

## Education on Sugar-Sweetened Beverage (SSB) for increasing knowledge mothers in Pattallassang Village

Tri A. Karini\*<sup>1</sup>, Yessy Kurniati<sup>2</sup>, Dian R. Wijaya<sup>3</sup>, Aswadi<sup>4</sup>, Nurhidayat<sup>5</sup>, Muhammad H. Asgari<sup>6</sup>

<sup>1,2,3,4,5,6</sup> Department of Public Health, Faculty of Medicine and Health Sciences, Universitas Islam Negeri Alauddin Makassar, Makassar, Indonesia

### ABSTRACT

Excessive consumption of Sugar-Sweetened Beverage (SSB) can cause various health problems, such as weight gain, diabetes and disease. The approach used in this service is Participatory Action Research (PAR), which means looking at the level of participation of participants in outreach and demonstration activities. In this approach, the community service team carries out persuasive and non-commanding facilitation efforts which aim to increase community knowledge, attitudes and behavior in finding, planning and solving problems using the resources/potential they have including the participation and support of community leaders. This community service activity uses an outreach method with a lecture, question and answer and discussion approach. The activity participants were mothers in Pattallassang Village. Before and after education, participants were given a questionnaire to determine their level of knowledge about MBDK. The results of community service show that there is an increase in the knowledge of mothers in Pattallassang Village before and after education about MBDK, with  $p$  value = 0.008. Outreach activities about MBDK to mothers in Pattallassang Village have succeeded in increasing their knowledge significantly.

### ABSTRAK

Konsumsi makanan berpemanis dalam kemasan (MBDK) yang berlebihan dapat menyebabkan berbagai masalah Kesehatan, seperti peningkatan berat badan, diabetes dan penyakit. Pendekatan yang digunakan dalam pengabdian ini yaitu Partisipatory Action Research (PAR) yaitu melihat besar partisipasi dari partisipan dalam kegiatan penyuluhan dan demonstrasi. Dalam pendekatan ini, tim pengabdian kepada masyarakat melakukan upaya fasilitasi yang bersifat persuasif dan tidak memerintah yang bertujuan untuk meningkatkan pengetahuan, sikap dan perilaku masyarakat dalam menemukan, merencanakan dan memecahkan masalah dengan menggunakan sumber daya/potensi yang mereka miliki termasuk partisipasi dan dukungan tokoh masyarakat. Kegiatan pengabdian masyarakat ini menggunakan metode penyuluhan dengan pendekatan ceramah, tanya jawab, dan diskusi. Peserta kegiatan adalah ibu-ibu di Desa Pattallassang. Sebelum dan setelah penyuluhan, peserta diberikan kuesioner untuk mengetahui tingkat pengetahuan mereka tentang MBDK. Hasil dan Pembahasan Hasil pengabdian masyarakat menunjukkan bahwa terdapat peningkatan pengetahuan ibu-ibu di Desa Pattallassang sebelum dan sesudah penyuluhan tentang MBDK, dengan nilai  $p = 0,008$ . Kegiatan penyuluhan tentang MBDK pada ibu-ibu di Desa Pattallassang telah berhasil meningkatkan pengetahuan mereka secara signifikan.

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### AUTHOR(S) INFO

#### Correspondence Email

[triaddy.karini@uin-alauddin.ac.id](mailto:triaddy.karini@uin-alauddin.ac.id)

#### Address

Jl. Sultan Alauddin No.63, Romangpolong, Kec. Somba Opu,  
Kabupaten Gowa, Sulawesi Selatan 92113, Indonesia



## INTRODUCTION

Obesity has emerged as a significant global public health issue, characterized by an abnormal accumulation of body fat that poses serious health risks. The World Health Organization (WHO) defines obesity as having a body mass index (BMI) of 30 or higher, and current statistics indicate that more than 1.9 billion adults are classified as overweight, with approximately 650 million of these individuals being obese (Chooi et al., 2019; Ta'ani et al., 2024). Alarming, the prevalence of obesity has surged nearly threefold since 1975, with projections suggesting that by 2025, one in five adults will be classified as obese (Sun et al., 2024). Furthermore, childhood obesity is also a growing concern, with around 39 million children under the age of five being overweight or obese as of 2020 (Sun et al., 2024).

The factors contributing to the rising prevalence of obesity are multifaceted, including changes in dietary patterns, physical inactivity, and socioeconomic factors. Rapid urbanization and globalization have led to the adoption of energy-dense diets that are high in fats and sugars, coupled with sedentary lifestyles (Chooi et al., 2019; Endalifer & Dires, 2020). In developing countries, these changes are particularly pronounced, as populations transition from traditional diets to more Westernized eating habits, which often include increased consumption of processed foods (Chooi et al., 2019; Ta'ani et al., 2024). The economic burden associated with obesity is substantial, as it is linked to various chronic diseases such as type 2 diabetes, cardiovascular diseases, and certain types of cancer (Krishna et al., 2019; Akşit & AKŞİT, 2023).

Geographically, the prevalence of obesity varies significantly. For instance, in certain regions of Africa and Southeast Asia, obesity rates have historically been low; however, recent trends indicate a sharp increase due to urbanization and lifestyle changes (Chooi et al., 2019; Liao et al., 2021). In contrast, developed nations have long struggled with high obesity rates, with countries like the United States reporting that approximately 38.9% of adults were classified as overweight or obese between 2013 and 2016 Ta'ani et al. (2024). This disparity highlights the need for tailored public health interventions that consider local dietary habits, cultural practices, and socioeconomic conditions (Endalifer & Dires, 2020).

The increasing prevalence of obesity, particularly among children and adolescents, has prompted a need for effective strategies to limit the consumption of sugar-sweetened foods. The World Health Organization (WHO) recommends that added sugars should comprise less than 10% of total energy intake, with further benefits observed at lower levels (Muth et al., 2019). This paper explores various approaches to reduce sugar consumption and, consequently, obesity rates.

However, social changes have affected food consumption patterns in society. Consumption of packaged foods and beverages that are high in sugar, salt, and fat has increased significantly. These packaged foods and beverages offer convenience and practicality, but on the other hand can cause various health risks, such as obesity, diabetes, and cardiovascular disease. According to data from the World Health Organization, (2020), poor diet is one of the main risk factors for non-communicable diseases.

Consumption of sugar-sweetened beverage (SSB) has become a significant public health problem, especially among mothers. Studies have shown that excessive consumption of SSBBD can increase the risk of metabolic syndrome and type 2 diabetes (Malik et al., 2010; Imamura et al., 2015). In addition, SSBBD is also associated with increased body weight and obesity, both in children and adults (Malik et al., 2006; Malik & Hu, 2019). This condition requires increased awareness and knowledge of mothers regarding the importance of a healthy diet that is in accordance with the principles of balanced nutrition. Consuming healthy and nutritious food is not only a health obligation (Ministry of Health, 2020), but also part of an effort to maintain public welfare which is one of the principles of religious moderation in Islam. Religious moderation teaches balance in all aspects of life, including in choosing and consuming food (Khaleghi, 2017).

In this context, community service programs that focus on improving the role of mothers in providing healthy food are very relevant. This program aims to improve mothers' understanding and ability in choosing and serving healthy and nutritious food, as well as raising awareness of the negative

impacts of consuming packaged food and drinks. Thus, it is hoped that a healthier and more prosperous family can be created, in line with Islamic teachings on public welfare.

## METHODS

The approach used in this community service is Participatory Action Research (PAR), which is to see the level of participation of participants in education activities. The approach used is an approach based on community role movements. In this approach, the community service team makes persuasive and non-orderly facilitation efforts aimed at increasing community knowledge, attitudes and behavior in finding, planning and solving problems using the resources/potentials they have including the participation and support of community leaders. The format of the solution offered is in the form of education activities carried out using lecture, discussion and practice methods. Tools such as viewers, props, and examples that are relevant to the material to be provided are also used to assist the education process. The method used to solve health problems in Pattalassang District is a participatory method. The community service team from the Public Health Study Program, FKIK UIN Alauddin Makassar will directly conduct education related to the levels and dangers of packaged sweetened foods (MBDK) for mothers.

## RESULTS AND DISCUSSION

Community service activities of Health Promotion and Behavioral Sciences Interest, Public Health Study Program carries the theme "Education of Sweetened Beverage Levels in Packages (MBDK) for Mothers in Pattalassang Village". This community service activity was carried out for mothers participating in the Integrated Health Post (Posyandu) in Bontolembang Hamlet, Pattalassang Village. The activity was attended by 50 mothers who were participants in the Posyandu (see Figure 1).



Figure 1. Educational Activity Process on SSB

Table 1 illustrates the characteristics of the respondents, the majority of whom were housewives (90.6%) with the last education of SMA (46.9%) and had 0-2 children (71.9%). Husband's education was generally equivalent to senior high school (34.4%), with the most occupations as laborers (43.8%). Most families had a monthly income between 1-3 million rupiah (68.8%), and the majority provided pocket money (71.9%).

The stages of community service activities, education, began with participants registering, followed by filling out a pre-test questionnaire for education and demonstration of sweetened beverage levels in packages (MBDK) for mothers in Pattalassang Village to measure the initial knowledge possessed by the participants. After that, it was continued with the provision of material using the lecture method. The media used were powerpoint slides containing material about MBDK including definitions, types of MBDK, permissible levels, and dangers/impacts of MBDK. After the presentation of the material, it was continued with a discussion session with the education participants

and filling out a post-test questionnaire to measure the level of knowledge about MBDK after the intervention was given.

**Table 1. Respondent Characteristics**

Characteristics	n	%
Education		
Graduated from Elementary School	4	12.5
Graduated from Junior High School	10	31.3
Graduated from Senior High School	15	46.9
Graduated from Undergraduate Degree	2	6.3
Graduated from Post-graduate Degree	1	3.1
Respondent's Occupation		
Housewife	29	90.6
Self-employed	1	3.1
Nurse	1	3.1
Teacher	1	3.1
Number of children		
0-2 kids	13	71.9
3-5 kids	9	28.1
Husband's education		
Graduated from Elementary School	8	25.0
Graduated from Junior High School	11	34.4
Graduated from Senior High School	11	34.4
Graduated from Undergraduate Degree	1	3.1
Graduated from Post-graduate Degree	1	3.1
Husband's occupation		
Labourer	14	43.8
Self-employed	6	18.7
Farmer	7	21.9
Teacher/Civil Servant	2	6.3
Employee	3	9.3
Family Income		
< 1 million	7	21.9
1-3 million	22	68.8
3-5 million	2	6.3
> 5 million	1	3.1
Giving pocket money		
Yes	23	71.9
No	9	28.1

Table 2 shows the improvement of respondents' knowledge on various aspects of SSBs after education. Before education, 81.3% of respondents had a correct understanding of the definition of SSBs, which increased to 93.75% after education. Knowledge about the types of SSBs increased from 37.5% to 93.75%, while awareness regarding the amount of sugar consumption allowed for children rose from 43.8% to 78.13%. All respondents (100%) understood the risks of SSBs after education, up from 87.5% before. Knowledge of the amount of sugar consumption for adults increased from 46.9% to 56.25%, while understanding of the daily sugar consumption limit increased from 31.3% to 62.5%. In addition, understanding of the definition of added sugar increased from 68.8% to 78.13%, knowledge of the sugar content in SSBs rose from 50% to 93.75%, and understanding of the amount of water that needs to be consumed per day increased from 59.4% to 84.38%. Lastly, knowledge on limiting consumption of sugar, salt, and fat increased from 28.1% to 84.38%. Overall, the education was effective in improving respondents' knowledge of sugar consumption and the associated health risks.

Table 3 shows the results of community service showed that there was an increase in the knowledge of mothers in Pattalassang Village before and after counseling on MBDK, with a p value =

0.008 (Thome et al., 2022; , Widiawaty, 2023; , Alwin, 2023; , Irwan & Risnah, 2021; , Farindra, 2023). This increase in knowledge is expected to encourage changes in community behavior in consuming MBDK wisely (Amiruddin et al., 2022; , Widiawaty, 2023; , Irwan & Risnah, 2021; , Fathonah et al., 2023).

**Table 2.** Respondent's Knowledge Before and After Education

Knowledge	Before Education						After Education					
	True		False		Dpn't know		True		False		Don't know	
	n	%	n	%	n	%	n	%	n	%	n	%
Definition of SSB	26	81.3	3	9.4	3	9.4	30	93,75	2	6,25	0	0
Types of SSB	12	37.5	13	40.6	7	21.9	30	93,75	1	3,13	1	3,125
The amount of sugar consumption permitted for children	14	43.8	9	28.1	9	28.1	25	78,13	5	15,6	2	6,25
SSB risk	28	87.5	3	9.4	1	3.1	32	100	0	0	0	0
The amount of sugar consumption permitted for adults	15	46.9	9	28.1	8	25.0	18	56,25	9	28,1	3	9,375
The amount of sugar consumption allowed in a day	10	31.3	15	46.9	7	21.9	20	62,5	10	31,3	2	6,25
Definition of added sugar	22	68.8	6	18.8	4	12.5	25	78,13	5	15,6	2	6,25
Sugar content in SSB	16	50.0	9	28.1	7	21.9	30	93,75	2	6,25	0	0
The amount of water you need to consume in a day	19	59.4	8	25.0	5	15.6	27	84,38	5	15,6	0	0
Restriction of sugar, salt and fat consumption	9	28.1	19	59.4	4	12.5	27	84,38	5	15,6	0	0

The effect of sugar-sweetened packaged foods is a multifaceted issue that encompasses health implications, dietary patterns, and public health policies aimed at reducing sugar consumption. The consumption of sugar-sweetened beverages (SSBs) and foods high in added sugars has been linked to various adverse health outcomes, including obesity, type 2 diabetes, and dental caries. The World Health Organization (WHO) has emphasized the need to reduce sugar intake, particularly among children, to mitigate these risks (Muth et al., 2019). The prevalence of sugar-sweetened foods in the diet, especially among vulnerable populations, underscores the urgency for effective public health interventions (Muth et al., 2019).

Research indicates that repeated exposure to sweet tastes can influence subsequent consumption patterns. For instance, Appleton's study suggests that initial consumption of sugar-sweetened beverages may lead to a temporary reduction in the intake of other sweet foods, indicating a potential regulatory mechanism in sugar consumption (Appleton, 2021). However, this finding is nuanced, as it raises questions about whether this reduction is due to a balancing act of sugar intake or merely a response to the sweetness itself. This complexity is further compounded by the high energy content of SSBs, which can contribute to excessive caloric intake and subsequent weight gain (Liu et al., 2023; Livingstone et al., 2021).

**Table 3.** The Influence of Education on Knowledge

Aspect	Before aducation	After education	P-Value
	Mean±SD	Mean±SD	
Knowledge	5.28±1.88	6.4±1.29	0.008*

The marketing and availability of sugar-sweetened packaged foods also play a significant role in consumption patterns. In Australia, for example, regulations require that packaged foods marketed to infants be labeled if they contain added sugars, reflecting a growing awareness of the need to inform consumers about sugar content (Martin-Kerry et al., 2020). However, the voluntary nature of health rating systems may lead to inconsistencies in labeling, potentially allowing products high in added sugars to evade scrutiny (Russell et al., 2021). This inconsistency can perpetuate consumer confusion regarding the healthfulness of these products, particularly among parents of young children who may misinterpret marketing claims (Fleming-Milici et al., 2022; Harris & Pomeranz, 2021).

Moreover, the trend towards reformulating products to reduce sugar content is gaining traction, driven by public health initiatives and consumer demand for healthier options. The substitution of added sugars with non-nutritive sweeteners (NNS) is one strategy being employed to maintain sweetness while reducing caloric intake (Russell et al., 2022; Russell et al., 2020). However, this shift raises questions about the long-term health implications of NNS consumption, as well as the potential for consumers to misinterpret these products as healthier alternatives (Moore & Fielding, 2022; Lee et al., 2023).

Research consistently demonstrates that diets high in free sugars, particularly from sugar-sweetened beverages (SSBs), are associated with increased obesity risk. Livingstone et al. highlight that energy-dense dietary patterns characterized by high free sugar and saturated fat intake correlate with a higher likelihood of obesity among young adults Livingstone et al. (2021). Similarly, studies indicate that the consumption of SSBs is a major contributor to weight gain and obesity, particularly in children and adolescents (Megally & Al-Jawaldeh, 2020; Falbe et al., 2019). The high caloric content of these beverages, combined with their low satiety value, leads to increased overall energy intake, which is a primary driver of obesity (Razzaque, 2020; Salgado et al., 2020).

Effective public health policies are essential in curbing sugar consumption. Implementing "sin taxes" on sugar-sweetened beverages has shown promise in reducing consumption volumes. For instance, research in Saudi Arabia indicates that such taxes can significantly decrease the intake of sugary drinks, thereby addressing rising obesity rates among children (Megally & Al-Jawaldeh, 2020). Additionally, fiscal policies aimed at reducing the affordability of SSBs can be part of a comprehensive strategy to combat obesity (Ferretti & Mariani, 2019). These measures not only discourage excessive consumption but also encourage manufacturers to reformulate products to lower sugar content.

Public health education plays a vital role in changing dietary behaviors. Campaigns that inform consumers about the health risks associated with high sugar intake, such as obesity, type 2 diabetes, and cardiovascular diseases, can empower individuals to make healthier choices (Razzaque, 2020; Moore & Fielding, 2022). Community-based initiatives, such as promoting access to healthier food options and providing nutrition education in schools, can also help reduce sugar consumption among vulnerable populations (Bobade & Ozoh, 2022; Nguyen et al., 2022). For example, the implementation of school policies that limit the availability of sugary snacks and beverages can significantly impact students' dietary habits and overall health (Russell et al., 2022; Russell et al., 2020).

While reducing sugar intake is crucial, the use of non-nutritive sweeteners (NNS) as substitutes for sugar has become a popular strategy for managing caloric intake. However, the effectiveness of NNS in preventing obesity remains debated. Some studies suggest that while NNS can help reduce caloric intake, their long-term impact on weight management and metabolic health is still unclear (Kullmann, 2021; Han, 2023). Moreover, reliance on NNS may not address the underlying preferences for sweetness, which can perpetuate unhealthy eating patterns (Epstein et al., 2023; Pang et al., 2021).

The role of mothers in Islam cannot be separated from their responsibility to provide nutritious food for their families. Mothers as the main pillars in the family, play an important role in maintaining the health and well-being of family members through the selection and provision of healthy and nutritious food (Alam and Karini, 2020). Islam teaches the importance of maintaining body health as a mandate from Allah, and one way is to consume halal and good food (*halalan thayyiban*).

## CONCLUSION

The community service activities conducted in Pattallassang Village have successfully improved mothers' knowledge about the consumption of Sugar-Sweetened Beverages (SSBs) and their associated health risks. The educational intervention, which included lectures, demonstrations, and discussions, resulted in a significant increase in respondents' understanding of key concepts such as the definition, types, permissible sugar consumption levels, and health risks of SSBs. The most notable improvements were observed in the awareness of daily sugar consumption limits, sugar content in SSBs, and the importance of restricting sugar, salt, and fat intake.

To sustain and expand the impact of this initiative, it is recommended that regular educational sessions be conducted at local health posts (Posyandu) and community centers, targeting not only mothers but also adolescents and other family members. These sessions should emphasize practical strategies for reducing SSB consumption, interpreting nutrition labels, and choosing healthier alternatives. Future activities should also include hands-on workshops and interactive demonstrations to reinforce learning. Additionally, collaboration with community leaders and health workers is essential to promote long-term behavioral changes and foster a culture of healthy eating habits within the community. Monitoring and evaluating the long-term effects of these interventions will help assess their effectiveness and guide improvements for future initiatives.

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