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Abstract

Background: Urbanization and economic development in Myanmar have brought about culture and dietary transition from a traditional to a westernized diet. The health of the nation, especially the youth, may influence the changing dietary patterns: i.e., the higher the soft drink consumption, the higher the prevalence of soft drink-related diseases.

Methods: This cross-sectional study was carried out among 250 middle school students in North Okkalarpa Township, Yangon Region. Data were collected using self-structured questionnaires, and respondents were selected by using simple random sampling method.

Results: In this study, 81.2% of the students consumed soft drink once a day, and the main reasons were taste, preference, and availability at home. Chi-square test showed significant relationship between gender and soft drink consumption patterns ($p = 0.005$), and a strong significant relationship was observed between education level and soft drink consumption patterns ($p = 0.000$). However, Kruskal-Wallis statistics showed significant relationship between education level and soft drink consumption habit ($p = 0.003$).

Conclusions: This study focused on the knowledge regarding soft drink, habits, and consumption patterns among students. This study highlighted that knowledge of preventive measures of non-communicable diseases since school age can also reduce the disease burden of Myanmar.

Keywords: middle school students, non-communicable diseases, soft drink consumption

INTRODUCTION

Soft drinks are a source of hydration and become increasingly popular in summer seasons, more readily available at home and school food stand, and often advertised through bill boards or Internet.¹ Although soft drinks, which are also known as health drinks, provide nutrition for growing children,² many studies have indicated that the large amount of calories in sweetened soft drinks can lead to tooth decay and overweight and is a major contributor to obesity and diabetes.^{2,3} In many middle-income countries, teenagers have transitioned swiftly from being underweight to being overweight. These factors influenced the increase in the intake of energy-dense foods, which lead to weight gain and poor life-long health outcomes.⁴

Taste is conveyed to be a main factor in the decision by school children to choose soft drinks over other beverages. The school is the most dominant location for the child after home,⁵ and schools play a prominent role in the education of children at an early age.⁶ Previously, at a state in Myanmar, school canteens only sold traditional Myanmar drinks, such as

tamarind, plum, and saykalamae juices. These drinks were natural, do not contain artificial coloring, and thus safe for consumption. However, many popular drinks are created and advertised currently, and students were more interested in new brand of soft drinks, which may be associated with the development of non-communicable diseases (NCDs).

Many adult health problems, such as obesity and hypertension, have originated from unhealthy dietary habits during childhood.⁷ The Global School-based Student Health Survey (GSHS) 2013 indicated that Myanmar is one of the eight ASEAN countries with prevalence of overweight or obesity.⁸ By contrast, 2016 Myanmar GSHS demonstrated the prevalence of unhealthy behaviors, such as unhealthy dietary habits including eating junk foods (46%) and drinking carbonated soft drinks (45%).⁹ Other studies have shown a positive relationship between soft drink consumption and increase rate of overweight and NCDs.¹⁰ Thus, Myanmar's public health decision-makers face the greatest challenges on what is the best way to explicate these burdens.¹¹

Another study showed that weekly consumption of soft drinks among children varied from 16.9% to 29.0%.¹² In another study, many people consumed various types of drinks without knowledge of the harmful effects of soft drink consumption.¹³ By contrast, many studies on soft drink intake were carried out in other countries, but

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research of soft drink consumption in Myanmar is limited. Moreover, as a long-term NCD prevention, health education is a priority in school age population, and school nurses play a major role in counseling for many health problems.¹⁴ Therefore, this study aimed to assess patterns of soft drink consumption among middle school students in North Okkalarpa Township.

METHODS

This study was approved by the Research and Ethics Committee of the University of Nursing, Yangon. Approval was obtained from the respective authorities from the study area prior to commencing the study. As the respondents were students aged <18 years, informed consent was obtained from their guardians. Before signing the consent form, contents of the information sheet and consent form were fully explained to the guardians. The information sheet and consent form were prepared in both English and Myanmar language for ease of understanding. Study commenced after obtaining permission from the guardian and verbal consent from the respondents. Numerical codes were used to substitute the names of the respondents to maintain confidentiality and anonymity.

The cross-sectional study, which was conducted to describe soft drink consumption patterns among middle school students in North Okkalarpa Township, Yangon Region, was carried out from May 2018 to October 2018. Cochran's formula with 95% confidence interval was applied for sample size calculation and was determined by a proportional estimation of soft drink consumption among adolescents based on the data of Ratnayake and Ekanayake (2012), who conducted a similar study in Sri Lanka and found an overall soft drink consumption rate of 82%.¹⁵

The inclusion criteria were as follows: students who presented at data collection day, students in grades 5–8, and students who volunteered to participate with permission of their guardians. A total of 250 respondents were collected by using simple random sampling method.

A self-structured questionnaire was developed and used in the study. Research questionnaires were based on the Sugar Intake for Adult and Children Guideline from the World Health Organization,¹⁶ other relevant studies on soft drink consumption, and other related studies.^{2,7} The instrument has a total of 38 items, divided into four parts: sociodemographic characteristics, patterns of soft drink consumption, knowledge regarding soft drink, and soft drink consumption habits. As content validity is the second most important criterion for evaluating a quantitative instrument,¹⁷ the content validity of this instrument was confirmed by five experts who were well experienced in public health, school health and nutrition,

and community health nursing. In this study, the overall scale of the content validity index was 0.98.

The pretesting questionnaire was administered in 30 middle school students from Tharkayta Township, Yangon Region, to test the clarity and reliability of the instrument. The reliability of the instrument (Cronbach's alpha coefficient) to test the knowledge regarding soft drink consumption and soft drink consumption habit was tested using SPSS version 20.0 (IBM Corp., Armonk, NY, USA). Thereafter, the questionnaire was modified based on the pretesting results. For data collection, the weight and height of the respondents were measured first. Then, in a private room, data were collected from each student with the help of the class teacher. Face-to-face interview method was employed, and each respondent was given 20–30 min to answer all questions.

The completed data were entered, processed, and analyzed with SPSS version 20.0.¹⁸ In this study, descriptive and inferential statistics were used. Descriptive analysis involved the frequency and percentage of sociodemographic data, soft drink consumption patterns, and soft drink consumption habits. Moreover, correct response to knowledge regarding soft drink consumption was scored 1, and incorrect response and "don't know" response was not given a score. According to the total score of knowledge assessment, knowledge level was categorized in two groups. In the inferential statistics, chi-square test was conducted to describe the association of sociodemographic characteristics with consumption patterns, knowledge level with sociodemographic characteristics, and knowledge level with consumption patterns. Furthermore, the Kruskal–Wallis test was used to find the association of sociodemographic characteristics with soft drink consumption habits. In this study, $p < 0.05$ was determined as significant.¹⁹

RESULTS

Table 1 shows the sociodemographic characteristics of the middle school students (age range, 10–14 years). This age group was predominantly composed of 13-year-old students (30.4%). Overall, 135 (54%) female students participated in the study, and 88 (35.2%) of the respondents were grade 7 students. As regards the body mass index (BMI), 170 (68%) students were underweight. Most of the guardians were working as a company or private staff ($n = 62$, 24.8%). When respondents were asked about the source of information regarding soft drink, majority (36.4%) learned about them from television or radio.

Table 1 also shows the soft drink consumption patterns of middle school students. As regards the consumption patterns, 142 (56.8%) middle school students consumed soft drink once a day, while 17 students (6.8%) never

consumed any type of soft drink. In terms of the amount of soft drink, 203 (81.2%) students drank a small bottle of soft drink each time and 219 (87.6%) students consumed 2–5 small bottles per week. Moreover, 217 (83.6%) students consumed soft drinks advertised on television. On the assessment of personal factors, 177 (70.8%) students drank soft drink by choice and 54 (21.6%) were influenced by friends. As regards accessibility, 129 (51.6%) respondents drank soft drink near their house. In this study, 181 (72.4%) students had high level and 69 (27.6%) had low level of knowledge regarding soft drink. According to the median score, low knowledge score had (<7) marks and high knowledge score had (≥ 7) marks.

Table 2 presents the association of gender with consumption patterns of middle school students. The consumption patterns comprised frequency of consumption, amount of soft drink with each consumption, and amount of soft drink consumed per week. In this study, gender was not associated with the frequency of soft drink consumption. By contrast, both male (73.9%) and female (87.4%) students consumed a small bottle (<340 ml) each time. Chi-square test showed an association between the amount of soft drink consumed each time and gender ($p = 0.005$). Moreover, 94.8% of the female students consumed 2–5 small bottles of soft drink per week, compared with 79.1% of male students, and the chi-square statistics also showed a strong association between the amount of soft drink per week and gender ($p = 0.000$).

As shown in Table 3, the mean rank of grade 8 (149.68) students was higher than the remaining grades. The Kruskal–Wallis statistics also showed significant difference in the education level ($p = 0.003$). Therefore, soft drink consumption habit was found to be associated with the education level of the students.

TABLE 1. Sociodemographic characteristics and soft drink consumption patterns of middle school students (N = 250)

Variables	Number of respondents	Percentage (%)
Age (years old)		
10	38	15.2
11	50	20.0
12	74	29.6
13	76	30.4
14	12	4.8
Gender		
Male	115	45.0
Female	135	54.0
Education Level		
Grade 5	48	19.2
Grade 6	65	26.0
Grade 7	88	35.2
Grade 8	49	19.6

Table 1 continues.

Variables	Number of respondents	Percentage (%)
Body Mass Index		
Underweight	170	68.0
Normal	70	28.0
Overweight	10	4.0
Guardian's Occupation		
Own business	62	24.8
Company or private staff	70	28.0
Government staff	38	15.2
Daily wager	44	17.6
Dependent	36	14.4
Source of information regarding soft drink		
Television	91	36.4
Internet	21	8.4
Magazine	17	6.8
Family	47	18.8
Health talk	74	29.6
Frequency consumed		
One time per day	142	56.8
More than 1 time per day	23	9.2
2 to 4 times per week	61	24.4
More than 5 times per week	7	2.8
Never	17	6.8
Amount of soft drink per one time		
Small bottle (< 340 ml)	203	81.2
Large bottle (> 340 ml)	40	16.0
More than 500 ml	7	2.8
Amount of soft drink per week		
2–5 Small bottle	219	87.6
2–5 Large bottle	31	12.4
Internal factor relating soft drink		
Feeling thirsty	67	26.8
Hungry	12	4.8
Like taste	148	59.2
Without reason	23	9.2
Advertisement relating soft drink		
On billboard, pamphlets, or poster	33	13.2
On television	217	86.8
Personal factor relating soft drink		
Family members	19	7.6
Friends	54	21.6
Own choice	177	70.8
Accessibility to soft drink		
Near school	74	29.6
On the way to school	29	11.6
At home	18	7.2
Near home	129	51.6
Knowledge Level regarding soft drink		
High level (Score ≥ 7)	181	72.4
Low level (Score <7)	69	27.6

TABLE 2. Association of gender with the consumption patterns of middle school students (N = 250)

Consumption patterns	Gender (Frequency (%))	
	Male	Female
Frequency consumed		
One time per day	70 (49.3)	72 (50.7)
More than 1 time per week	37 (40.7)	54 (59.3)
Never	8 (47.1)	9 (52.9)
Amount of soft drink per one time		
Small bottle (< 340ml)	85 (73.9)	118 (87.4)
Large bottle (> 340ml)	30 (26.1)	17 (12.6)
Amount of soft drink per week		
2-5 Small bottle	91 (79.1)	128 (94.8)
2-5 Large bottle	24 (20.9)	7 (5.2)

TABLE 3. Association between soft drink consumption habit and education level of middle school students (N = 250)

Grades	N	Mean rank
Grade 5	48	95.92
Grade 6	65	129.22
Grade 7	88	125.43
Grade 8	49	149.68

DISCUSSION

This study investigated soft drink consumption patterns of middle school students, considering the sociodemographic characteristics, including age, sex, education level, BMI, occupation of guardians, and information regarding soft drink consumption. In the 10–14 years age group, 13-year-old students were predominant. This result is nearly similar to the results of a previous study of 9–12-year-old students, which was conducted to determine the association of beverage intake among children and parent home-related factors.²⁰ As regards gender, over half of the respondents (54%) were female, while 48% were male, and this concurred with the finding of a study conducted in South Africa, describing soft drink consumption patterns among grade 11 and 12 students, in which 56.8% and 43.2% of the respondents were female and male, respectively.² At present, as various types of soft drink are accessible everywhere and every time in Myanmar, soft drink intake had increased in all age groups and in both men and women.

As regards the BMI, this study used the CDC guideline for BMI range (2014).²¹ Moreover, WHO described that while <1% of children and adolescents aged 5–19 years were obese in 1975, more than 124 million children and adolescents were obese in 2016.²² Although among children and adolescents aged 10–19 years in Yangon 7.6% of both sexes were obese,²³ students with underweight status (68%) were predominant in the

present study. In addition, this finding did not agree with the results of a previous study, in which 25.5% of the children were overweight, 36.5% of the participants were obese, 62% of the Kuwaiti children were obese.⁷ Nearly all respondents were underweight; therefore, it can be assumed that BMI did not depend on the consumption of soft drinks. Considering the occupation status of the guardians, fathers of most students were working as company or private staff. In Myanmar, many school children were reared by guardians and only given pocket money. Moreover, parents’ income was considered one of the factors that affect students’ habit of consuming soft drinks. Moreover, in this study, the main source of information regarding soft drink was the television. Nowadays, advertising on television is a more popular means of interaction among adolescent, and advertisements directly affected children’s food consumption.

In this study, more than half of the respondents (56.8%) consumed soft drink once a day, and this finding was nearly similar to that of another study in which 40% of the university students from Saudi Arabia consumed sweetened beverage.²⁴ As regards the amount of soft drink consumption, we assumed that nearly all students consumed a small bottle of soft drink once a day and once a week. In a previous study, 12% of the respondents agreed to buy an advertised soft drink.² In the present study, 86.8% of the students consumed soft drink because it was advertised on television. Moreover, television is the main source of knowledge regarding soft drink, which may indicate that the students spend their leisure time in watching television. In addition, accessibility of soft drink was one of the factors that affect soft drink consumption. In the present study, 58.8% of the respondents have readily available soft drink at home and 41.2% can easily them buy at school. In another study conducted in the United States, 50% of middle school students consumed soft drink available at school.²⁵ School is the second place for adolescents, and various types of soft drink are easily available around the school.²⁶ Another issue is that there is a high supply of soft drink in school, so students tend to consume more soft drinks.

Moreover, the instrument contains 13 items about knowledge level of students. Education was categorized into two groups according to the median score of the students: 27.6% of the students had low level and 72.4% had high level of knowledge on soft drink. This result was similar to that of a previous study of Nigerian Institution undergraduates, showing that 86.7% of the students had adequate knowledge, while 13.3% had inadequate knowledge on the health implication of excessive intake of sweetened beverage.²⁷ In a study of 273 junior high school students in Ghana, only 22.2% had no knowledge of soft drinks.²⁸ In the present study, nearly all students can answer the questionnaires correctly. Nowadays, as

technology and social media have become more advanced, the students can get health knowledge through social media.

In the analysis of the association of sociodemographic characteristics with soft drink consumption patterns, the chi-square test showed that gender was associated with the amount of soft drink with each consumption. In this study, 87.4% of the female students had consumed soft drink. However, another study revealed that boys had significantly higher sweetened beverage consumption, with 504 ml at each time.²⁹ By contrast, gender was found to be strongly associated with the amount of soft drink consumed per week. Although more female students participated in the study, 20.9% of the male students consumed large amounts of soft drink compared with 5.2% of female students. In addition, 59.3% of the female students consumed soft drink more than one time per week, but no association was found. The result did not correspond to results of other studies, showing that nearly 82% of Sri Lankan adolescents consumed soft drinks more than one time per week and that gender was associated with the frequency of consumption.¹⁵

The analysis of the association of sociodemographic characteristics with soft drink consumption habits, we found that the habits of students and patterns of taking soft drink became part of their activities of daily living. In this study, grade 8 students significantly consumed more soft drink than other grades. The Kruskal–Wallis statistics also showed that a soft drink consumption habit was significantly associated with the education level of the students. In Myanmar, the basic education system has three levels: primary, middle, and high level. In this study, all respondents were middle school students. The respondents were divided into four grade levels, who have various consumption habits. Compared with other countries, although the age range was similar, the grade levels were quite different.^{30–32} Besides, only a few studies have investigated the association of soft drink consumption habits with education level.

This study has some limitations. First, this study only included representative students from the only basic middle school in a township in Myanmar. Second, a self-structured questionnaire was developed and used in this study, and soft drink-related research was limited. Thus, it was difficult to compare the present results with those of other studies. Third, two individuals measured the height and body weight of the students, so errors may have occurred on the BMI measurement. Moreover, this study had a cross-sectional design. Only the association of consumption patterns, knowledge, and habits regarding soft drink consumption was revealed in this study.

CONCLUSIONS

This study evaluated the sociodemographic characteristics, soft drink consumption patterns, knowledge regarding soft drink, and consumption habits among students attending basic education middle schools at North Okkalarpa Township. This study found not only descriptive data but also inferential statistics. Nowadays, in any age and gender, consumption patterns of soft drink have increased. Many environmental factors, such as nearness of the house, exposure to advertisement of soft drinks, and media development were the main causes of increased soft drink consumption. The students consumed soft drink unaware of the risk factors of regular intake of soft drink. Therefore, the school is the most appropriate place to promote health throughout life. Finally, this study highlighted not only knowledge regarding soft drink consumption also described that knowledge of preventive measures for NCDs since school age can also reduce the disease burden of Myanmar.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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