SUGAR CRAVINGS AND ADDED SUGAR INTAKE AMONG BREASTFEEDING WOMEN IN KUANTAN, PAHANG

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ABSTRACT

Introduction: Previous studies have shown a positive association between craving for sweets and actual sweet food intake. Women reported more episodes of food craving compared to men, especially during pre-menstruation and pregnancy. However, studies on sugar craving and added sugar intake among breastfeeding women are limited. This study aimed to assess this among breastfeeding and non-breastfeeding women in Kuantan, Pahang. **Methods:** This cross-sectional study included participants aged 18-45 years, free of any chronic diseases, with BMI between 18.5 and 29.9kg/m^2, through convenience sampling. The respondents rated their craving for 30 sweet foods and beverages using the Sugar Craving Assessment Tool for Malaysians (MySCAT) questionnaire. Their total sugar intake was estimated using 24-hour diet recall and FFQ for sugar. **Results:** Seventy-one subjects completed the study. This comprised of 46 non-breastfeeding and 25 breastfeeding women aged 27.1±6.7 years with a total MySCAT score of 37.4±16.0. The most craved items were sugar-sweetened beverages (SSBs) (mean score 2.2±1.3), cake varieties (2.0 ±1.1), and chocolate (2.0±1.2). The findings demonstrated that mean sugar intake for non-breastfeeding and breastfeeding women were 34.4±22.1g/day and 39.7±22.3g/day, respectively. The average percentage of sugar intake in this study was within the World Health Organization's recommendation for adults but higher than the American Heart Association's recommendation for women ($P<0.001$). There was no significant difference between added sugar intake and sugar craving among breastfeeding and non-breastfeeding women. Besides, there was also no significant

correlation between added sugar intake and sugar craving scores in this study. **Conclusions:** Sugar-sweetened beverages were the most craved food item among the respondents, regardless of the breastfeeding status. Breastfeeding practice was also not associated with craving for sweet items. Despite that, the findings support the need for additional efforts toward educating women of reproductive age to minimize foods and beverages high in added sugar while promoting more nutrient-dense options.

KEYWORDS: Breastfeeding, Sugar cravings, Sugar intake, Added sugars

INTRODUCTION

Sugar is a form of carbohydrate which is found in many foods. It is also known for its sweet taste, which gives pleasures and addictive sensation when eating and can provide energy about four calories per gram. Simple sugars, which are glucose, fructose, and galactose, are also known as monosaccharides. They bond with each other and themselves to make more complex carbohydrates.

According to the Malaysian Adult Nutrition Survey (MANS) 2003, an average adult in Malaysia consumed seven teaspoons of sugar a day comprising of table sugar and sweetened condensed milk that is usually added to beverages such as tea, coffee, and chocolate-based drinks (Norimah et al., 2008). According to the most recent National Health Morbidity Survey (NMHS) findings (2019), 53.2% of Malaysians took sugar from self-prepared drinks daily (Institute for Public Health 2020). It included sugar, sweetened condensed milk, or sweetened creamer added in the coffee, tea, chocolate, or malted beverages. The median intake of energy among women in Malaysia was 1490.7 kcal/day, and 51% was contributed from carbohydrates (Lee & Wan Muda, 2019).

Excessive sugar intake notably added sugar in food and beverages, poses serious public health threats by increasing the risk of non-communicable diseases (NCDs) such as obesity and type 2 diabetes (Mojto et al., 2019). Based on NHMS 2019, about half of Malaysian adults were overweight or obese, with 54.7% were female. The national prevalence of obesity was the highest among the ASEAN countries. It also in line with the increasing consumption of added sugar and fat. In both adults and children, the World Health Organization (WHO) (2015) strongly recommends limiting free sugar intake (including hidden sugar to less than 10% of total energy intake or not exceeding ten teaspoons a day (50g). Besides, the American Heart Association (AHA) recommends that intake of added sugars should not exceed five teaspoons per day for women and about seven teaspoons per day for men (Sofia et al., 2016).

Food craving is known as an intense desire for specific foods, but not necessarily because of hunger. Foods high in both sugar and fat are frequently related to food cravings. Some studies also demonstrated that sugar craving positively correlates with the intake of sugary foods and drinks (Chao et al., 2015; Wan Fathin Fariza & Nik Mazlan, 2017). Women mainly report more food craving episodes than men, especially during pre-menstruation and pregnancy (Romm et al., 2010; Weingarten & Elston, 1990). It may increase the added sugar consumption and contribute to extra caloric intake, causing a positive energy balance, which leads to weight gain. It also may prevent postpartum weight loss during the breastfeeding period (Davis et al., 2017; Falivene et al., 2017). Despite all this, sugar craving during breastfeeding remains relatively understudied. Therefore, this research aimed to highlight the prevalence of sugar craving and added sugar intake among breastfeeding women compared to non-breastfeeding women in the area of Kuantan, Pahang.

METHODS

Subjects

This study involved 25 breastfeeding and 46 non-breastfeeding women in Kuantan, Pahang, aged between 18 to 45 years old, with body mass index (BMI) between 18.6 and 29.9 kg/m2, and was free from diabetes, gestational diabetes, and any chronic diseases. Informed consent was obtained from the volunteers. The protocol of the study was approved by the International Islamic University Malaysia Research Ethics Committee (IREC).

Research Instruments

Demographic Data

The questionnaire asked for demographic information of the subject, including age, self-reported weight and height, working status, marital status, and current health condition.

Sugar Craving Assessment Tool (MySCAT)

The status of sugar craving was assessed using the MySCAT questionnaire. The MySCAT is a tool that has been developed and validated to assess the sugar craving level in the diabetic adult population (Ali et al., 2019). It has a list of 30 common Malaysian sweet foods and beverages according to the Malaysian Dietary Guidelines. It ranges from the traditional *kuih* (with condiment); pancakes; 3 in 1 instant drinks; soft drinks; drinks with sweetened condensed milk; flavored milk; canned fruits; energy bars; *agar-agar*; *air batu campur* (ABCs); biscuits; popcorn with caramel; bun with fillings; cakes and muffin; candy and sweets; bananas dumpling; chocolate or flavored chocolates; *dodol*; donuts; fruit juices; ice-cream; egg jam (*kaya*);

fruit jam; traditional sweets (*kuih*). The subjects would rate the items from the scale 'Never' to 'Always/ Almost Every Day'.

24-hr diet recall and self-constructed FFQ for added sugars

The total added sugar intake was assessed using the 24-hour diet recall technique which included a 'quick list', a detailed description of food and beverage consumed, and a 'review'. The subjects were asked to recall all the foods and beverages they consumed within the past 24 hours. Besides, a self-constructed FFQ for added sugar intake was used along with diet recall.

Statistical Analysis

The data of this study were analyzed using SPSS for windows version 21.0. Descriptive analyses were performed to determine the percentage, mean and standard deviations (SD) of the demographic data and total craving scores and the score of each item on SCAT. An independent sample t-test was carried out to compare the differences between breastfeeding and non-breastfeeding women. Spearman correlation was used to determine the association between sugar craving score and total sugar intake. All p-values were two-sided and considered to be statistically different if less than 0.05.

RESULTS

Respondents' Background

The total 71 respondents, 64.8% (n=46) subjects were non-breastfeeding, while 35.2% (n=25) were breastfeeding with mean ages 27.1 ± 6.7 years. Table 1 presents the distribution of subjects according to BMI, ethnicity, working status, marital status, and age groups. Out of 71 subjects, 77.5% fall under the normal BMI category, while the remaining (22.5%) were overweight. All the non-breastfeeding mothers were married (n=25) and 64% aged between 26 to 35 years old (n=16) as compared to the non-breastfeeding women, in which 87.0% were single (n=40) and 82.6% aged between 18 to 25 years (n=38).

Table I Demographic characteristics of the respondents (n=71)

Respondent profile	Breastfeeding (n=25) n (%)	Non-Breastfeeding (n=46) n (%)	Total (n=71) n (%)
BMI			
18.5-24.9	18 (72.0)	37 (80.4)	55 (77.5)
25.0-29.9	7 (28.0)	9 (19.6)	16 (22.5)
Ethnicity			
Malay	25 (100.0)	46 (100.0)	71 (100.0)
Working Status			
Not working or student	7 (28.0)	37 (80.4)	44 (62.0)
Working	18 (72.0)	9 (19.6)	27 (38.0)
Marital Status			
Single	0 (0.0)	40 (87.0)	40 (56.3)
Married	25 (100.0)	5 (10.9)	30 (43.3)
Divorced	0 (0.0)	1 (2.2)	1(1.4)
Age group			
18-25	1 (4.0)	38 (82.6)	39 (54.9)
26-35	16 (64.0)	5 (10.9)	21 (29.6)
36-45	8 (32.0)	3 (6.5)	11 (15.5)

Total added sugar intake among breastfeeding and non-breastfeeding women

For the added sugar intake, the mean intake of added sugar from the 71 subjects was 36.3 ± 22.1 g/day while the range of added sugar intake among the subjects was between 3.4 and 106.9 g/day as shown in Table 2. The mean sugar intake for non-breastfeeding and breastfeeding women was 34.4 ± 22.1 g/day and 39.7 ± 22.3 g/day, respectively. There was also no significant difference between the average added sugar intakes of the breastfeeding and non-breastfeeding women.

Table 2 Descriptive information on total calories and added sugar intake among breastfeeding and non-breastfeeding women (n=71)

Variable	Non-Breastfeeding Women (n=46)	Breastfeeding Women (n=25)	Total (n=71)	RNI/WHO recommendations
	Mean ± SD	Mean ± SD	Mean ± SD	
Added sugar				
Grams/day	34.4 ± 22.05	39.7 ± 22.3	36.3 ± 22.1	50g/day
Kcal/day	137.6 ± 88.2	159.0 ± 89.0	145.1 ± 88.4	200kcal/day
%kcal/day	8.9 ± 6.0	9.9 ± 5.6	9.2 ± 5.8	Less than 10%

RNI – Recommended Nutrient Intakes; WHO – World Health Organization

Sugar cravings among breastfeeding and non-breastfeeding women

The mean total MySCAT score was 37.4 ± 16.0 among all subjects while the range of sugar craving score was 12 until 82. Figure 1 shows the number of respondents according to craving classes between breastfeeding (n=25) and non-breastfeeding mothers (n=46). There was no significant difference between the craving scores of breastfeeding and non-breastfeeding women (Table 3).

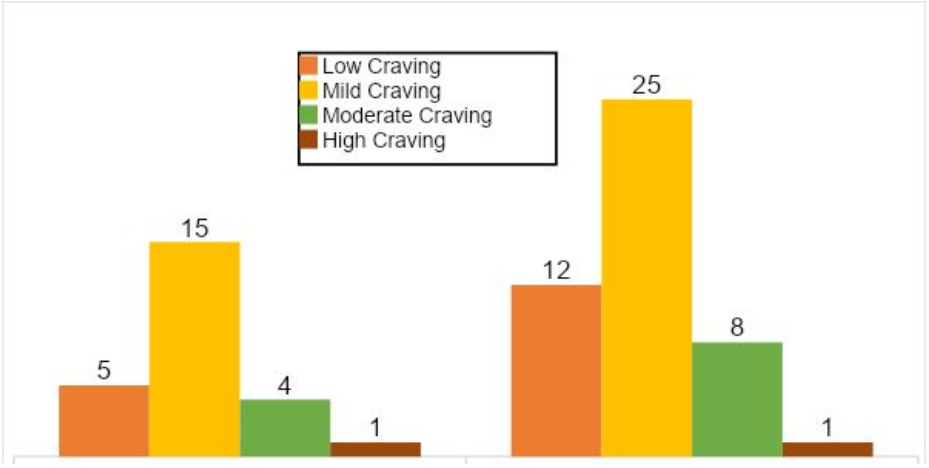

Figure 1 The number of respondents according to craving classes between breastfeeding (n=25) and non-breastfeeding mothers (n=46)

Table 3 Association between breastfeeding status with total sugar intake and craving score

	Breastfeeding women Mean ± SD	Non-breastfeeding women Mean ± SD	P-value*
Craving score	37.88 ± 15.95	37.17 ±16.16	0.860
Sugar intake (g)	39.74 ± 22.26	34.4 ± 22.05	0.334

*Independent sample T-test

The most craved item by breastfeeding and non-breastfeeding women was sugar-sweetened beverages with means and standard deviations of 2.4 ± 1.1 and 2.1 ± 1.4, respectively (Figure 2). For breastfeeding women, the second and third craved items were cakes and varieties (2.2 ± 1.1), and traditional *kuih* (2.0 ± 1.1). For non-breastfeeding women, the second and third craved items were chocolate (2.0 ± 1.1) and ice cream (2.0 ± 1.3).

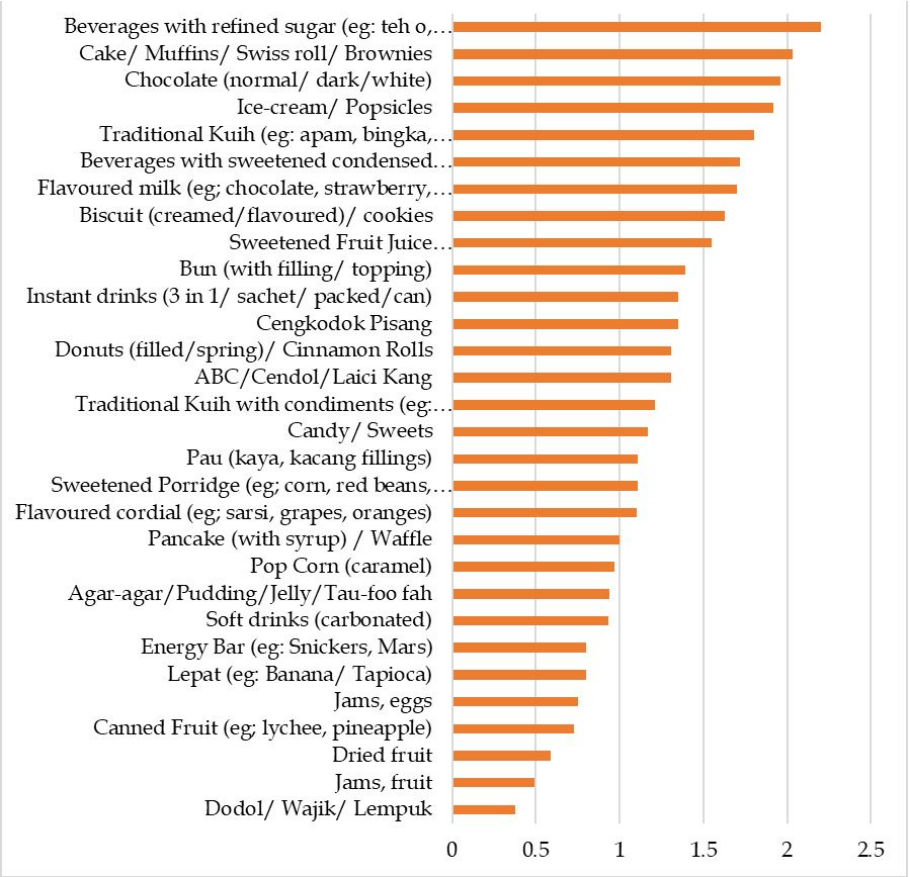

Figure 2 Mean sugar craving score according to food items among respondents (n=71)

Association between craving status and craving score

The relationship between the sugar craving and added sugar intake was investigated using the Spearman correlation coefficient. There was no significant correlation between sugar craving score and added sugar intake in this study (r=0.26, p value = 0.270).

DISCUSSION

Total added sugar intake

The recommendation of sugar intake differs among health organizations with an emphasis on limiting the intake. WHO (2015) and Malaysian Dietary Guidelines (2010) have suggested that a total daily intake of added sugar must not be more than 50g for every 2000 kcal per day or equivalent to ten teaspoons per day to reduce the risk of chronic diseases. The mean added sugar intake of the subjects in this study was 37g per day, which did not exceed the recommended value. Besides, the mean sugar intake of women in Kuantan, which the majority is Malay is slightly lower than another study on added sugar intake among adult's Malay women, which is

54.3g per day (Wan Fathin Fariza & Nik Mazlan, 2017). However, this recent finding reported a higher sugar intake than a more extensive sample study, approximately 28.5g per day (Lee & Muda, 2019). The added sugar intake in this study also higher than the recommendation by American Heart Association (AHA) for women, which is not more than one hundred kcal per day (or less than 25g per day).

There was also no significant difference in added sugar intake between breastfeeding and non-breastfeeding mothers. It might be influenced by other sociodemographic and behavioral factors including gender, age, education status, smoking status, and physical activity level, which have been associated with the level of added sugar intake (Adam & Epel, 2007; Park et al., 2016; Scherr et al., 2015). Individuals who were younger, less educated, less physically active, and had lower income were reported to have higher added sugar intake in their daily diet (Park et al., 2016). Despite the breastfeeding status, the inconsistent differences in the sociodemographic background may influence the intake of added sugar among these women in this study.

Sugar craving

The term 'sugar craving' is a consuming desire or longing for sweet foods and beverages (Yanovski, 2003). This study's most craved item (which is sugar-sweetened beverages) was consistent with a previous study on the sugar craving among Malay adults (Wan Fathin Fariza & Mazlan Mamat, 2017). However, the second and third most craved items (cake varieties and chocolates) were different from what Wan Fathin Fariza & Mazlan Mamat (2017) found: fruit juices and drinks with sweetened condensed milk. From the diet recall, the added sugar intake sources mostly came from sugar that was added in beverages such as coffee, tea, and premix drinks. Easy access and frequent consumption may be one reason sugary beverages became among the most craved items by the women. It agrees with Apolzan et al. (2017) study among 367 subjects that found a positive association between the frequency of people consuming precious items with sweet cravings.

There are limited studies on craving among breastfeeding mothers. However, available evidence showed that women tend to crave chocolate, sweet foods, and sweet drinks during PMS (Krishnan et al., 2016). Besides, many other factors may influence craving levels, which are hard to control, including stress, insufficient nutrients intake or dieting, and smoking (Chao et al., 2017; Breeland et al., 2016). This associated factor may contribute to the craving status among breastfeeding and non-breastfeeding women, which may influence the result, though this cannot be confirmed from the data available.

Association between sugar craving and added sugar intake

There was no significant correlation between added sugar intake and sugar craving scores in this study, unlike what has been reported in previous studies (Fariza & Mamat, 2017; Jayasinghe et al., 2017; Christensen, 2007). It may be due to the smaller sample size and the duration gap of taking mySCAT score and diet recall.

The data collection was conducted both online and in person. For the face-to-face method, all the data, including sociodemographic data, craving status, and 24-hr diet recall, were collected on the same day. However, for the online medium, the diet recall was usually conducted one or two days after the participants answered the online survey that consists of sociodemographic questions and the MySCAT questionnaire. It can be much longer when the participants were busy or less responsive. The longer duration gap between completing the mySCAT questionnaire and dietary intake assessment might cause their sugar craving to be not proportional to their sugar intake.

CONCLUSIONS

In conclusion, sugar-sweetened beverages are the most craved food item, among the current study's participants regardless of the breastfeeding status. Breastfeeding practice was also not associated with craving for sweets items while sugar craving did not associate with added sugar intake. Despite these, the findings of the current study also indicated that the added sugar intake among women, mostly from sugar-sweetened beverages, was still a public health concern. Thus, additional efforts are needed toward educating women of reproductive age to reduce the intake of foods and beverages high in added sugar while promoting more nutrient-dense options. Therefore, further research needs to be carried to fully understand the impact of a diet high in added sugar during breastfeeding on milk quality and its effect on the child.

ACKNOWLEDGEMENTS

The authors would like to thank all the individuals who have participated in this study.

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