Milk
Perceptions

A Study of Milk Consumption Patterns in Singapore

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Contents

Introduction

Milk is a nutritive beverage consumed by humans since prehistoric times. Most milk for human consumption is obtained from dairy cows, although milk from other sources is also used in various parts of the world.

In industrialised countries, raw cow's milk is processed before it is consumed. During processing, the fat content of the milk is adjusted, various vitamins are added, and potentially harmful bacteria are killed. In addition to being consumed as a beverage, milk is further processed to make butter, cream, yogurt, cheese, and a variety of other products.

Milk demand is on the rise in Singapore, according to a report from research firm Euromonitor International. In its September 2016 report, "Drinking Milk Products In Singapore: Sales of Drinking Milk Products by Category (Volume 2011-2016)", the research firm reported that 53,386.6 tonnes was consumed in 2016 compared to 47,042.2 tonnes in 2011, which is equivalent to a 12% increase. But this increase in consumption is not specific to milk consumption by adults. Consumption of milk among adults has been steadily declining globally as reported by other countries like the United States and Canada (Lacroix et al., 2016). A similar trend is also seen in Korea where only 20% of adults aged 19 to 64 years consume milk more than once a day, and an inverse correlation was noted recently between decreased milk consumption and the increasing age of both men and women (Ministry of Health and Welfare, Korea, 2009).

However, the importance of milk consumption is ever more crucial especially with an increasing ageing population. Singapore is projected to have exponential growth in the number of elderly people in its population compared to some East Asian countries (Hong Kong, Japan and South Korea) and Organisation for Economic Co-operation and Development (OECD) societies (France, Germany, Sweden and the United States) placing emphasis on nutritional concerns among the ageing population.

Evidence suggests that people are aware of the importance of milk and its products, especially for the positive effects of its calcium content on bone metabolism (Wham, 2001; Bus and Worsley, 2003; Wham and Worsley, 2003; Davis and Katz, 2013). But a sizeable part of the world's population still does not consume the recommended amount of milk and dairy produce. The results of a recent study conducted among middle-aged and elderly adults in Switzerland indicated that 25% of the respondents had reduced their milk or dairy consumption (Chollet et al., 2014). In addition, data from the Canadian Community Health Survey showed that just one-third of the adult population meet the Canada Food Guide recommended minimum daily servings for the "milk and alternatives" food, (i.e. two servings per day for 19 to 50 year olds.) Similar findings have been observed in the United States (Lacroix et al., 2016; Krebs-Smith et al., 2010).

According to the Singapore Health Promotion Board's (HPB) National Nutrition Survey (2010), 50% of Singaporean residents aged 18 to 69 years of age do not consume any milk. Among those that do, most are not meeting the daily recommended allowance of milk for calcium intake. In addition, one in four have protein intakes below the recommended level. This is a worrying trend especially when the requirements of these nutrients play a crucial role in the health and well-being of adults. Singapore's societal landscape is changing rapidly, with both an increasing ageing population and declining birth rate. On a statistical front, Singapore's elderly, as a percentage of the population, is expected to rise from the current 11% to 20% by 2030 (**Figure 1**). This means one in four Singaporeans will be in that age group, up from one in eight today.

Attention to healthcare and quality of life has also become a pressing issue. The average spend on healthcare per person is expected to rise by more than 460%. Steps to prevent and manage disease through non-pharmacological interventions for older adults, such as improvements in diet quality, are now even more urgent.

Regular milk consumption as part of the daily diets of adult Singaporeans can contribute to essential nutrients without compromising much of their time and resources. This necessitates the need for the propagation of appropriate nutritional information about milk consumption to the middle-aged and elderly population. Better knowledge of health and nutritional status, as well as of appropriate nutritional behaviour, might help to improve quality of life in the third and fourth stages of lifespan (Turconi et al., 2013).

Furthermore, addressing an individual's attitude, beliefs and barriers surrounding milk consumption in adults may provide a more complete picture of their decision-making process regarding milk consumption. Previous and limited data related to milk and milk product consumption habits in children have been collected using questionnaires. There is a dearth of milk consumption data in adults. Although use of questionnaires is cost-effective and frequently used, a qualitative approach, such as the use of focus groups, provides an opportunity to elicit thoughtful responses through open-ended questions that may not otherwise be captured in a questionnaire. Focus groups are a key example of formative research, which can be instrumental in developing an effective education campaign or intervention.
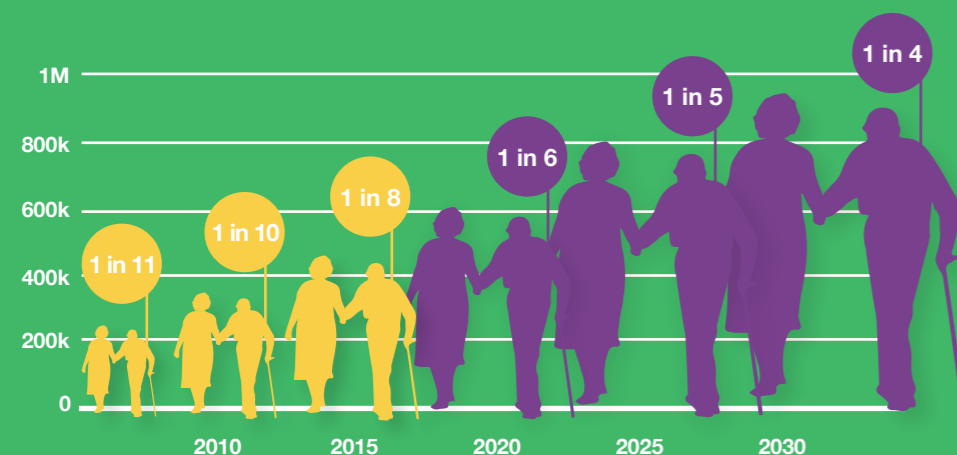
Fig 1

Number of Singapore citizens aged 65 and above

1

What **attitudes, perceptions and habits** do Singaporean adults have towards milk?

3

What could be done to support an **increase in milk consumption** among adults in Singapore?

2

What specifically is **driving and inhibiting milk consumption** among adults in Singapore?

Fig 2 Three key focus areas addressed during the focus group discussions

Objectives

With this in mind, a focus group discussion was conducted to better understand the drivers and barriers to milk consumption and what could be done to increase the consumption of milk in Singapore. In order to achieve this, the focus group discussion addressed the following three key question areas as given in **Figure 2**.

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Methodology

Participants and Recruitment

A thoroughly designed screener, taking into account demographics, attitudes and behaviours of participants, was used to recruit the participants for a focus group discussion. The interview recorded in this screener was conducted strictly according to instructions specified in the screener as well as given in the briefing and/or interviewer guide and ICC/ESOMAR International Code. Informed consent was sought from all the participants. **Figure 3** presents information about the sample size and participant profile. **Figure 4** shows the distribution of participants based on the different milk consumption behaviours.
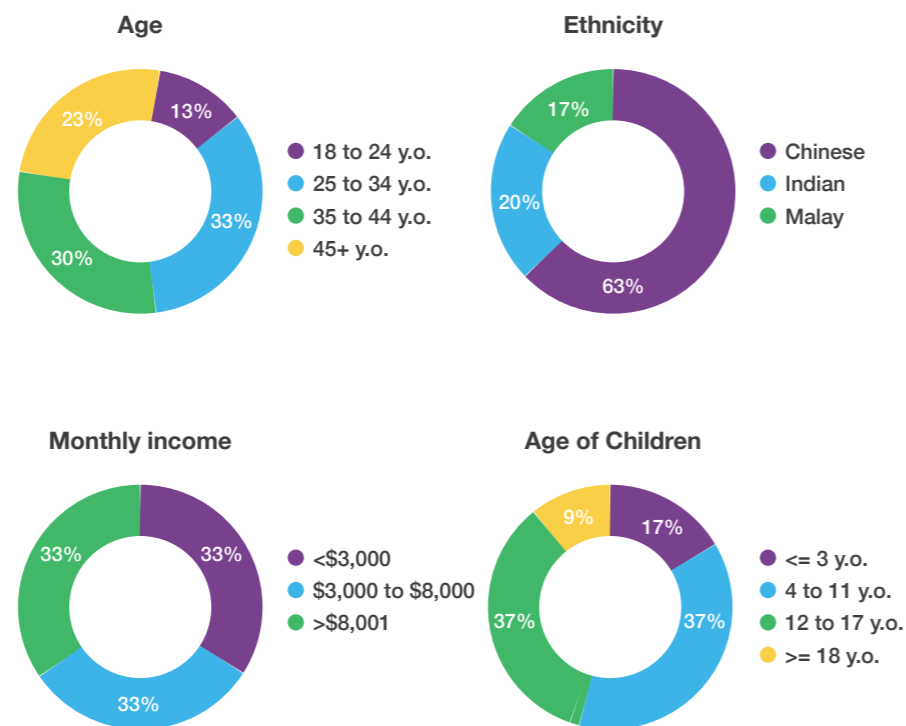
Screening Criteria

- Singapore citizen
- Male and female, aged between 18 to 65 years old
- Low, middle and high income
- Ethnicity: Chinese, Malay, and Indian
- Parents with children aged 3 to 17 years old, and non-parents
- Exclude those who are lactose intolerant
- (Cow's) Milk drinker and non-drinker
- Among milk drinkers, recruit heavy and light drinkers
- Those who consume milk in different formats: pure, as added to coffee and tea, in cooking, with cereal etc.

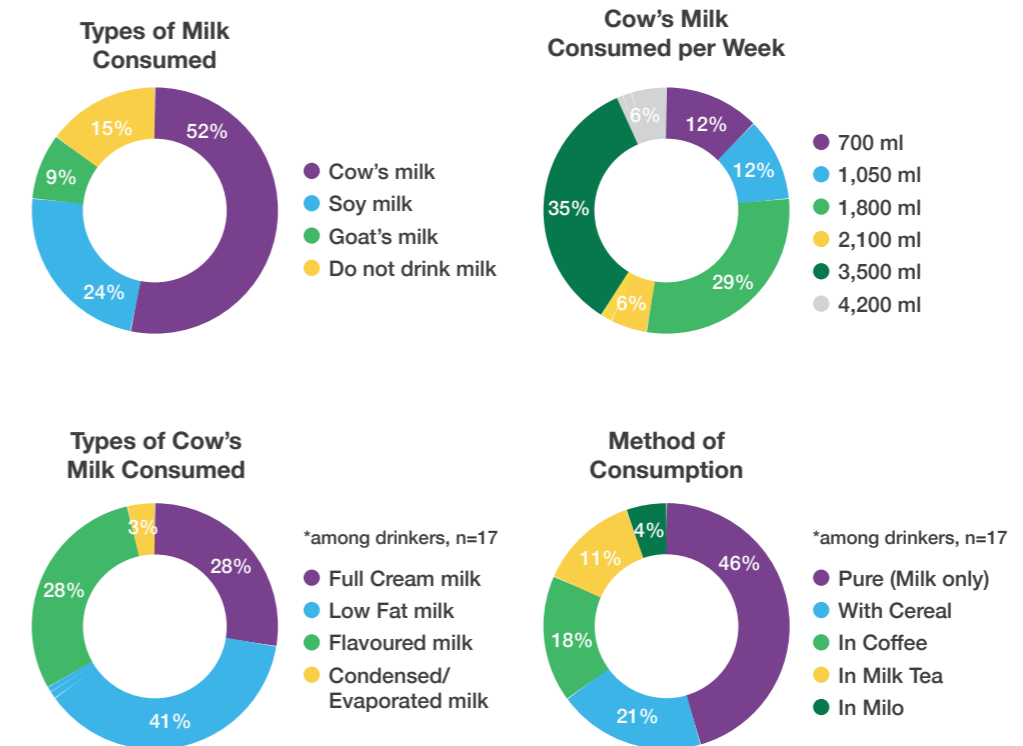**30** participants in total were interviewed

Across **3** focus groups

10 participants per focus group

Fig 3
Profile of participants based on age, ethnicity, monthly income and parental status (age of their children)

Age
- 13% 18 to 24 y.o.
- 33% 25 to 34 y.o.
- 30% 35 to 44 y.o.
- 23% 45+ y.o.

Ethnicity
- 63% Chinese
- 20% Indian
- 17% Malay

Monthly income
- 33% <$3,000
- 33% $3,000 to $8,000
- 33% >$8,001

Age of Children
- 17% <= 3 y.o.
- 37% 4 to 11 y.o.
- 37% 12 to 17 y.o.
- 9% >= 18 y.o.

Fig 4
Participants distribution based on different milk consumption behaviours

Types of Milk Consumed
- 52% Cow's milk
- 24% Soy milk
- 9% Goat's milk
- 15% Do not drink milk

Cow's Milk Consumed per Week
- 12% 700 ml
- 12% 1,050 ml
- 29% 1,800 ml
- 6% 2,100 ml
- 35% 3,500 ml
- 6% 4,200 ml

Types of Cow's Milk Consumed
*among drinkers, n=17
- 28% Full Cream milk
- 41% Low Fat milk
- 28% Flavoured milk
- 3% Condensed/ Evaporated milk

Method of Consumption
*among drinkers, n=17
- 46% Pure (Milk only)
- 21% With Cereal
- 18% In Coffee
- 11% In Milk Tea
- 4% In Milo

Data Collection

A focus group discussion was conducted to gather the necessary information. "A focus group is a data collection procedure in the form of a carefully planned group discussion among about 10 people plus a moderator and observer, in order to obtain diverse ideas and perceptions on a topic of interest in a relaxed, permissive environment that fosters the expression of different points of view, with no pressure for consensus." (OMNI, 2013). The most widely recommended size for a group discussion is between eight and 12 participants (Falconer, 1976; Fern, 1982).

Focus groups were conducted to determine the overarching attitudes, beliefs, and barriers regarding milk and milk consumption based on personal, behavioural, and environmental factors. Each focus group session had 10 participants and lasted for 90 minutes. The main objective was to focus on liquid milk because consumption patterns of milk and milk products has changed over time with less liquid milk being consumed worldwide - a trend that has been similarly observed in Singapore.

Using the focus group facilitation techniques of Krueger and Casey (2009), an experienced focus group moderator led each group using a standard semi-structured interview guide. The interview guide was pilot-tested prior to the study and fine-tuned accordingly. The pilot study data is not included in the results of the present report. All groups were audio-taped. To ensure as broad a range of insights were captured across a spectrum of Singapore society, quotas were applied to the recruitment process. Therefore, any respondent data collected should not be interpreted as a natural fallout of the total population.

Focus Group Questions

The focus group discussion guide contained a list of questions under two main categories.

Table 1 presents the sample questions that were developed to explore personal, behavioural, and environmental factors related to milk consumption, based on the key constructs of Bandura's Social Cognitive Theory (SCT) (Bandura, 1986).

Questions reflected the three interacting domains of SCT: personal factors (e.g. health concerns), behavioural factors (e.g. beverages frequently consumed), and environmental factors (e.g. availability of milk). These domains have been recognised in explaining human behaviour, and were a focus of similar research exploring factors associated with calcium and milk, and milk product intake (Mobley, Jensen, & Moulding, 2014).

Table 1 Sample Questions

Areas of Focus	List of Sample Questions
Attitudes and Habits Towards Milk Consumption	○ What beverages do you drink most often? ○ When do you typically drink milk? ○ Do you use milk in other ways in addition to drinking it by itself? ○ In your view, what are the advantages/ disadvantages of consuming fluid milk?
Understand The Drivers and Barriers of Milk Consumption	○ Why do you drink milk? ○ Is there anything that ever prevents you from drinking milk? ○ Is there anything that would enable you to consume milk? ○ Do you have any specific health concerns related to drinking milk? ○ Do your friends or family drink milk? ○ Do you have any problems with milk spoiling?

Data Coding and Analysis

All discussions were transcribed for analysis following standard methodology. During the analysis, a copy of the original recordings and field notes was kept available for the purposes of confirmation or traceability (Patton, 2002). Transcripts were coded line by line by pairs of analysts assisted by computer software.

Limitations

As with all qualitative research, the findings of this are limited to a snapshot of the target population. Because of the limitations of qualitative research, any "figures" presented in this report lack statistical rigour. Consequently, they may be used for directional insights but may not be conclusive in nature.

Results & Discussion

The key findings of the focus group discussion are detailed in this section.

The findings of this research are based on participant comments that recurred to some degree throughout the focus group discussions, discounting isolated comments.

1. Attitudes, Perceptions and Habits Towards Milk Consumption

When participants were asked about words that were associated with "milk", the strongest associations are with its calcium nutrition; its source animal; its colour; and a strong linkage towards health. The contribution of dairy products in providing the recommended calcium intake has largely driven the recommendations for dairy intake in most dietary guidelines. It is interesting to note that the participants were aware that milk is a rich source of calcium, and is important for bone health, however, 50% of Singapore residents aged 18 to 69 years of age do not consume any milk.

1.1 Advantages and Disadvantages of drinking milk

Perceived Advantages	Perceived Disadvantages
Rich in calcium	Fattening or causing weight gain
Good for bones	Gastrointestinal side effects, e.g. diarrhoea
Healthy	Taste not appealing
Source of protein	Easy to expire (fresh milk)
Makes you feel full	Price
Enhances the taste of other beverages and food	
Nutritious	
Source of vitamins	
Good taste	
Helps people sleep	

Milk is not just about calcium; its nutritional richness is unquestionable. The protein in cow's milk is of high quality, containing a good balance of all the essential amino acids, that supports maximal growth. Indeed, dairy products represent good dietary sources of calcium due to their high calcium and nutrient contents, high absorptive rate, availability and relatively low cost, which makes the regular consumption of dairy products feasible. They provide more calcium, protein, magnesium, potassium, zinc and phosphorus per calorie than any other typical food found in the adult diet (Heaney, 2009; Caroli et al, 2011).
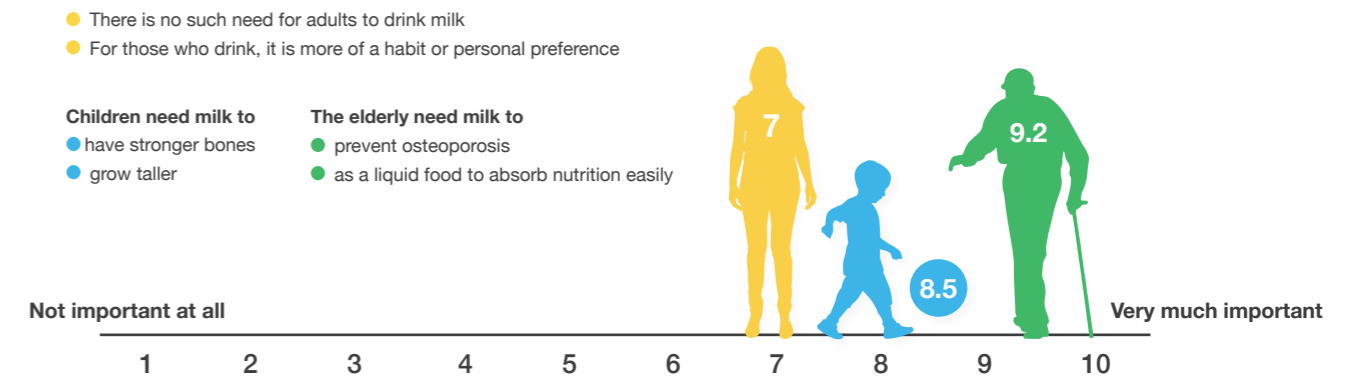
Heaney (2009) and Caroli (2011) opine that dairy products are not only touted for their excellent sources of dietary calcium, but also due to other prime nutrients present, increased bioavailability, easy availability and comparatively lower cost to other calcium containing food products thus enabling regular intake of dairy products.

On the other hand, the most frequently cited disadvantages of milk consumption were milk's contribution to weight gain; gastrointestinal problems, for e.g. diarrhoea, and unpleasantness of the taste of milk in general. Similar reasons were cited in a study conducted in Canada (Lacriox et al., 2016) and in Switzerland (Chollet et al., 2014).

Low calcium intake as a risk factor for overweight and obesity, has been observed in epidemiological studies. Zemel, Thompson, Milstead, Morris, & Campbell (2004) and Zemel, Richards, Milstead, & Campbell, (2005) affirmed the clinical implications of this relationship in weight loss studies performed in low-calcium consumers in whom calcium or dairy supplementation accentuated body weight and fat loss. One of the possible reasons for this association between dairy consumption and healthier body weight might be the due the role of milk proteins (Astrup, Chaput, Gilbert, & Lorenzen, 2010).

1.2 Importance of Milk Consumption

There is a clear difference between the participants' perception with regard to perceived importance of regular milk consumption. Many participants do not feel they need to drink milk regularly, but recognise its importance for children and the elderly. This is a misconception, and bone health is taken for granted.

- There is no such need for adults to drink milk
- For those who drink, it is more of a habit or personal preference

Children need milk to
- have stronger bones
- grow taller

The elderly need milk to
- prevent osteoporosis
- as a liquid food to absorb nutrition easily

Not important at all — Very much important

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

7   8.5   9.2

Most of the adults do not realise that bone is an active living tissue which needs a continuous supply of nutrients. Building bones and maintaining them is a lifetime proposition. It has been noted that the interactions between calcium, inorganic phosphate, protein and vitamin D result in the reduction of bone resorption, reducing bone loss linked to ageing (Bonjour, Kraenzlin, Levasseur, Warren & Whiting, 2013).

Dairy Foods or Calcium Supplements?

The absorption of calcium from commonly consumed supplements, such as calcium carbonate and calcium citrate, is around 30% to 40%. Studies have demonstrated that this is optimised by concurrent food intake and by taking divided doses with protein-containing meals throughout the day (Gueguen & Pointillart, 2000). In any case it is not as simple and pragmatic as calcium supplements can cause drug-nutrient interactions. For example, proton pump inhibitors reduce the physiological absorption of calcium from calcium carbonate. Calcium supplements may interact with antibiotics, thiazide diuretics, digoxin and phenytoin. Furthermore, **"calcium supplements do not contain the additional nutrients—including protein, potassium and magnesium — provided by consumption of dairy products"** (Rozenberg et al, 2016, p.4).

2. Drivers and Barriers of Milk Consumption

The drivers and barriers that influence milk consumption in Singapore can be classified into five themes:

+ **HEALTH**

+ **PREFERENCE**

+ **CULTURE AND HABITS**

+ **CONVENIENCE**

+ **OCCASION**

+ HEALTH

As a driver of milk consumption	As a barrier of milk consumption
○ Good source of calcium	○ Gain weight due to fat content in milk
○ Good for bones, associated with the prevention of osteoporosis	○ Cause gastrointestinal side effects
○ Helps one get to sleep	○ Less concerned about the prevention of osteoporosis at adulthood

Participants massively overestimated the percentage of fat content within the full fat milk category. Participants perceived milk as a high fat food with fat content ranging from 15% to 46%, when the actual fat content is less than 4%. Given that fat content and weight gain were cited as key concerns and barriers to milk consumption, this is a clear issue that needs to be solved to dispel such misunderstanding.

While participants are aware of the nutritional benefit of milk to bone health, they remain largely ignorant of other health and nutritional benefits of milk. Dairy items may represent an important dietary wellspring of calcium because of their unique nutrient profile (good source of calcium, slow release sugars (lactose), high biological value protein), high absorptive rate, and are generally accessible and affordable. By examining the evidence-based information in this domain, health professionals can play a critical part in dispelling these convictions encompassing dairy items (Rozenberg et al., 2016).

Other nutrients present in milk include:

Calcium and vitamin D in milk
Calcium and vitamin D, as well as magnesium, may reduce the risk of type 2 diabetes through their role in modulating insulin resistance, pancreatic beta-cell function, and inflammation (Aune, Norat, Romundstad & Vatten 2013; O'Connor et al., 2014; Santaren et al., 2014).

Milk proteins
• Whey protein may promote insulin sensitivity, improve glucose tolerance and lipid profile, and help in weight control (Turner et al., 2014; Bjørnshave & Hermansen, 2014; Chen et al., 2014).

• Bioactive peptides may also help in improving blood pressure.

Dairy fatty acids
• Trans-palmitoleic acid (trans-16:1n-7), a biomarker for dairy fat intake has been associated with lower insulin resistance, lower blood pressure, a better lipid profile and a reduced risk of type 2 diabetes (Mozaffarian et al., 2010; Mozaffarian et al., 2013 and Kratz et al., 2014).

• Pentadecanoic acid (15:0) has been inversely associated with fasting plasma glucose and incident type 2 diabetes (Forouhi et al., 2014; Kratz et al., 2014; Santaren et al., 2014).

• Conjugated linoleic acid may play a role in the prevention of obesity, which is a risk factor for type 2 diabetes.

+ PREFERENCE

As a driver of milk consumption	As a barrier of milk consumption
○ Taste is a key driver for some drinkers	○ To most non-drinkers, taste is a key barrier
○ Meal supplement or replacement was also a driver for some as it gives a sense of fullness in the stomach, and is considered a light meal	• The taste is described as milky or cheesy • The thickness of milk and the phlegm in throat after drinking can put people off ○ A preference for alternatives such as soy milk

Surprisingly, taste was both a driver and barrier for milk consumption. This is similar to other foods, as preference towards certain foods is very personal. When individuals realise the importance of milk consumption towards their health, they might then consider consuming milk even if they do not have a personal preference for the taste of milk.

+ CULTURE AND HABITS

Milk consumption insights	As a barrier of milk consumption
○ People associate high milk consumption with western countries	○ In Singapore, people lack the habit of drinking milk, as they generally have coffee, tea and other beverages
○ Milk is perceived to be a popular ingredient in many western food recipes	○ Milk is perceived to be a product that is mostly consumed at home. Therefore, the perception of having little time to eat breakfast (fast paced society) and culture of eating out (hawker centers) provides fewer 'opportunities' for milk to be consumed at home

Drinking milk is considered less of a cultural norm compared to many other western countries where it is used more in cooking, as part of the breakfast routine or consumed on its own with a meal. Singapore's fast paced society (where people tend to have less time at home for family meals) is also believed to be a key reason for low milk consumption in Singapore. Inadequate milk and milk product consumption may also be related to barriers stemming from one's culture and community (Bronner et al., 2006).

+ CONVENIENCE

As a barrier of milk consumption

- **The awareness of Ultra High Temperature processing (UHT), as one of the milk choices, is currently low among consumers**

- **There are concerns about the nutrition loss due to the high temperature processing and the perceived use of preservatives in UHT**

- **Fresh milk needs to be stored in the refrigerator**

- **The short shelf life of fresh milk can result in:**

    1. Frequent trips to the shops

    2. Inablility to buy in bulk

    3. Wastage, if not consumed within the timeframe

Milk drinkers within the focus group mostly choose to drink fresh milk over UHT even though fresh milk is considered inconvenient due to its storage requirements and short life span, which may stifle greater milk consumption. More needs to be done to better educate consumers on the similarities, benefits and convenience of UHT. The nutritive value of UHT milk changes little by the heat treatment and during storage. There is a slight loss of nutritive value, especially in terms of B vitamins namely - folacin, B12, riboflavin, and thiamine. Of special importance is the decrease of available lysine. Lysine losses in UHT processed milk is about 4% as compared to losses during fresh milk pasteurisation of 1% to 2%. The loss of lysine is not serious in itself because in milk protein, lysine is in excess (Walstra, Wouters & Geurts, 2006).

+ OCCASION

As a driver of milk consumption

- **In Singapore, milk is widely added to coffee and tea to help enhance the flavour**

- **Milk is also used in some forms of cooking, e.g. baking or in curries**

As a barrier of milk consumption

- **However, all these combinations are perceived by participants as not consciously drinking milk, except with cereal**

- **From a nutritional perspective, drinking milk on its own is perceived to have the greatest health benefits**

Milk consumption covers numerous occasions. The consumption of milk, when combined with food or beverage options, is driven less by health and nutritional benefit and more by flavour and enjoyment. Educating consumers on the different consumption occasions and 'pairings' may help to drive greater consumption.

Can other foods match the GOODNESS of MILK?

NATURAL GOODNESS

ONE SERVING OF MILK (~240ml)

Calcium 300mg

All in a Single cup!

Source of Energy 149kcal
=
Calories in
2 slices of white bread

Potassium 322mg
=
Potassium in
1 small banana

Carbohydrates 12g
=
Cabohydrates in
3 cups unsweetened soy milk

Sodium 105mg
=
Sodium in
20g dried anchovies

Protein 7.7g
=
Protein in
1 ½ medium egg

Vitamins A 395 IU
=
Vitamin A in
¾ cup of broccoli

Fat 7.9g
=
Fat in
15g of mixed nuts

Vitamin D 5 IU
=
Vitamin D in
20g cooked salmon

Phosphorus 205mg
=
Phosphorus in
1 cup canned kidney beans

B Vitamins
=
B Vitamin in
1 cup mushrooms

3. Reduced Consumption or Avoidance of Milk: Implications for Nutrient Adequacy and Health

Consumption of milk or dairy products provide a nutritional bundle (with up to 16 essential nutrients) that is very difficult to replicate in other food products.

There is a growing body of evidence that demonstrates the link between dairy intake and a decreased risk of developing several conditions, including hypertension and type 2 diabetes. Unfortunately, many individuals avoid dairy due to the often **mistaken belief that they are lactose intolerant. Dairy exclusion dietary regimens may fuel the danger of osteoporosis and contrarily affect other health outcomes such as blood pressure control and colon cancer risk (NIH, 2010).**

Avoiding dairy products means missing out on several key nutrients and potential health benefits (e.g. reduced risk of hypertension and type 2 diabetes). It is not recommended to avoid dairy products even if you have lactose intolerance. There are several recommended strategies to manage lactose intolerance and there is evidence that gradually increasing lactose intake over time can result in colonic adaptation.

Self-perceived lactose intolerance and dairy avoidance

In a recent cross-sectional study, individuals who believed they were lactose intolerant had significantly lower average daily calcium intakes from dairy foods than did those without self-perceived lactose intolerance. A significantly higher percentage of participants with self-perceived lactose intolerance, compared to participants without self-perceived lactose intolerance also reported having physician-diagnosed diabetes or hypertension. The odds of self-reported, physician-diagnosed diabetes or hypertension decreased by 30% and 40% respectively, for every 1,000mg increase in calcium intake from dairy foods per day (Nicklas et al, 2011).

4. Strategies to Increase Milk Consumption

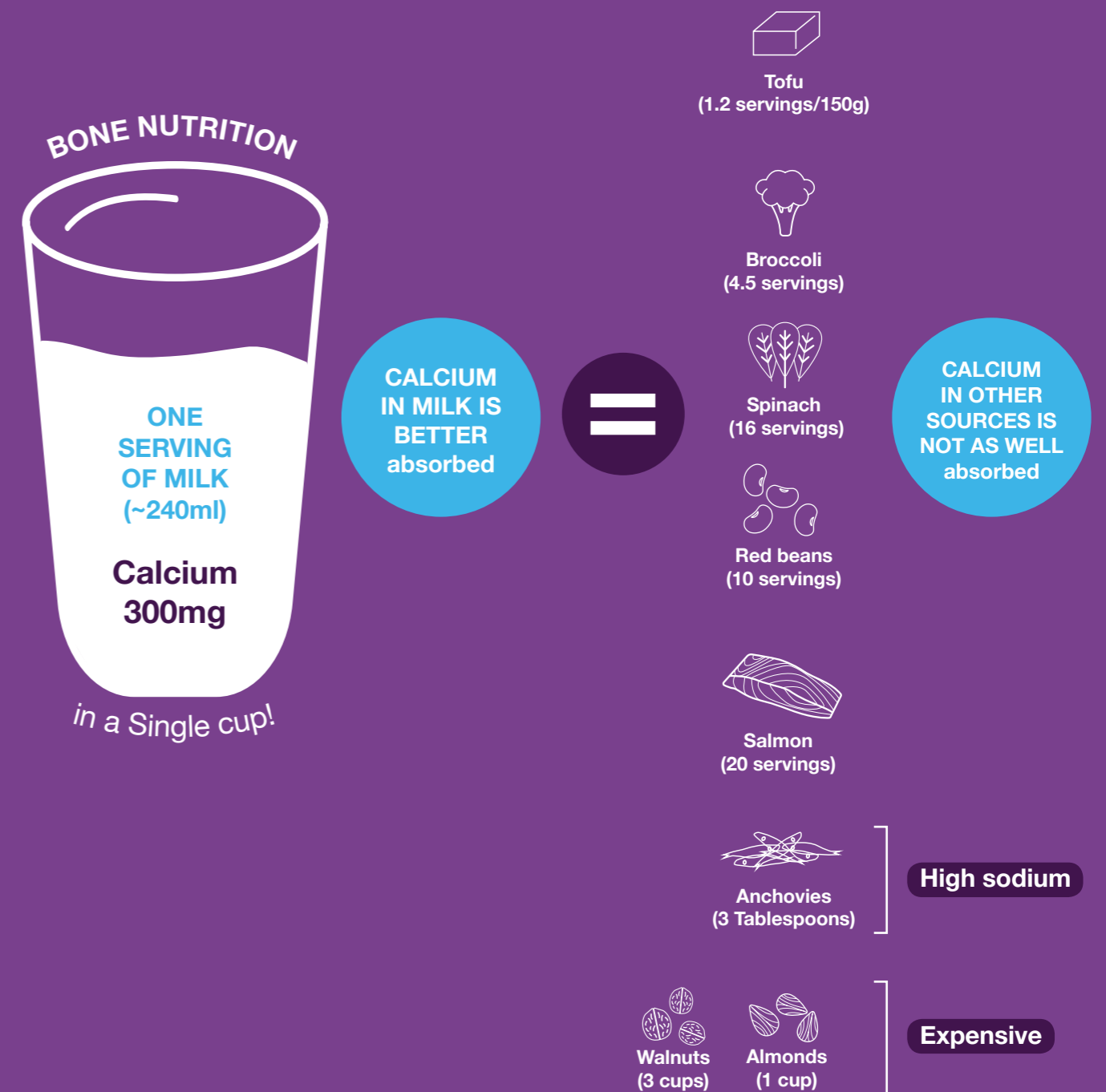Messages to increase milk consumption should target consumers' beliefs about the benefits of milk products, dispel ingrained myths, and provide strategies for increasing consumption. In this study, it was noticed that the participants massively overestimated the percentage of fat content within full fat milk. The reason could be that "full fat" or "full cream milk" resonates with "fat" giving consumers the impression that milk is nothing but a fattening food product.

Given that fat content and weight gain were cited as key concerns and barriers to milk consumption, this is a clear issue that needs to be resolved in order to dispel such misunderstanding. Messages comparing fat content in one serving of milk with the fat content of a commonly consumed local food could be a better strategy to dispel this myth. Consumers can be encouraged to consume low fat, reduced fat or skim milk varieties if they still feel that milk contains too much fat.

Perceived fat content

Milk — **15% to 40% fat**

Actual fat content

Milk — **< 4% fat**

1 serving of milk = **8g fat**

1 serving of char kway teow = **38g fat**

1 doughnut = **10g fat**

1 slice of kueh lapis = **12g fat**
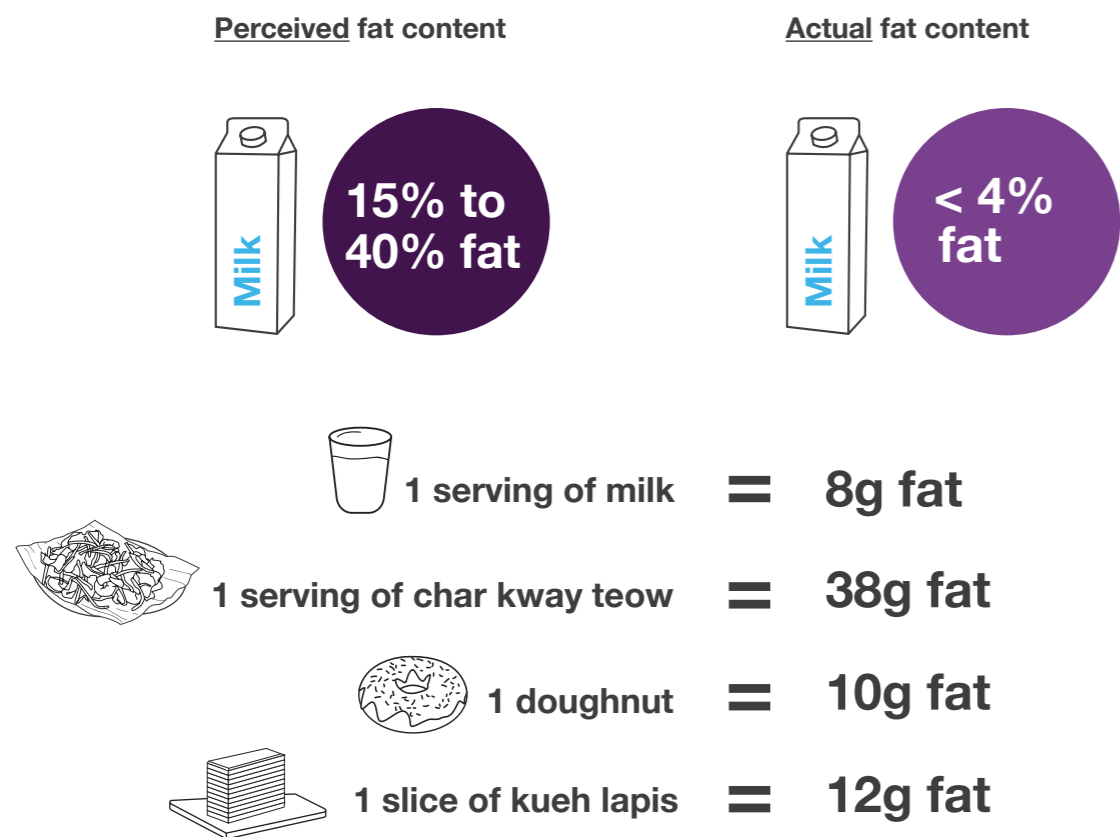
This observation is similar to other qualitative studies that were conducted in adult men and women. Lack of knowledge about the benefits of milk and milk products specific to adults appeared to be the most common barrier to consumption. Men preferred messages with factual information and from reputable sources. Women preferred health and well-being messages and disapproved of aesthetic appeals (Jung et al, 2014).

Can other foods match the **GOODNESS** of **CALCIUM** in **MILK**?

Tofu (1.2 servings/150g)

BONE NUTRITION

ONE SERVING OF MILK (~240ml)

Calcium 300mg

in a Single cup!

CALCIUM IN MILK IS BETTER absorbed

=

Broccoli (4.5 servings)

Spinach (16 servings)

Red beans (10 servings)

CALCIUM IN OTHER SOURCES IS NOT AS WELL absorbed

Salmon (20 servings)

Anchovies (3 Tablespoons) — **High sodium**

Walnuts (3 cups) **Almonds** (1 cup) — **Expensive**

Consumption driven scenario testing to identify strategies to promote milk consumption

Consumer Driven Scenario	Consumer Response	Proposed Action
…that milk is one of the best sources for calcium, protein, vitamins, etc.	Participants feel less motivated, as the message is viewed as too scientific, and does not resonate with them	○ Communicate on the health benefits of these nutrients, instead of conveying the data in a complex scientific way, e.g., "Protein is good for muscle, bones and skin" ○ Ensure the messages resonate with consumers
…that the absorption rate of calcium, protein, vitamins in milk is faster compared to other sources	Not a strong push factor Participants still feel satisfied that they can get the essential nutrients from other food sources	○ More compelling arguments will be needed. Highlight the better efficiency of getting essential nutrients from milk compared to other commonly consumed products ○ Moreover, messaging should focus on the greater convenience benefit of milk for getting essential nutrients (compared to other food sources)
…that the prevention of osteoporosis needs to start in adulthood and waiting until old age is too late…	The majority of participants will consider taking actions for prevention of disease Nevertheless, participants think that the age range of between 45 to 50 years old will be a good starting point for them to drink milk to prevent the onset of osteoporosis	○ Education needed to better inform people that prevention of osteoporosis needs to start early, before 35 years of age ○ Besides the prevention of osteoporosis, promote the benefits of milk in the maintenance of general health and the prevention of other diseases (to be explored)

5. Participants' Suggestions on What Would Encourage Greater Milk Consumption

Messaging about **nutritional benefits** needs to be more compelling

Advertisements need to be **trendier** to catch people's attention

Milk pairing ideas and suggestions with other food

Make milk more **easily accessible** e.g. availability at hawker centers, in vending machines, and as a delivery service

Broaden the scope of **interventions** beyond school setting

Target family as a whole, not just children, engage parents directly

Some ideas proposed by participants for the content of an educational campaign

Given below are spontaneous participant suggestions:

❝ **Raise the awareness of prevention of diseases,** e.g., show national statistics data on the number of people suffering from osteoporosis and the impact on their life, so as to educate the public to drink milk before a certain age to prevent osteoporosis. ❞

❝ Design posters on **"Myths and Truths about Milk",** to communicate the health benefits and eliminate the misconceptions of milk. ❞

❝ Showcase **all family members** from children to the elderly drinking milk and share their **testimonies on the benefits** of drinking milk with the public. ❞

50% of Singaporeans lose out on the nutritious benefits of milk by not drinking a glass a day

'Milk Perceptions' is the first of its kind study on trends of adult milk consumption in Singapore

Singapore faces an ageing population

**By 2030, 1 in 4 adults will be above 65 years old**

To prevent health issues in old age, steps such as having quality diets are more urgently needed than before.

Consumption of milk can contribute to the attainment of high quality diets. Milk's nutritional richness makes it a source of calcium and high-quality protein

One glass of low fat milk provides **380mg of calcium**

Regular consumption of milk can contribute to improvements in diet quality
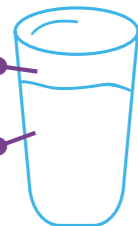
Despite knowing of milk's benefits, new study finds that

50% of Singaporean adults do not consume any milk

Most are not meeting the recommended daily allowance for calcium intake

Little understanding of milk's other benefits, (eg. source of high quality protein)

Existing attitudes do not encourage ongoing milk intake in adulthood

RDI for calcium is **800mg** for adults 19-50

and **1,000mg** for those aged 51 and above

Did you know? A glass of milk contains the same amount of protein found in 1½ medium eggs?

Singaporeans' Wrong Perceptions of Milk

○ **Mistaken 'diagnosis'** ⊗
Fearing gastrointestinal problems, some exclude dairy from diets, as do those with perceived lactose intolerance

○ **Weight gain due to fat in milk** **46%** (perceived) vs **4%** (actual)
Singaporeans overestimate the amount of fat in milk servings, hence avoiding milk for fear of gaining weight

○ **UHT milk inferior to fresh milk**
UHT milk which has a longer shelf life, is no less nutritious than fresh milk

○ **Milk not part of local food culture**
Drinking milk seen as less of cultural norm as compared to western societies

Suggestions to Encourage Milk Consumption

○ **Milk pairing**
Provide recommendations on what types of foods milk can be paired with

○ **Greater accessibility**
Make milk an option at hawker centres, or in vending machines

○ **Focus on families**
Engage parents and involve the family as a whole

○ **Compelling messaging**
Trendier advertisements and calling out nutritional benefits

About the Author

Dr Kalpana Bhaskaran

Dr Kalpana Bhaskaran is the Domain Lead for Applied Nutrition and Glycemic Index Research at Temasek Polytechnic, Singapore.

Dr Kalpana championed the design, planning and implementation of the first accredited Glycemic Index Research Unit (GIRU) in Singapore and the region.

A qualified Nutritionist/Dietitian with more than 20 years of experience in nutrition research, lecturing, project management and consultancy services, Dr Kalpana is currently the Principal Investigator for five ongoing clinical research studies in the areas of Glycemic Index, Applied Nutrition and efficacy testing.

Dr Kalpana regularly acts as a food and nutrition consultant to local and overseas food companies, and was invited to sit on the Singapore Armed Forces Feeding and Institutional Catering Advisory Panel to offer her expertise in the area of food and nutrition. A frequently featured commentator in both print and broadcast media, Dr Kalpana is also often invited to speak at conferences and seminars.

Dr Kalpana is the Vice President of the Diabetic Society of Singapore, and a Council member of the Singapore Nutrition and Dietetics Association, where she heads the media relations sub-committee. She is also a member of the Singapore Heart Foundation and the Singapore Institute of Food Science and Technology.

Dr Kalpana was conferred the Commendation Medal in the 2014 National Day Honours in recognition of her work and its impact to diabetes management and education. She was awarded Temasek Polytechnic's "Teaching Excellence Award" in 2009. In September 2017, her team was awarded the Innergy award by the Ministry of Education to recognise project teams who brought about significant benefits to stakeholders through their innovation efforts.

Disclaimer

The author states that there are no conflicts of interest regarding the publication of this paper. The commission of the report played no role in the study design; collection; analysis and interpretation of data; and writing of the report.

Assumptions and recommendations made in this document are not indicative of the position of any entity or organisation.

About FrieslandCampina Asia

FrielsandCampina is one of the world's largest dairy companies, providing millions of consumers around the world with food that is rich in valuable nutrients, ranging from infant and children's nutrition, to condensed milk, dairy drinks, yoghurt and dessert. Over the past 90 years, FrieslandCampina has established a presence in Asia, with many of its products becoming household names across the region – Dutch Lady, Frisian Flag, Foremost, Black & White and others have endeared themselves to consumers across the generations.

FrieslandCampina spreads the goodness of dairy around the region by actively contributing to food and nutrition security initiatives in Asia. The company is committed to being a responsible business, with the goal of creating a sustainable future for the communities that it serves.

Around the region, the health and nutrition landscape is heavily impacted by ageing populations, the double burden of malnutrition, and the increasing incidence of non-communicable diseases. This necessitates an understanding of how consumers are behaving, their attitudes towards food and how in turn, companies like FrieslandCampina can help address the inadequacies to promote better health and nutrition. In recent years, there has been renewed focused on the health and well-being of Singaporeans, with the Government according the issue greater attention in its policy approaches. Greater investment in infrastructure and development of manpower for the health sector has been reinforced with a decision to declare war on diabetes, and the creation of the dedicated Nuture SG taskforce on enhancing health outcomes for young Singaporeans.

With a particular focus on the need to prevent chronic diseases, including diabetes, FrieslandCampina has commissioned this White Paper ("Paper") to examine the dairy consumption patterns and habits of Singaporeans.

The Paper seeks to glean insight into the attitudes of adult Singaporeans towards milk, and better understand their consumption habits of milk, which has been established a source of nutrients such as calcium and protein for all stages of life.

Reaffirming its commitment to the role it can play in promoting good nutrition and healthy lifestyles amongst the people of Asia, FrieslandCampina hopes that the findings from the Paper will help to effect the discussion and action needed to not only promote the intake of milk, but also in reminding Singaporeans of the need for balanced and nutritious diets.

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