	78.8
Three or more children	1,676	76.03	78.53	72.06
Number of teenagers (aged 6-18)				
None	140,146	64.55	64.19	65.07
A teenager	109,484	79.64	79.5	79.82
Two teenagers	63,675	81.36	81.48	81.18
Three or more teenagers	26,279	80.85	82.11	79.28
Number of elderlies (aged 65+)				
None	279,064	75.94	75.89	76.01
Elderly	47,997	65.26	64.01	66.83
Two elderly	12,365	60.27	56.43	64.93
Three or more elderly	158	60.63	46.48	78.76
Number of women adults (aged 18+)				
None	17,579	65.75	67.17	63.28
A woman	246,760	72.33	72.06	72.7
Two women	63,427	77.47	76.77	78.43
Three or more women	11,818	78.83	78.6	79.19
Have a refrigerator				
Yes	204,020	75.49	74.33	77.8
No	135,564	69.62	69.68	69.59
Total	**339,584**	**73.59**	**73.29**	**74.01**

Almost 80% of households having three or more women have SSB expenditures, while 65% of households without adult female members purchase SSBs. A distinct trend emerges between rural and urban areas. Urban families without adult females exhibit a greater proportion of household spending on SSBs compared to rural households. Conversely, rural families with one or more adult females have a higher percentage of households with SSB expenditures compared to urban areas. Finally, approximately 75% of residents who own refrigerators, a space to store SSBs, spend money on SSBs. Typically, individuals residing in rural locations who have refrigerators tend to have a 3% greater proportion of households buying SSBs compared to urban areas.

As shown in Table 3, the mean proportion of SSB expenditures is only 2% of total food consumption, considered moderate according to other studies.[2] There is a slight difference (around 2%) between the mean of SSB expenditures in urban and rural areas. When comparing conditions in rural and urban areas, it is observed that urban areas exhibit a decreasing trend in the average share of SSB expenditures across quintiles one to five. In contrast, rural households display a quadratic effect, with higher averages in quintiles one and five. Moreover, there is a positive correlation between the average level of education in families and the proportion of SSB expenditures both in rural and urban areas (with a disparity of around 0.05%–0.1% higher in rural areas).

An inverse relationship is shown in the household size, number of children, teenagers, elderly, and adult women variables, where an increase in the number of these variables leads to a decrease in the mean share of SSB consumption. When comparing their means, rural households had a higher mean than urban households, ranging from 0.04% to 0.33%, except for the number of adult women, where the urban mean surpasses the rural mean and is

the highest mean of SSB expenditure across other determinants. Moreover, rural areas, in comparison to urban areas, exhibit a 0.08% greater average share of SSB expenditures in houses equipped with refrigerators.

Table 3. Distribution of mean of households SSB expenditure proportion by residence

Variables	Mean of SSB expenditure proportion (%)					
	All		Urban		Rural	
	Mean	SD	Mean	SD	Mean	SD
Quintile of total food household expenditure						
Q1	2.0623	0.0006	2.0664	0.0009	2.0584	0.0008
Q2	1.9363	0.0005	1.9159	0.0006	1.9582	0.0007
Q3	1.9409	0.0004	1.9084	0.0006	1.9799	0.0007
Q4	1.9346	0.0004	1.8914	0.0005	1.9954	0.0007
Q5	1.9475	0.0004	1.8910	0.0005	2.0662	0.0007
Mean years of schooling in household						
<=9 years	1.9513	0.0003	1.8967	0.0005	1.9915	0.0004
9-12 years	1.9441	0.0003	1.8994	0.0004	2.0217	0.0005
>12 years	1.9978	0.0005	1.9820	0.0006	2.0610	0.0011
Household size						
1-2 person/s	2.2135	0.0006	2.2309	0.0009	2.1896	0.0010
3-4 persons	1.9323	0.0003	1.8864	0.0003	1.9956	0.0004
5-6 persons	1.8868	0.0004	1.8314	0.0005	1.9612	0.0006
>7 persons	1.8469	0.0009	1.8076	0.0012	1.8913	0.0013
Number of children (aged 0-5)						
Childless	1.9852	0.0002	1.9579	0.0003	2.0235	0.0004
A Child	1.9026	0.0004	1.8357	0.0005	1.9842	0.0006
Two children	1.8685	0.0009	1.8148	0.0012	1.9512	0.0015
Three or more children	1.8083	0.0035	1.7840	0.0044	1.8502	0.0056
Number of teenager (aged 6-18)						
None	2.0335	0.0004	1.9972	0.0005	2.0860	0.0006
A teenager	1.9159	0.0003	1.8844	0.0004	1.9552	0.0005
Two teenagers	1.9018	0.0004	1.8411	0.0005	1.9890	0.0007
Three or more teenagers	1.8918	0.0008	1.8468	0.0011	1.9492	0.0013
Number of elderly (aged 65+)						
None	1.9593	0.0002	1.9283	0.0003	2.0026	0.0003
Elderly	1.9530	0.0006	1.8782	0.0007	2.0436	0.0009
Two elderly	1.8844	0.0011	1.7839	0.0014	1.9906	0.0016
Three or more elderly	1.8209	0.0082	1.6337	0.0101	1.9624	0.0121
Number of women adult (aged 18+)						
None	2.6449	0.0016	2.7325	0.0021	2.4830	0.0025
A woman	1.9594	0.0002	1.9113	0.0003	2.0232	0.0004
Two women	1.8796	0.0004	1.8330	0.0005	1.9423	0.0006
Three or more women	1.8352	0.0009	1.8197	0.0011	1.8594	0.0014
Have a refrigerator						
Yes	1.9078	0.0002	1.8817	0.0003	1.9571	0.0004
No	2.0639	0.0004	2.0479	0.0006	2.0744	0.0005
Total	**1.9556**	**0.0002**	**1.9170**	**0.0003**	**2.0080**	**0.0003**

Assessing the Link between Household Characteristics and the SSB Expenditures using Probit Model

According to Table 4, there is a positive correlation between total food expenditures and SSB expenditures. In other words, when total food expenditures, or economic status, increase, so do SSB expenditures. The likelihood of the household group in the top quintile experiencing an increase in SSB expenditures is 23% compared to the lowest quintile. This pattern is apparent in both urban and rural areas, with a somewhat larger frequency observed in urban areas compared to rural areas (26% compared to 22%). Moreover, a positive correlation is evident in the variable of household size, wherein an increased number of household members correlates with a heightened likelihood of engaging in SSB consumption. This trend persists across both urban and rural households.

Additionally, the likelihood of a household spending on SSBs is inversely related to the educational attainment of its adult members. Specifically, households with an average length of schooling exceeding 12 years (characterized as high education) exhibit a 4% lower probability of SSB expenditures compared to those with an average of less than nine years of schooling (classified as primary education). Furthermore, the probability of SSB expenditures in households with higher education in both urban and rural settings diminishes by up to 4.9% and 2.6%, respectively. Regarding the presence of children in households, those with a single child have a higher probability for SSB spending compared to childless households, but those with more than two children tend to decrease their SSB expenditures. A distinct pattern emerges between rural and urban households. Having one or more children provides the opportunity to decrease household SSB spending in urban areas, while in rural areas the trend was observed in households with more than three children.

Table 4. Marginal Effect of Probit model for Household SSB expenditure

Variables	All		Urban		Rural	
	dy/dx	p	dy/dx	p	dy/dx	p
Quintile of total food household expenditure						
Q1	(baseline)					
Q2	0.110	<0.001*	0.113	<0.001*	0.113	<0.001*
Q3	0.160	<0.001*	0.168	<0.001*	0.160	<0.001*
Q4	0.197	<0.001*	0.206	<0.001*	0.199	<0.001*
Q5	0.239	<0.001*	0.266	<0.001*	0.225	<0.001*
Mean years of schooling in household				<0.001*		
<=9 years	(baseline)					
9-12 years	-0.004	0.036*	-0.014	<0.001*	0.004	0.056
>12 years	-0.040	<0.001*	-0.049	<0.001*	-0.026	<0.001*
Household size						
1-2 person/s	(baseline)					
3-4 persons	0.132	<0.001*	0.143	<0.001*	0.123	<0.001*
5-6 persons	0.154	<0.001*	0.177	<0.001*	0.136	<0.001*
>7 persons	0.144	<0.001*	0.183	<0.001*	0.119	<0.001*
Number of children (aged 0-5)				<0.001*		
Childless	(baseline)					

Variables	All		Urban		Rural	
	dy/dx	p	dy/dx	p	dy/dx	p
A Child	0.015	<0.001*	-0.002	0.488	0.026	<0.001*
Two children	-0.012	0.003*	-0.033	<0.001*	0.002	0.725
Three or more children	-0.052	<0.001*	-0.067	0.001*	-0.038	0.011*
Number of teenager (aged 6-18)						
None	(baseline)					
A teenager	0.053	<0.001*	0.052	<0.001*	0.052	<0.001*
Two teenagers	0.037	<0.001*	0.039	<0.001*	0.034	<0.001*
Three or more teenagers	-0.009	0.043*	-0.004	0.606	-0.009	0.143
Number of elderly (aged 65+)						
None	(baseline)					
Elderly	-0.023	<0.001*	-0.052	<0.001*	-0.003	0.398
Two elderly	-0.028	<0.001*	-0.084	<0.001*	0.010	0.059
Three or more elderly	-0.069	0.062	-0.250	<0.001*	0.063	0.146
Number of women adult (aged 18+)						
None	(baseline)					
A woman	-0.061	<0.001*	-0.081	<0.001*	-0.042	<0.001*
Two women	-0.063	<0.001*	-0.078	<0.001*	-0.047	<0.001*
Three or more women	-0.081	<0.001*	-0.094	<0.001*	-0.068	<0.001*
Have a refrigerator						<0.001*
Yes	(baseline)					
No	0.029	<0.001*	-0.018	<0.001*	0.056	<0.001*
n	339,584		142,112		197,472	
Prob>Chi	<0.001*		<0.001*		<0.001*	
Pseudo R^2	0.0686		0.0751		0.0678	

*Significant at the 5% level

Households with one or two teenagers exhibit a heightened likelihood of SSB spending compared to households without teenagers, with percentages of 5.3% and 3.7%, respectively. Conversely, households with more than three teenagers demonstrate a slightly lower probability of SSB consumption expenditures, at 0.9%, compared to households without teenagers, irrespective of their residential areas. Moreover, households with one or more elderly individuals exhibit a diminished likelihood of SSB spending compared to those without elderly members. This trend is consistent in rural and urban households as well.

However, it is noteworthy that the presence of two or more elderly individuals in a rural household paradoxically increases the probability of SSB spending by up to 6.3%. This situation merits attention, given that heightened SSB consumption among the elderly is associated with cognitive function disorders or dementia, as well as an increased risk of cardiovascular disease, diabetes, hypertension, obesity, and depression.[22]

A higher number of adult women in a household is associated with a significant reduction in the probability of SSB consumption expenditures compared to households without adult women. This trend is consistent in both urban and rural areas, with a decrease in SSB spending of up to 9.4% and 6.8%, respectively. This gender-related disparity has implications for increased SSB expenditures at the household level. The presence of women in a household appears to play a regulatory role in SSB expenditures, given their often-greater involvement in shopping activities and fulfilling household food needs with an emphasis on balanced nutrition.

In rural areas, households equipped with refrigerators show an increased probability of SSB expenditures by 5.6% compared to those without refrigerators. Conversely, in urban households, the probability of SSB expenditures is 1.8% lower with refrigerators compared to households without refrigerators. This is likely because urban households often purchase and consume SSB outside the home, given the easy accessibility of SSB in various outlets, such as shops, small vendors, and supermarkets.[23]

DISCUSSION

This study shed light on SSB expenditures in Indonesian households using nationally representative data that revealed a notable proportion of these households are allocating funds to SSBs and the reasons for this behavior. This study determined that households in rural areas have slightly higher SSB expenditures compared to urban counterparts.

These findings contrast with previous studies from various countries that mentioned urban populations spend more on SSBs than those living in rural areas.[2, 10, 11] The explanation often tied to urban areas having greater sugary drink availability and accessibility is challenged by findings from this study suggesting that sugary drinks in Indonesia may not be exclusively concentrated in urban areas.[10, 24] Moreover, this shift may be attributed to the widespread availability of convenience stores like *Indomart* and *Alfamart* (Indonesia's minimarket brands), reaching even the remotest corners of Indonesia. While this market expansion may enhance the economy, each community must endure the social costs of these enterprises, including adverse health effects.

Furthermore, despite the accessibility of convenience stores in rural regions being adequate, the distribution of goods from manufacturers to these areas often results in higher costs due to longer distances and less efficient transportation networks. This results in elevated prices for rural consumers. Conversely, in urban settings where road access and supply chains are well-developed and numerous retailers are present, SSBs can be sold at a lower cost per unit.[25–27] However, this study does not include the availability and accessibility of SSB in the analysis, so further studies are needed to analyze the influence of these minimarkets on households' accessibility and SSB expenditures.

Findings from this study offer evidence for developing policies and interventions to reduce sugary drink consumption, particularly considering the influence of household composition and education on SSB expenditures. Household compositions exhibit differing impacts on SSB expenditures in rural and urban areas. While an increase in the number of children, female adults, and the elderly decreases household SSB expenditures in urban areas, this trend is different in rural households. Despite similar access to sugary drinks in both settings, discrepancies in access to health education and awareness about the negative impact of added sugar in SSBs are evident.

Additionally, the average years of schooling among urban household members exert a greater influence in reducing SSB expenditures compared to rural areas. These findings suggest a need to enhance the role of educational institutions and community movements in rural areas to increase awareness regarding the adverse effects of excessive sugary drink consumption. Community awareness and health literacy remain areas for improvement even though Indonesia's Ministry of Health (2013) advocates for more nutritional information on products, including added sugar proportions.[28]

The disparities in household SSB expenditures across Indonesian regions and rural-urban areas, coupled with the different influences of household

composition, may stem from diverse social and cultural factors. While not directly analyzed in this study, our findings underscore that SSB consumption and expenditures are not solely tied to health considerations, but they are intricately linked to social and economic conditions. Determinants of SSB consumption and expenditures extend from individual and household to community levels, encompassing both internal and external aspects influencing people's decisions on sugary drink consumption.[29]

The socioeconomic characteristics analyzed in this study are limited to household aspects and overlook individual and community-level dynamics within households and communities related to SSB expenditures. Comprehensive qualitative studies are needed to understand these disparities more thoroughly, considering the broader contextual elements of household decision-making in SSB expenditures.

RECOMMENDATIONS

Health literacy among household members in rural areas must be enhanced so they can make informed decisions about their food and beverage expenditures. Educational institutions and community initiatives can serve as instrumental avenues to augment community health literacy, thereby fostering informed choices, and contributing to healthier beverage consumption patterns.

To achieve a more comprehensive understanding of household SSB expenditure disparities, qualitative studies are warranted to delve into the contextual nuances. There is also a need for more research linking the availability and accessibility of SSB to household spending.

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ETHICAL APPROVAL AND CONSIDERATION.

Authors declare that the article is original and has not been submitted anywhere else and the tables included in the article are original.

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