Soft Drink Consumption Pattern and Diabetes Mellitus Knowledge Level in Adolescents

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O R I G I N A L A R T I C L E

ABSTRACT

Diabetes mellitus (DM) is a disease that develops due to impaired insulin production or function, which causes blood sugar levels to exceed normal limits. Adolescents are very vulnerable to DM because of their low level of DM knowledge and excessive soft drink consumption patterns. The aim of this research is to describe soft drink consumption patterns and the level of DM knowledge among adolescents in Medan Johor District. This research design with a quantitative approach involving 114 teenagers in the Medan Johor area as respondents. Data is collected through a questionnaire that has been validated by experts and for efficiency, the questionnaire is distributed via Google Form. The results of this study show that the majority of respondents (82 teenagers, 71.9%) consume soft drinks 1-2 times/week. The majority of respondents in this study showed a very good knowledge (70 teenagers, 61.4%). This research concludes that teenagers in Medan Johor have very good knowledge regarding DM and consume soft drinks in moderate amounts. It is recommended that future studies examine the effectiveness of educational interventions in reducing soft drink consumption and increasing diabetes knowledge among adolescents.

Keywords: Diabetes Mellitus, Soft Drinks, Teenager.

ABSTRAK

Diabetes mellitus (DM) adalah penyakit yang berkembang akibat gangguan produksi atau fungsi insulin, yang menyebabkan kadar gula darah melebihi batas normal, remaja sangat rentan terhadap DM karena tingkat pengetahuan DM yang rendah dan pola konsumsi *softdrink* yang berlebihan. Tujuan dari penelitian ini untuk mendeskripsikan pola konsumsi *soft drink* dan tingkat pengetahuan DM pada remaja di Kecamatan Medan Johor. Penilitian ini menggunakan desain penilitian deskriptif dengan pendekatan kuantitatif yang melibatkan 114 remaja di wilayah Medan Johor sebagai responden. Data dikumpulkan melalui kuesioner yang telah divalidasi oleh ahli dan untuk efisiensi, kuisioner disebarkan melalui Gogle Form. Hasil penelitian ini menunjukan bahwa sebagian besar responden (82 remaja, 71,9%) mengonsumsi *Soft drink* 1-2 kali/minggu. Mayoritas responden dalam penelitian ini menunjukkan tingkat pengetahuan diabetes sangat baik (70 remaja, 61,4%). Kesimpulan penelitian ini adalah remaja di Medan Johor memiliki pengetahuan yang sangat baik terkait DM dan mengkonsumsi *softdrink* masih dalam jumlah yang tidak berlebihan. Disarankan penelitian selanjutnya meneliti tentang efektivitas intervensi edukasi dalam mengurangi konsumsi minuman ringan dan meningkatkan pengetahuan diabetes di kalangan remaja.

Kata Kunci: Diabetes Melitus, Soft Drink, Remaja.

INTRODUCTION

Diabetes mellitus (DM) is a disease that develops due to impaired insulin production or function, which causes blood sugar levels to exceed normal limits. This disease is a major concern because of its wide impact, including the increasing incidence in adolescents, especially related to unhealthy food and beverage consumption patterns (Kinivaldy et al. 2023). A report issued by the International Diabetes Federation shows that worldwide there are 536.6 million people with Diabetes Mellitus (DM) in the age range of 20 to 79 years, and about 6.7 million people die from this disease. Globally, Southeast Asia ranks third in the number of DM sufferers, and Indonesia ranks seventh as the country with the most sufferers. Other countries that occupy this rank are China, India, the United States, Pakistan, Brazil, and Mexico (Sanjaya & Setiawan, 2024). Risk factors for diabetes mellitus (DM) are divided into two categories. The first category consists of unchangeable factors, such as age, gender, race, family history of DM, and ethnicity. The second category consists of factors that can be changed, such as overweight, lack of physical activity, history of hypertension, dyslipidemia, and an unbalanced diet or not paying attention to healthy food intake, especially foods that are high in calories (Asriati & Juniasty, 2023).

Diabetes not only occurs in adults but also in adolescents. A 2017 report from the International Diabetes Federation (IDF) states that diabetes in children and adolescents in the United States in 2015 was estimated at 7.2% of the total child and adolescent age population. About 132,000 children under 18 and 193,000 children under 20 had diabetes. In the United Kingdom, the incidence of type 2 diabetes in children aged 17 years or older was recorded at 0.72 per 100,000 children in the period 2015-2016. In Australia, the incidence of type 2 diabetes in children under 17 years was recorded at 2 per 100,000 children per year, In the UK, the incidence of type 2 diabetes in children aged 17 years or older was recorded at 0.72 per 100,000 children in the period 2015-2016. In Australia, the incidence of type 2 diabetes in children under 17 years was recorded at 2 per 100,000 children per year, with an average increase of 27% from 1990 to 2002 (Riskawaty, 2022). Data shows that there are 159,014 people in Indonesia who have diabetes mellitus based on a doctor's diagnosis in the age group of 15 to 24 years (Qifti, et al. 2020).

The World Health Organization (WHO) says adolescents are people aged 10 to 20 years and not married. In contrast, the National Population and Family Planning Agency (BKKBN) says adolescents are people aged 10 to 24 years (Leonardo et al. 2021). The irregular lifestyle that adolescents have today has the potential to increase the risk of developing diabetes in the future. Soft drink consumption patterns are one of the factors that can increase the likelihood of developing diabetes in adolescents. Soft drinks are non-alcoholic beverages that are usually added with natural or synthetic ingredients and packaged in bottles. Many drinks are high in simple carbohydrates, such as glucose, fructose, and sucrose, along with other types of sugar, which can be harmful to health, especially in children (Kamisna et al. 2023). Every year, soft drink consumption in Indonesia continues to increase, ranking third largest in the world after mineral water, with 48.57%. The group that most frequently consumes these drinks is adolescents aged 15 to 20 years, especially soft drinks and isotonic drinks (Tarigan, 2023).

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Teenagers often follow the trend of consuming fast food and drinks. The risk of developing diabetes mellitus increases if they consume these types of foods more frequently.

In addition, an unhealthy lifestyle and lack of physical activity in adolescents can increase the likelihood of suffering from prediabetes and weight gain. Especially for adolescents, technological advances and easy access today allow them to do various activities without the need to move much (Asriati & Juniasty, 2023).

It is very important to understand diabetes mellitus management because it can affect a person's level of health and lifestyle, especially in terms of prevention, detection, and treatment of diabetes mellitus (Ramadhani, 2019). Knowledge, or the cognitive component, plays a very important role in shaping a person's behavior. A person's future attitudes and decisions can be influenced by the knowledge they have. The fact that adolescents do not know about diabetes mellitus can lead to increased mortality and disability, which makes diabetes management more difficult (Fabroyanti et al. 2024). The purpose of this study was to describe the consumption patterns of soft drinks and the level of knowledge of diabetes mellitus in adolescents in Medan Johor sub-district.

RESEARCH METHODS.

This research method uses a quantitative approach with a descriptive design to analyze soft drink consumption patterns and the level of knowledge about diabetes mellitus among adolescents in Medan Johor Sub-district. This study involved 114 adolescents as respondents selected through simple random sampling technique to ensure appropriate representation of the population. The variables studied included soft drink consumption patterns as the independent variable and the level of knowledge about diabetes mellitus as the dependent variable. Data collection was conducted through a questionnaire via google form which was divided into two parts: the first part contained questions about Soft drink consumption patterns, while the second part contained questions about the respondents' level of knowledge regarding diabetes mellitus. The data obtained will be analyzed descriptively using descriptive statistics, such as percentages and averages, to describe Soft drink consumption patterns and the level of knowledge of adolescents about diabetes mellitus.

RESULTS

Table 1. Frequency Distribution of Age and Gender of Adolescents in Medan Johor Sub-district

Variable	Frequency	Percentage (%)
Age		
11-14	11	9,6
15-18	37	32,5
19-23	66	57,9
Total	114	100
Gender		
Male	12	10,5
female	102	89,5
Total	114	100

Table 1 above, from a total of 114 respondents studied, it is known that 9.6% were 11-14 years old, 32.5% were 15-18 years old, while 57.9% were between 19-23 years old. Based on gender characteristics, there are more women than men. The number of male respondents was 10.5% while the number of female respondents was 89.5%.

Table 2. Soft Drink Favorability Level

| Favorability Level	Frequency	Percentage (%)
Dislike	2	1,8
Ordinary	39	34,2
Like	50	43,9
Liked Very Much	23	20,1
Total	114	100

Table 2 above, from a total of 114 respondents studied, it is known that 34.2% stated that they liked it and 20.1% stated that they really liked it, this shows that more than half of the respondents showed that soft drinks were quite popular among them, as many as 34.2% were

ordinary which showed a nertral attitude that might consume Soft drinks occasionally, while 1.8% did not like Soft drinks.

**Table 2.** Soft Drink Consumption Rate in a Week

Consumption Level	Frequency	Percentage (%)
1-2 times/week	82	71,9
3-4 times/week	20	17,6
5-6 times/week	3	2,6
Every day	9	7,9
Total	114	100%

Table 3 above, from a total of 114 respondents studied, most showed a relatively low frequency of Soft drink consumption patterns. A total of 71.9% of respondents consume Soft drinks only 1-2 times per week, which indicates that Soft drinks are consumed as occasional drinks at certain times, but not regularly. A total of 17.6% of respondents consume Soft drinks 3-4 times per week, which indicates that they consume Soft drinks more often, although still in the moderate category. Only 2.6% of respondents consume Soft drinks 5-6 times per week, and another 7.9% consume them every day.
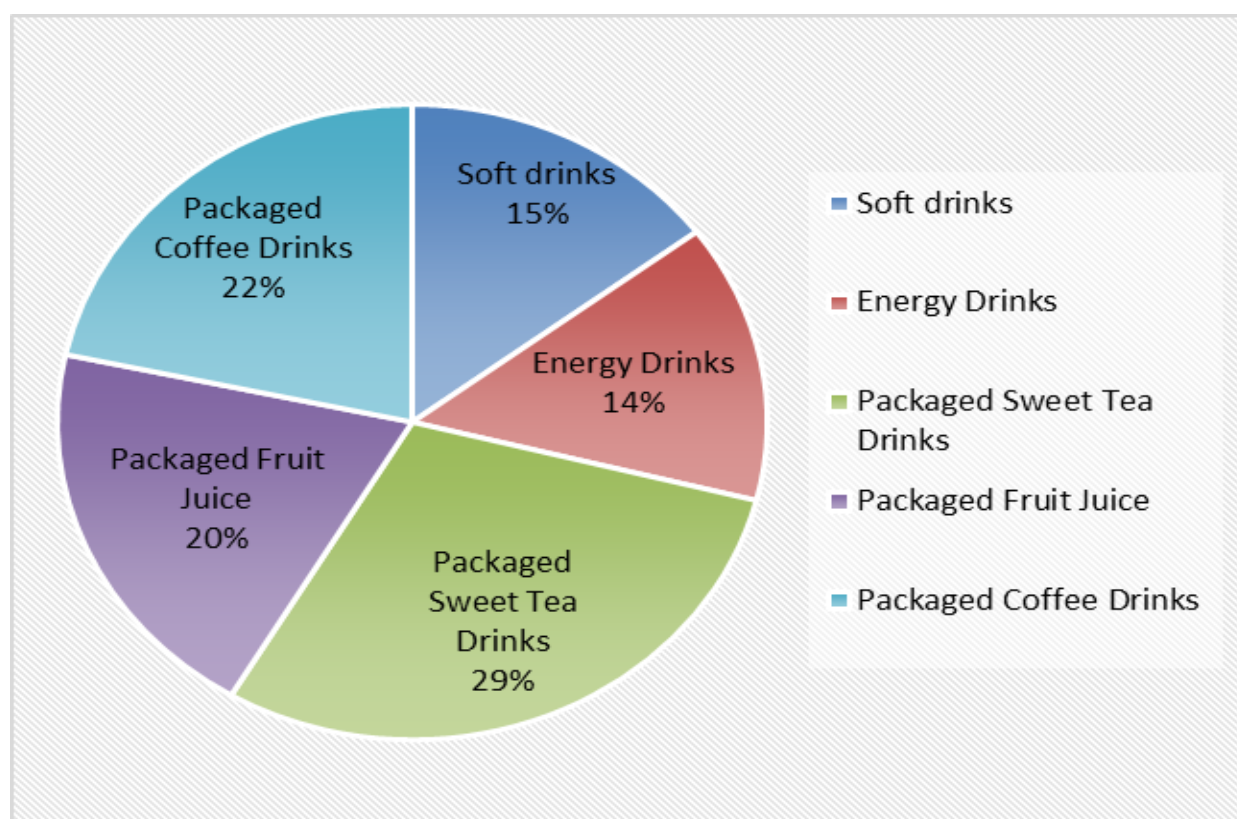

Diagram 1. Types of Soft Drinks that are Often Consumed

Diagram 1 shows that teenagers in medan johor sub-district have a variety of Soft drink choices that they prefer, the types of Soft drinks they often consume are packaged sweet tea drinks which are the top favorite with consumption reaching 29%, followed by packaged coffee drinks which are popular with a percentage of 22%. Packaged fruit juices are also popular with 20%, while soft drinks and energy drinks are consumed by 15% and 14% of them respectively. These drinks not only provide freshness, but are also part of the lifestyle of young people.
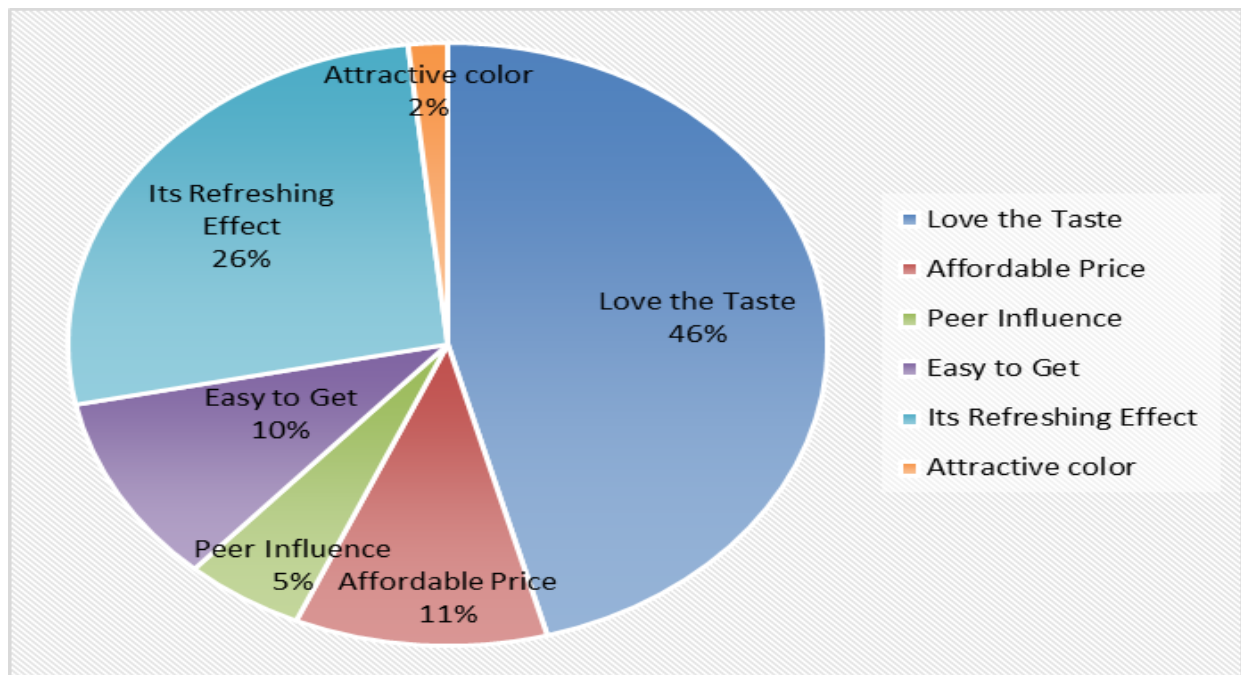
Diagram 2. Reasons for Consuming Soft Drinks

Based on the results of teenagers in medan johor sub-district, the reason for consuming Soft drink is because it tastes good (46%) and the effect is refreshing (26%), so it makes the body feel fresh. In addition, Soft drinks are easily available in many places (10%) and the price is also affordable (11%), so it is fitting to be enjoyed at any time. Although only a small proportion, peer influence (5%) and the attractive color of these drinks (2%) also add to the attractiveness of Soft drinks for teenagers.
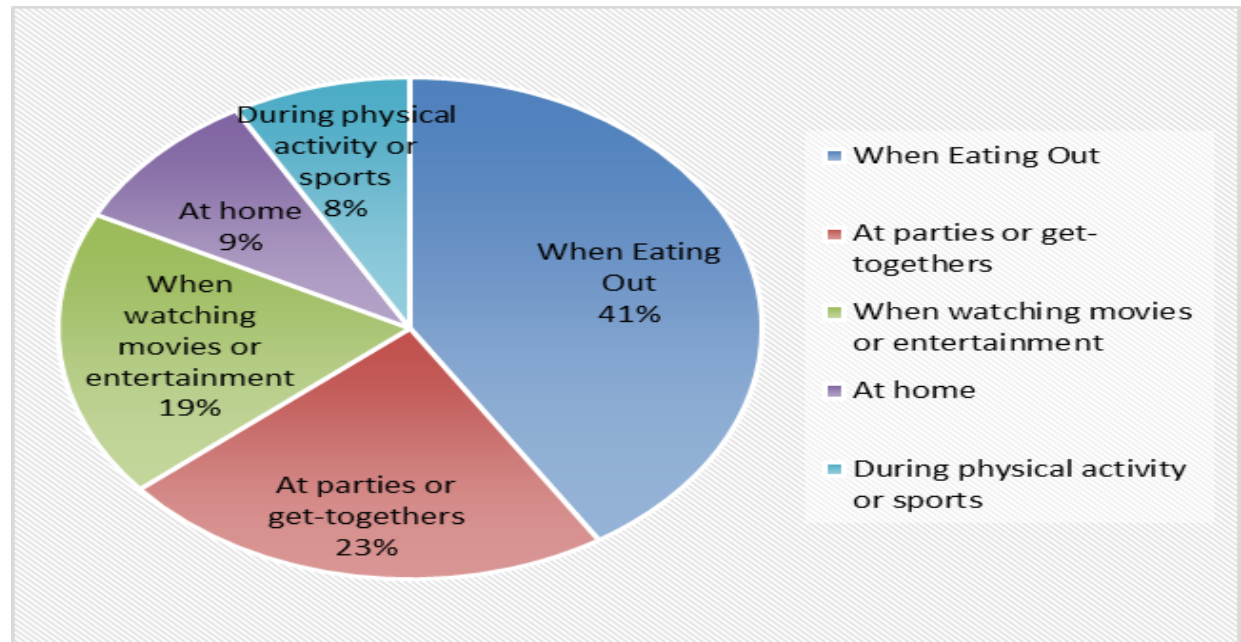
Diagram 3. What Occasions Consume Soft Drinks Most Often

Based on the results of teenagers in medan johor sub-district, the habit of consuming Soft drinks tends to be highest when eating out, which is 41%, followed by when attending parties or get-togethers with friends and family as much as 23%. Meanwhile, as many as 19% of people enjoy Soft drinks while watching movies or entertainment, and only 9% choose to drink Soft drinks at home. Finally, Soft drink consumption during physical activity or exercise is

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the lowest, at 8%. Overall, Soft drinks are a popular choice for a variety of occasions. From dining out to parties and entertainment, these drinks are always there to add fun to every moment. However, it is important to keep an eye on the sugar consumption in Soft drinks to keep it healthy and balanced in our lifestyle.
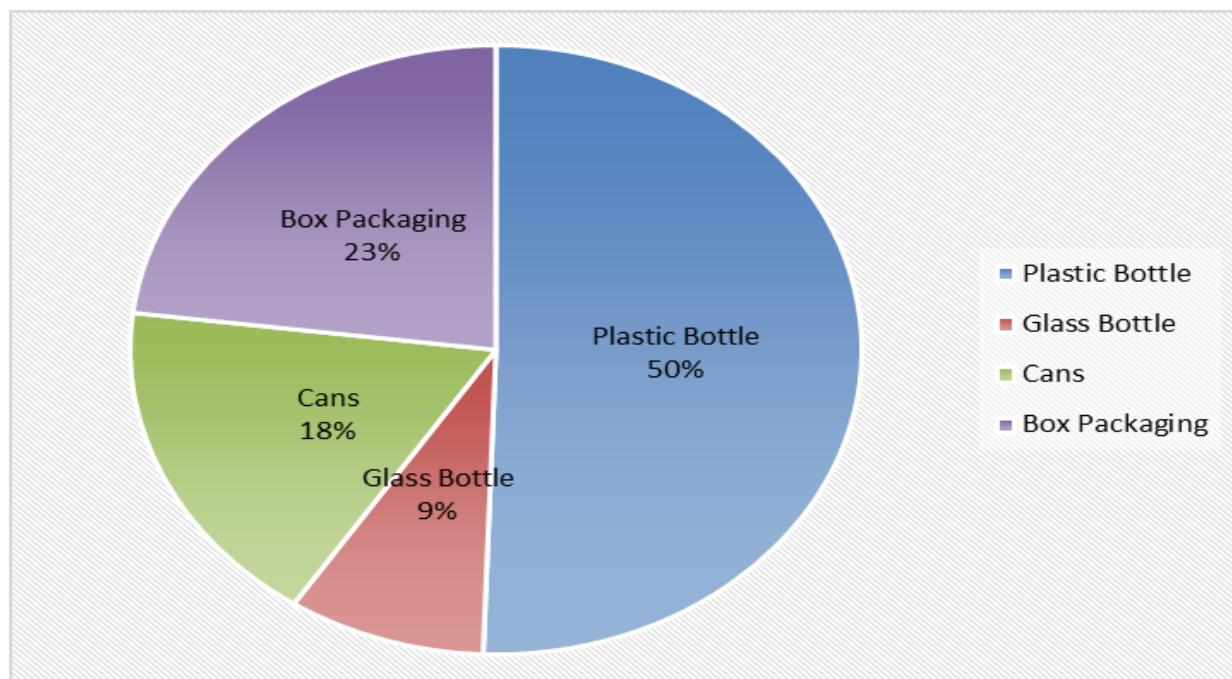
Diagram 4. Normally Consumed Packaging Forms

Based on the results, teenagers tend to prefer soft drinks in various packages that are practical and easy to carry around. Plastic bottle packaging is the top favorite, with 50% of teens preferring this type because it is lightweight and can be drunk on the go. Boxed packs are also quite popular, at around 23%, as they are compact and often easier to store in a bag. Canned packaging ranks third with 18%, giving it a modern and practical feel. Glass bottles, while only favored by 9% of teens, are still popular because they look more premium and elegant. This variety of packaging options makes it easy for teens to customize according to their style and needs in enjoying Soft drinks.

Table 3. Level of Knowledge about Diabetes Mellitus

Value	Categories	Frequency	Percentage (%)
<3	Bad	4	3,5
3-5	Less Good	11	9,6
6-7	Good	29	25,5
8-10	Very Good	70	61,4
Total		114	100

Table 4 shows that the knowledge of respondents that a score of less than three is bad as much as (3.5%) this indicates the need for increased education and understanding of DM. The value of 3-5 is not good as many as (9.6%) respondents in this category have inadequate knowledge about DM. Scores 6-7 are good as many as (25.5%) of these respondents have good knowledge about DM. Scores 8-10 are very good as many as (61.4%) they understand very good knowledge about DM.

DISCUSSION

Today's teenagers lead busy and dynamic lifestyles, leading to drastic changes in their eating and drinking habits. The increasing popularity of artificially sweetened beverages, such as sodas, energy drinks and other packaged sweets, is one of the most notable trends. While these drinks are easily accessible and pleasant in taste, they have the potential to cause major

health problems, especially for adolescents who are in their developmental years. Consuming artificially sweetened beverages is not only a common habit, but it is often considered part of the lifestyle. Adolescents tend to ignore information about the adverse effects of excessive sugar consumption because they are easily influenced by peers and attention-grabbing advertisements (Susanti et al. 2024).

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In this study, most respondents consumed soft drinks with a frequency that was classified as good, namely 82 respondents (71.9%) who consumed soft drinks only 1-2 times per week. However, there were 9 respondents (7.9%) who fell into the bad category for consuming soft drinks every day. soft drinks are carbonated drinks given flavorings and sweeteners, such as sugar. Sugary drinks are carbonated drinks that are given sugar as a sweetener, and non-sugar soft drinks are carbonated drinks that do not contain sugar (Aringaneng et al. 2020). Deficiency of essential minerals in the body can be caused by the high phosphate content in soft drinks. These mineral deficiencies can lead to heart disease (due to magnesium deficiency) and osteoporosis (due to calcium deficiency), among other health conditions. Several factors, such as adolescents' level of knowledge, peer influence, easy access, and the influence of soft drink advertisements, often influence adolescents' soft drink consumption behavior (Yuningrum et al. 2021).

For a single drink, at least one can of fizzy drinks contains at least 9 to 10 teaspoons of sugar. Humans only consume 3 to 4 teaspoons of sugar per day. According to the Ministry of Health, a 1.25 liter bottle of soda contains at least 33 teaspoons of sugar. Consuming soft drinks more than the recommended amount can cause health problems, namely obesity and lead to diabetes (Agung & Hansen, 2022).

In addition to consumption patterns, knowledge also plays an important role in shaping behavior, because knowledge is the basis for forming a person's perception or attitude. This attitude then becomes the basis for individuals in making decisions and determining actions, which ultimately develop into behavior (Fitriani et al., 2022). Knowledge is the result of understanding that a person gains through learning and experience, which helps him solve problems or adapt to situations. The more knowledge you have, the greater your influence on your attitude and behavior when facing problems (Maysaroh et al. 2022).

According to this study, most respondents understood diabetes well. Overall, 70 respondents (61.4%) had very good knowledge, while 4 respondents (3.5%) had poor knowledge. Diabetes is a long-term condition that occurs when the body cannot produce or use insulin properly, leading to increased levels of glucose in the blood. Information from family and friends, formal education, and mass media are some of the sources that can be used to gain this knowledge (Cantika et al. 2024).

The higher the level of education required, the faster information is absorbed and understood. One of the causes of the high prevalence of diseases, including diabetes, is a lack of knowledge and education. Knowledge is essential for behavior, including diabetes prevention. To prevent diabetes, people should know what diabetes is, its signs and symptoms, its risk factors, and how to prevent the disease from occurring. Health promotion can include the utilization of environmental factors that support a clean and healthy lifestyle and community health education (Silalahi, 2019).

Education provides an understanding that applies to the actions of each individual. However, some studies have different conclusions and say that education has no effect on a person's knowledge. A person with a high level of education does not necessarily have extensive knowledge, and vice versa. This shows that not all highly educated people are aware and concerned about their health problems. Factors that influence this include busy activities

that lead to unhealthy lifestyle changes, especially related to eating habits and physical activity (Aristia et al. 2024).

CONCLUSION

This research concludes that teenagers in Medan Johor have very good knowledge regarding DM and consume soft drinks in moderate amounts. It is recommended that future studies examine the effectiveness of educational interventions in reducing soft drink consumption and increasing diabetes knowledge among adolescents.

REFERENCES

Agung, S. Q., & Hansen. (2022). Studi Konsumsi Junk Food Dan Soft Drink Sebagai Penyebab Terjadinya Diabetes Melitus Tipe 2 Pada Remaja. *Borneo Student Research, 3*(2), 1774-1782.

Aringaneng, Z., A.Laya, A., & Riu, S. D. (2020). Hubungan Pola Konsumsi Softdrink Dengan Kejadian DM Tipe 2 Pada Lansia di Puskesmas Wawonasa. *Jurnal Kesehatan Amanah, 4*(2), 134-141. https://doi.org/10.57214/jka.v4i2.196

Aristia, B. F., P, A. R., Intan, F., & K, Y. D. (2024). Hubungan Pengetahuan Diabetes Melitus Dan Pengetahuan Asupan Gizi Pada Remaja Di Smk X Sidoarjo. *Jurnal Riset Kefarmasian Indonesia, 6*(3), 422-436. https://doi.org/10.33759/jrki.v6i3.486

Asriati, & Juniasty, H. T. (2023). Analisis Perilaku Konsumsi Makanan Dan Minuman Manis Terhadap Prediabetes Remaja Di Kota Jayapura. *PREVENTIF: Jurnal Kesehatan Masyarakat, 14*(3), 495-511. https://doi.org/10.22487/preventif.v14i3.970

Cantika, A. P., Yuvi, A., Nugroho, B. H., & Handayani, D. T. (2024). Pengaruh Pola Hidup Mahasiswa Fakultas Bahasa Dan Seni UNNES Terhadap Risiko Diabetes Miletus. *Jurnal Analis, 3*(2), 206-221.

Fabriyanti, A., Mardalena, I., Noamperani, S. R., & Laasara, N. (2024). Pengaruh Media Pop-Up Digital "Srikandi" Terhadaptingkat Pengetahuan Pada Remaja Berisiko Diabetes Mellitus Di Turi Yogyakarta Indonesia. *Jurnal Ilmiah Keperawatan Indonesia, 7*(2), 217-228. https://dx.doi.org/10.31000/jiki.v7i2.12118

Fitriani, N. S., Wurjanto, A., Kusariana, N., & Yuliawati, S. (2022). Hubungan Tingkat Pengetahuan Dan Pengaruh Media Sosial Dengan Perilaku Konsumsi Makanan Berisiko Diabetes Melitus Pada Mahasiswauniversitas Diponegoro. *Jurnal Epidemiologi Kesehatan Komunitas, 7*(1), 404-410. https://doi.org/10.14710/jekk.13308

Hesti Yuningrum, H. T. (2021). Faktor Risiko Penyakit Tidak Menular (PTM) Pada Remaja:Studi Kasus Pada SMA Negeri Dan Swasta Di Kota Yogyakarta. *Jurnal Formil (Forum Ilmiah) Kesmas R, 6*(1), 41-50. https://doi.org/10.35842/formil.v6i1.343

Kamisna, S., Hajrina, Ezida, R. N., & Muslem. (2023). Tingkat Konsumsi Minuman Ringan (Soft Drink) Dan Sosialisasi Pola Minum Sehat Bagi Kesehatan Anak Di Desa Lamcot Kabupaten Aceh Besar. *Jurnal Riset Dan Pengabdian Masyarakat, 3*(2), 239-246.

Kinivaldy, A. L., Wiryanthini, I. A., Sutadarma, I. W., & Surudarma, I. W. (2023). Tingkat Pengetahuan, Sikap, Dan Perilaku Mahasiswa PSSK FK Unud Angkatan 2021 Terhadap Pola Makan Sebagai Faktor Risiko Diabetes Melitus Tipe 2. *Intisari Sains Medis, 14*(1), 249-253.

Leonardo, C., & Dase, D. C. (2021). Gambaran Status Gizi Dan Aktivitas Fisik Remaja Selama Pandemi COVID-19. *Jurnal Keperawatan Muhamdiyah, 6*(4), 79-84. https://doi.org/10.30651/jkm.v6i4.9621

Maysaroh, U., Ariestiningsih, E. S., & Has, D. F. (2022). Hubungan Pola Konsumsi Buah Dan Pengetahuan Diet Dengan Kadar Glukosa Darah Pada Penderita Diabetes Mellitus Di Puskesmas Manyar. *Ghidza Media Journal, 4*(1), 1-14. http://dx.doi.org/10.30587/ghidzamediajurnal.v4i1.4698

Qifti, F., Malini, H., & Yetti, H. (2020). Karakteristik Remaja SMA Dengan Faktor Risiko Diabetes Melitus Di Kota Padang. *Jurnal Ilmiah Universitas Batanghari Jambi, 20*(2), 560-563. http://dx.doi.org/10.33087/jiubj.v20i2.950

Ramadhani, W. S. (2019). Hubungan Pengetahuan Diet Dan Motivasi Diri Dengan Kepatuhan Diet Pada Remaja Penyandang Diabetes Melitus Di Surabaya. *E-Journal Tata Boga, 8*(2), 251-257.

Riskawaty, H. M. (2022). Penyuluhan Kesehatan: Identifikasi Resiko Diabetes Melitus Pada Remaja Di Sma 8 Kota Mataram Nusa Tenggara Barat Tahun 2022. *LENTERA (Jurnal Pengabdian), 2*(1), 185-192.

Sanjaya, L. R., & Setiawan, Y. (2024). Faktor Risiko Diabetes Melitus Tipe-II Pada Remaja. *Citra Delima Scientific Journal Of Citra Internasional Institute, 8*(1), 66-73. https://doi.org/10.33862/citradelima.v8i1.395

Silalahi, L. (2019). Hubungan Pengetahuan Dan Tindakan Pencegahan Diabetes Mellitus Tipe 2. *Jurnal Promkes: The Indonesian Journal Of Health Promotion Ad Health Education, 7*(2), 223-232.

Susanti, N., Saragih, I. A., Sikumbang, E. S., & Faiza, M. (2024). Hubungan Antara Konsumsi Minuman Manis Buatan Dan Faktor Risiko Penyakit Diabetes Pada Remaja Di Mts Swasta Alwasliyah Pancur Batu. *PREPOTIF : Jurnal Kesehatan Masyarakat, 8*(2), 3457-3462. https://doi.org/10.31004/prepotif.v8i2.30683

Tarigan, N. (2023). Konsumsi Air Putih Dan Minuman Manis, Soft Drink/Minuman Berkarbonasi, Minuman Berenergi, Mie Nstan Dan Makanan Olahan Pada Remaja. *Jurnal Ilmiah Pannmed (Pharmacyst, Analyst, Nurse, Nutrition, Midwivery, Environment, Dental Hygiene), 18*(1), 28-36.

Yuningrum, H., Trisnowat, H., & Rosdewi, N. N. (2021). Faktor Risiko Penyakit Tidak Menular (PTM) Pada Remaja:Studi Kasus Pada SMA Negeri Dan Swasta Di Kota Yogyakarta. *Jurnal Formil (Forum Ilmiah) Kesmas Respat, 6*(1), 41-50. https://doi.org/10.35842/formil.v6i1.343