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Milk Cereal Drink Feeding Practices: A Descriptive Study Among Swedish Children participating in the IDEFICS. Family Study

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Research

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ABSTRACT

Background: Childhood overweight is an increasing public health concern and has recently been associated with the consumption of a traditional Swedish milk cereal drink (MCD). This study aimed to describe the consumption pattern of MCD among study participants in relation to the recommendations by the National Food Agency of Sweden.

Method: A cross-sectional study among the Swedish cohort of the IDEFICS.Family (I.Family) study was conducted in 2013/2014. Swedish participants completed a questionnaire aimed at understanding the prevalence of consumption, timing, frequency, feeding modality and rationale for offering MCD.

Results: Most children (74.7%) reportedly consumed MCD. Of those who consumed MCD, a large part of the participants consumed MCD two or more times a day with a high proportion of participants (87%) stating a preference for bottle-feeding.

Conclusion: This study described the MCD feeding practices among participants. Our findings indicated that many children are offered MCD, or välling as it is known in Sweden, in a manner that does not align with the national guidelines, including bottle feeding when a bowl and spoon are recommended.

Keywords: Milk cereal drink, Obesity, Complementary food, Feeding practice, I. Family Study, Sweden.

1.INTRODUCTION

The burden of childhood overweight, including obesity, in the 21st century is alarming and presents a huge global health challenge that requires more attention and priority due to increased risk for adult obesity and other health conditions such as cardiovascular diseases and diabetes [1–3]. An overall increase in the prevalence of obesity and overweight among children has been observed in both developed and developing countries over the last three decades[4]. According to the World Health Organization, about 41 million children under five years of age were overweight or obese globally in 2016[4, 5]. Imbalance between calorie intake and calories required for growth has been identified as a major cause of childhood obesity[6] alongside other risk factors such as parental and gestational weight[7].

Several studies have shown that early infant nutrition and feeding practices can influence body weight in childhood and even during later life[8, 9]. For example, formula fed infants are more likely to gain more weight than their breastfed counterparts and this is known to be attributed to the higher energy, protein content and volume of consumption of a formula milk [9, 10]. A recent study conducted in Sweden did not find a significant relationship between formula feeding and increased BMI but did find that milk cereal drink use at 6 months was a risk factor for a high BMI at 12 and 18 months[11].

In Sweden, the prevalence of childhood obesity has increased by up to 3 folds in the last decades[12]. Results from the Halland Health and Growth study[11] and among the Swedish cohort of the "Identification and prevention of Dietary and lifestyle-induced health Effects In Children and infants (IDEFICS)"[13] found milk cereal drink (MCD), a typical Swedish food offered to children as a risk factor for increased BMI. A study conducted to examine the association between MCD and overweight revealed a positive association between MCD and childhood overweight, suggesting a 2-fold increase in risk for overweight at 5 years of age among children consuming MCD daily at 12 months[14]. In the same study, the prevalence of overweight (11.6%) and obesity (2.3%) among Swedish children were reported [14].

MCD is mostly purchased as a ready-made mix composed of dehydrated skimmed milk and grains to which only the addition of hot water is required[15]. The grain content may include wheat, oat, rice, corn or a blend of grains and the product is often fortified with iron and other micronutrients[16]. According to findings from the IDEFICS, MCD consumers were about 5 times more likely to be overweight than the non-consumers[13].

According to the National Food Agency in Sweden, introduction of small amounts of food containing gluten such as MCD made from gluten containing cereals such as wheat and barley[17] is recommended for children between 4-6 months old in order to reduce the risk of gluten intolerance. Further recommendations include introducing small food portions using a spoon rather than bottle feeding to avoid over consumption. After 6 months of age, the portion size of gluten containing foods can slowly be increased but never exceeding three portions a day to ensure a varied diet[16]. Breast milk or infant formula is the only recommended food for children less than 4 months of age[18].

Since research has found an association between increased weight status and MCD consumption[11, 13, 14], understanding the practices surrounding the consumption of MCD in Swedish children is therefore relevant. This study aimed to describe the consumption pattern of MCDs among study participants in relation to the recommendations by the National Food Agency in Sweden.

2. METHOD

2.1. Study Design

A cross-sectional study was conducted in 2013/2014 with participants of the Swedish IDEFICS.Family, or I.Family study in short, to assess MCD practice patterns. The IDEFICS study began in 2006 with the aim to investigate lifestyle and health in children from eight countries. At baseline, the Swedish cohort consisted of 1837 children. The I.Family study, a continuation of the IDEFICS study, investigated the determinants of food choice, lifestyle and health in European children, adolescents, and their parents. Families with children (n=522) aged between 2 to 10 years old at baseline from three municipalities of Västra Götaland province were asked to complete the MCD questionnaire. Further details about the study design and data collection process have been previously published[19].

2.2. Data Collection

An MCD questionnaire to understand the consumption pattern of MCD among children was administered to parents. Questions answered included age of MCD introduction, duration, mode of delivery, frequency, and rationale for MCD consumption. The MCD questionnaire was presented in Swedish and later translated into English for analysis.

Age at MCD introduction was given in whole months and categorized as either early introduction (<6months of age) or in line with recommendations of the Swedish Food Agency (> 6 months of age).

Duration of consumption was calculated by subtracting age at introduction from age at discontinuation and further classified as short duration (≤ 12 months) or long duration (≥13 months).

To determine frequency, respondents were asked to indicate servings per day or week. Parents were instructed to indicate all responses that applied to their child in regard to the time-of-day MCD was consumed. In addition to the traditional breakfast, lunch, and dinner, the Swedish culture incorporates a mealtime referred to as "kvällsmat" (supper). This is typically a snack eaten before bedtime. We also included between meals and night to indicate MCD consumption between two common mealtimes and at night in the MCD questionnaire. Parents indicated MCD delivery by bottle, mug, or bowl with a spoon and further specifying the regularity as always, often, sometimes, seldom, or never.

Parents were asked to state the reasons for consuming MCD from the following options: the child thinks it tastes good, so that the child will be full, so that the child will fall asleep, so that the child will calm down, so that the child will get enough nutrition, and other, in which open ended responses were accepted. Lastly, parents were asked to designate the type of MCD most often consumed by their child.

2.3. Data analysis

A total of 256 parents accepted to participate in the survey, giving a response rate of 49%. However, the responses of 19 participants were excluded during analysis due to incomplete information. Therefore, a total of 237 participants' responses were analyzed using IBM SPSS Statistics for Windows, Version 25 (IBM SPSS Statistics for Windows, IBM Corporation, Armonk, NY) and results summarized as percentages and presented in tables.

2.4. Ethical Consideration

This study was conducted as part of the I.Family study in Sweden and adhered to the ethical standards of the I.Family study which obtained its ethical approval from the Regional Ethics Committee of the University of Gothenburg Sweden with ethics number 927-12.

3. RESULTS

The findings in this study show that the majority 177 (74.7%) of children were reported to have consumed or were still consuming MCD. Among the 177 children who were reported to have consumed MCD, the median age at start of MCD consumption was 6 months, while the median age at which the children stopped consuming MCDs was 36 months. 55,4% of children who consumed MCD started consumption before 6 months while 44.6% started after 6 months of age.

The duration of MCD consumption among study participants ranged from 1 month to 139 months (11 years 7 months). Among participants who were reported to have consumed MCD, 80.8% consumed MCDs for longer than 12 months while a lower proportion 16.4% consumed MCDs for a period shorter than 12 months. However, 2.8% of the participants were still consuming MCD at the end of data collection.

Based on the responses provided, most parents (66.7%) offered MCD to their children mainly to ensure satiety. The mode of delivery of MCDs overall was dominated by bottle feeding with 94% of study participants always or often used bottle-feeding. Based on the results of this study, 86.3% and 97.7% of study participants reported they never used a mug or a bowl with a spoon respectively as the mode of delivery of MCD. Among the children that consumed MCD, approximately 4% were reported to have consumed MCD four or more times per day while the majority (53%) consumed MCD two times per day. A high percentage of study participants (84%) showed preference to consuming MCD containing wheat followed by oat (23%). Based on the time of MCD consumption, most participants showed preference to consuming MCDs during supper (81.4%) and breakfast (68.9%) with 66% and 49% of participants reporting to have served their children with MCD so that the children are full and because their children think it tastes good.

Table 1: Milk cereal drink feeding practices.

Timing of consumption shown as n (%)						
	Snack	**Breakfast**	**Lunch**	**Dinner**	**Supper**	**Night**
Yes	23(13)	122(68.9)	12(6.8)	17(9.6)	144(81.4)	24(13.6)
No	154(87)	55(31.1)	165(93.2)	165(90.4)	33(18.6)	153(86.4)
Frequency of MCD consumption shown as n (%)						
≥4Times Per day	**3Times Per day**	**2Times Per day**	**1Time Per day**	**4-6 Times Per week**	**1-3 Times Per week**	**≤1 Time Per week**
7(4)	23(13)	94(53.1)	42(23.7)	1(0.6)	1(0.6)	9(5.1)
Type of MCD consumed shown as n (%)						
	Gruel from wheat	**Gruel from oat**	**Gruel from rice**	**Gruel from corn**	**Milk-free/ Lactose-free gruel**	**Others**
Yes	149(84.2)	41(23.2)	10(5.6)	20(11.3)	5(2.8)	5(2.8)
No	28(15.8)	136(76.8)	167(94.4)	157(88.7)	172(97.2)	172(97.2)
What is the reason for consuming MCD shown as n (%)						
	Child thinks it tastes good	**To calm the child**	**So the child is full**	**To sleep**	**Nutrition**	
Yes	87(49.2)	29(16.4)	118(66.7)	32(18.1)	63(35.6)	
No	90(50.8)	148(83.6)	59(33.3)	145(81.9)	114(64.4)	
How does your child eat MCD shown as n (%)						
	Always	**Often**	**Sometimes**	**Rarely**	**Never**	
***In a bowl with spoon**	2(1.2)	0(0)	1(0.6)	1(0.6)	168(97.7)	
***Mug**	5(2.9)	5(2.9)	9(5.1)	5(2.9)	151(86.3)	
Bottle feeding	154(87)	12(6.8)	5(2.9)	0(0)	6(3.4)	

*Categories with few non-responses coded as missing, N=177 (participants who consumed MCD)

4. DISCUSSION

The aim of this study was to describe the consumption pattern of MCDs among study participants in relation to the recommendations by the National Food Agency in Sweden. According to the National Food Agency in Sweden breastfeeding or infant formula is encouraged for the first six months. However, at the earliest of four months and the latest of six months, the National Food Agency advices small tastes of solid food or gluten containing food like gruel or porridge in small quantities that does not compete with breastfeeding and slowly increasing the portion size from six months[18]. However, based on the results of this study, 55,4% of Swedish children were reported to have started MCD consumption of MCD before 6 months. This result is consistent with other studies which reported early introduction of complementary food to children before this age [20, 21]. Given that 55,4% of participants reported introduction of MCD before the age of 6 months coupled to the fact that majority (87%) showed preference to bottle feeding decreased the likelihood of small tastes which is recommended by the National Food Agency.

Parents indicated that when serving MCD, the large majority always used the bottle, and almost none used the bowl with spoon method as recommended. Serving by bottle increases the risk of overeating and the body receiving more than the necessary calories required [22]. Bottle-fed children have a decreased ability to self-regulate intake and have a slowed satiety sensation, thus encouraging children to consume more than needed[23].

According to findings from this study, 68.9% of children were fed MCD at breakfast and 81.7% at supper. Consuming a caloric beverage before bed in addition to dinner has been linked to childhood obesity, although with some inconsistency in findings[24]. The consumption of food or snacks before bedtime among children has been associated with parental eating habits[25].

Furthermore, this study showed that 66% and 49% of participants respectively reported to serve their children with MCD so that the children are full and because their children think it tastes good, both of which stand as the most common rationale for serving MCD. Serving MCD to ensure satiety for instance coupled to the fact that many participants used bottle-feeding, which makes regulation of the quantity of intake difficult, could result in the child getting more calories than needed for growth and development[26]. Although this study does not attempt to establish evidence of a relationship between consumption of MCD and overweight, previous studies have established this and we believe the rationale is of public health importance. Further interventions could be directed at promoting early feeding practices that are aligned with the national guidelines.

To our knowledge, this is the first study to document findings with regards to frequency, age of introduction, mode of delivery, feeding time and rationale of MCD use. Previous research revealed that MCD consumers are more likely to become overweight[14]. Early introduction, frequency of consumption, the use of bottle feeding coupled with the time of feeding are likely risk factors for becoming overweight in childhood in relation to MCD. These results yield opportunities for further research.

Retrospective studies are contingent on the participants' memory. This presents a weakness as some participants had not served MCD for several years and have a lengthy recall period. A larger study population would strengthen the results; however, our findings are consistent with similar previous literature. This study had a response rate of 49% which is rather typical of survey research though less than the majority responded. Though the authors did not find any differentiating characteristic between non-responders and responders, the authors however think that a higher response rate would have provided a similar but better understanding of MCD feeding practices in the population.

5. CONCLUSION

The findings of this study revealed a high prevalence of MCD consumption much of which was reportedly different from the guidelines for early child feeding practices suggested by the Swedish National Guidelines. Early feeding habits, timing, and frequency of MCD consumption may significantly influence future overweight. However, prospective research aimed at elucidating the implication of early introduction of MCD and frequency of MCD consumption to future overweight and obesity should be explored further.

Conflict of Interest

The authors declare that there is no conflict of interest.

Author's contribution

CHN, MP, analyzed and interpreted the data and drafted the manuscript. MR, GE and MH conceptualized the study. All authors reviewed and approved the final manuscript.

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