

ORIGINAL ARTICLE

Exploring Influence of Food-Related Social Media Content on Eating Habits of Undergraduate Students

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ABSTRACT

Introduction: Social media has become a ubiquitous part of daily life. However, little is known about the influence of food-related social media content (FRSMC) on the eating habits of Malaysian undergraduates. This study explored FRSMC usage of undergraduates enrolled in a non-health program, its influence on eating habits, and how such social media content influences dietary behaviours. **Method:** This qualitative semi-structured interview study involved chemical engineering (CE) undergraduates at a university in Penang, Malaysia. The study was carried out from April 2021 to March 2022 during which ten participants were purposively selected. Based on precedent qualitative research sampling rule of thumb, this sample size of ten participants provided sufficient data saturation for an initial exploratory study. The interview sessions were recorded, transcribed, and thematically analyzed. **Results:** According to study findings, in terms of usage, food advertising and promotions; cooking tutorials and food and nutrition information are the most appealing types of FRSMC. With regards to eating habits, FRSMC can lead to healthy and unhealthy food choices. The study identified several perceived challenges, namely unrealistic and untrustworthy content, difficult and repetitive content, and algorithm-driven deviations from healthy diets. The effectiveness of FRSMC can be enhanced by creating trustworthy and engaging content. **Conclusion:** The study highlights that social media engagement can have both positive and negative impact on food choices among undergraduates. Some FRSMC are perceived to encourage and motivate undergraduates to adopt healthier dietary habits. Future research could involve a larger sample, representative of diverse socio-demographic groups in Malaysia.

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INTRODUCTION

Malaysia has the highest prevalence of obesity and overweight among Asian countries with 65% of female and 64% of male population being either obese or overweight (1). According to a Spanish literature review, a critical period of life in which eating habits change abruptly is during the university stage (2). Eating habits or eating behaviour is a broad term that encompasses food choices and motives, feeding practices, dieting, and eating-related problems such as eating disorders, obesity and feeding disorders (3).

During the transformative period, which typically occurs between the age of 18 and 25, students need to adapt to a new environment, gradually gaining independence, and continuously challenged to practice

healthy eating habits (4, 5). The development of eating habits is influenced by individual child development, personal factors (e.g., food beliefs, taste preferences and time constraints), parent-child interaction, social influences (e.g., social facilitation, social suggestion) and environmental factors (e.g., product characteristics) (5, 6).

Technological advancement of smartphones and Internet services have enabled the exponential growth of social media users. Popular social media platforms like Facebook, Instagram, and Twitter, as well as YouTube and Wikipedia, offer a wealth of information, including nutrition facts, meal preparation tips, patient and public education programs, and much more (7-9).

Research indicates that nutrition-related food content on social media is able to improve the eating habits (e.g., increase fruits consumption) of social media users (10). Yet, it is worth noting that such beneficial content often suffers from poor engagement and high attrition rates (11). On the other hand, some food imagery and

content can worsen eating behaviour and lead to poor food choices (12).

Research indicates that possessing higher education can contribute to discerning a healthier lifestyles and better eating behaviour compared to those with lower levels of education (13). However, it is uncertain if those from non-health sciences higher education backgrounds practice good eating habits. Understanding the eating habits and social media use of students from a non-health science discipline especially a technical field such as engineering could be particularly meaningful. It is acknowledged that a reasonable level of intelligence and academic excellence is necessary to undertake studies in engineering. However, there is a gap in knowledge on whether the non-health higher education background in engineering corresponds with beneficial usage of FRSMC and good eating habits.

To the best of the researcher's knowledge, there is no recent research focusing specifically on the eating habits of non-health program students, particularly engineering in Malaysia. The current study explores the engagement and understanding towards FRSMC among engineering undergraduate students from the Chemical Engineering (CE) program at USM, Penang. The findings in this study could help improve FRSMC's beneficial influence on eating habits. The findings may be useful for social media content generators especially nutritionists or dieticians to develop better nutrition-related food content to improve public engagement and improve eating habits of young individuals from non-health science disciplines.

To explore the complex dynamics of FRSMC and eating habits among non-health-sciences undergraduates, this cross-sectional qualitative study adopted a semi-structured interview research design methodology. As this research aimed to understand how social media influences eating habits rather than how many feel influenced, adopting a qualitative approach is appropriate in fulfilling the study aim (14). A semi-structured interview approach provided consistency in exploring relevant concepts among participants over a fixed period of time (15). Therefore, a question framework was developed to elicit feedback pertaining to the research focus area (social media, food-related content and eating habits), including additional probing questions to delve deeper into participants' responses or ideas (15).

MATERIALS AND METHODS

Interview Questions

The interview questions were adapted from previous studies (16,17) to explore the influence of social media on eating habits of undergraduate students. The adopted questions served a crucial purpose in this study by helping to explore the depth of participants' engagement with FRSMC, shedding light on its potential impact on

their eating habits. Open-ended interview questions were used to provide the benefit of uncovering issues or concerns that had not been considered or anticipated by the researcher (18). Based on the purpose of the study, interview questions consisting of five parts were developed, which are (A) Opening questions and types of FRSMC used, (B) Experiences and perceptions with FRSMC with regards to influence on eating habits, (C) Issues encountered with food-related social media content, (D) Suggested improvements for food-related social media content, and (E) Final comments. Part A's opening questions were for ice-breaking, allowing participants to gradually build rapport with researcher and start sharing about the types of FRSMC they use. Parts B, C, and D elicited input on the study's specific research focus areas. Part E was included to prompt for final comments participants may have forgotten or overlooked conveying under parts B, C, and D. Feedback from all interview parts was incorporated into four categories in the presentation of study findings.

Methods

Study design and sampling

Undergraduate students ranging from Year 1 to Year 4 from Chemical Engineering (CE) programme of Universiti Sains Malaysia, Engineering Campus, were recruited for this study. Six to seven interview participants are generally sufficient to capture dominant themes in a homogeneous sample, nevertheless a few more participants are often needed to achieve a higher degree of data saturation (19). Following precedent qualitative research on eating disorders in the United Kingdom context (20), a rule of thumb of ten interview participants was deemed sufficient for data saturation in this study's focus area. Although the qualitative sample size is small, a dense sample specificity (participants from a homogenous group) and high-strength interview guide (semi-structured interview questions) contribute towards information trustworthiness in this study (21,22). Purposive sampling guided the recruitment of participants. Purposive sampling works by identifying and selecting participants that meet the predetermined important criteria (23). This strategy ensured a balanced representation of students in terms of ethnicity, gender, and degree year of study. The CE student club president assisted in recruiting participants. Eligible participants were approached and invited to participate via WhatsApp. The participants were given an online briefing on the study's background and purpose, and the assurance of anonymity and confidentiality for input provided. Consent from participants was acquired electronically before interview sessions were carried out. Participation in the study was strictly voluntary, with participants being able to withdraw their participation at any point of the interview process. None of the recruited participants withdrew their consent during this study.

The inclusion criteria for this study were undergraduate

engineering students from the Chemical Engineering program at the USM campus, who were in their 1st to 4th year of studies, had social media accounts, and had reasonable proficiency in English communication. Exclusion criteria comprised international undergraduate students, those practicing therapeutic diets, and/or diagnosed with eating disorders.

Data Collection

The interview sessions were carried out online, using Zoom meeting application at time slots convenient for participants. Each interview session took between 45 minutes and an hour (24,25). The research session duration provided sufficient time for addressing and probing study areas with participants while not overburdening participants. All interview sessions were conducted in the English language to avoid the intended meaning of study participants being lost or misinterpreted in the translation process. The main task was to seek and collect deep information and knowledge from participants. The transcription of interview recordings was assisted by Sonix software. The researcher rewatched the interview recordings comparing against initial transcriptions as needed, listened carefully to verbal input of participants and reread interview transcripts to ensure the accuracy of the transcriptions. Data collection was semi-structured and flexible. Data was collected and reviewed synchronously and asynchronously during online interview sessions and from recordings of the research sessions (25). The data collection process took approximately 7 weeks to complete, from October 2021 to mid-November 2021. Due to data collection taking place during a pandemic period of restricted movement and social distancing, the online mode of interviewing was appropriately safe and convenient. Restricted movement during the pandemic may have increased social media usage and affected eating habits. Thus, the study period provided a suitable circumstance for exploring social media influence on eating habits among participants.

Data Analysis

In this research, a hybrid approach of deductive top-down and inductive bottom-up thematic analysis (26,27) was chosen to interpret primary data of this research. Thematic analysis is a process for identifying, analysing and reporting themes within qualitative data (28). The deductive top-down approach involves coming to the data with preconceived themes and existing knowledge whereas the inductive bottom-up approach involves generating themes from the data. Doing a hybrid thematic analysis involves three phases, which contain seven stages in total (27). The three phases were carried out sequentially but the stages within each phase can be taken concurrently or in any order. Phase 1 includes (1) prepare a table of the codes and information, (2) creating priori codes from study aims, research questions and interview questions, and (3) familiarising with the data by reading and re-reading the interview transcripts.

Then, Phase 2 involves (4) generating a priori and posteriori coding, and (5) systematically organise the data onto the table. In the Phase 3, (6) the codes will be examined and turned into themes that are relevant to the research questions, and (7) the preliminary themes will be reviewed and modified to make sure the themes are coherent and distinct from each other. The process was continued by interpreting, defining the themes and writing up an analysis. Data analysis was commenced by the researcher immediately after the very first interview session. Findings from the initial data analysis guided probing during subsequent interview sessions. All findings synthesized from thematic analysis were subsequently checked for accuracy by another research team member.

Ethical considerations

The ethics of this research was conducted at the Human Research Ethics Committee of USM (JEPeM), with the number USM/JEPeM/21060475.

RESULTS

This paper presents the findings of FRSMC and eating habits obtained from interviews with recruited engineering undergraduate students. This study involved a total of 10 study participants who were undergraduate students in the CE program. The participants varied in terms of gender, ethnicity, and degree year of study. Insights from the study participants were categorized under four sub-sections: types of FRSMC used, influences of FRSMC on eating habits, issues faced in using FRSMC, and strategies to improve FRSMC. Thematic findings are supported with quotes to illuminate the analysis and provide context for important issues.

Participants' characteristics

The study involved undergraduates from USM's Chemical Engineering program who actively use social media platforms. Participants were equally divided by gender and consist of Malay, Chinese, and Indian ethnicities, spanning various academic years. Table I shows the characteristics of the study participants.

Table I: Overview of participants

Participant	Gender	Ethnicity	Year of study
A	Male	Malay	4
B	Male	Indian	4
C	Female	Malay	4
D	Male	Chinese	3
E	Female	Malay	3
F	Female	Indian	3
G	Male	Malay	2
H	Female	Chinese	2
I	Male	Chinese	1
J	Female	Malay	1

Types of FRSM used

FRSMC that attract and engage participants the most are (1) food advertising and promotions, (2) cooking tutorials and, (3) food and nutrition information.

Food advertising and promotions

Majority of the participants described how food advertising and promotions on social media attracts their attention. The attractiveness of food advertising and promotions were articulated as follows: “The way that they present the food in the advertisement is really interesting. The colour of the food and how they make it seem like it tastes good.” (Participant A)

“I like food showcased in a nice quality video. For example, the melting cheese at the beginning of the video. It’s engaging to watch it until the end.” (Participant D)

“I think videos attracted me easily. I get to see the whole cooking process and the expression of people enjoying the food. It’s very attractive.” (Participant I)

The presented quotes indicate that food advertisements are deemed attractive based on use of colour, quality of video, motion and acts of food enjoyment.

Cooking tutorials

Responses from participants B, G, I and J explained the reasons they engage with cooking tutorials on social media. The following answers describe the attractiveness of cooking videos: “High-quality cooking videos with the explanation given are the best. It should be clear; the plating should be nice and attractive. It looks delicate and nice.” (Participant B)

“I would say, food vlogger. They make creative food videos to introduce special and popular food. Some of the videos are short but they deliver important messages. They also share how to cook those food.” (Participant J)

Food and nutrition information

Few participants (C, E, F and J) mentioned that food and nutrition information on social media is interesting and beneficial. The interesting food facts, healthy cooking tips and eating guideline are captured in the following responses:

“Those posts attracted me on how they cook delicious meal without using much oil. They taught us how to use air fryer. They taught us about the hidden sugar and hidden fats. I find these kinds of posts interesting and beneficial.” (Participant C)

“The post would encourage me to eat healthy according to Malaysian Healthy Plate. Social media changed my eating patterns. I tried to eat balanced meals. I eat more vegetables and consume less sugar. I don’t drink a lot of sweet beverages anymore. Social media influenced me

in that way.” (Participant J)

Table II presents findings from Part B, C, and D, which are categorized into three subsections: the influence of FRSMC on eating habits of study participants, the issues that they faced in using FRSMC, and their proposed strategies to improve FRSMC.

Table II: Themes and subthemes

Theme	Subthemes
Influences of FRSMC on Eating Habits	
Potential to support healthy eating habits	<ul style="list-style-type: none"> • Being inspired and motivated • Information and idea
Potential to influence food choice	<ul style="list-style-type: none"> • Positive influences on food choice • Negative influences on food choice • Increase appetite
Negative effects on emotional well-being	<ul style="list-style-type: none"> • Feeling guilty for eating too much • Being demotivated
No influence on eating habits	<ul style="list-style-type: none"> • Parental feeding • Accessibility to food
Issues in using FRSMC	
Unrealistic and untrustworthy content	<ul style="list-style-type: none"> • Unrealistic expectations around food • Untrustworthiness
Difficult and repetitive content	<ul style="list-style-type: none"> • Repetitive FRSMC • Having trouble understanding nutrition-related content
Poor adherence to healthy diet	<ul style="list-style-type: none"> • Low self-discipline • Inadequate access to healthy food
Profit-oriented content	<ul style="list-style-type: none"> • No specific subtheme
Social media algorithms	<ul style="list-style-type: none"> • No specific subtheme
Strategies to improve FRSMC	
Trustworthy content	<ul style="list-style-type: none"> • Educational and informative content by professionals • Accurate representation in advertisement
Engaging content	<ul style="list-style-type: none"> • Create interactive activities • Be trendy and innovative

Influences of FRSMC on eating habits

Interview findings regarding influences of FRSMC on participants are categorized under four key themes: (1) potential to support healthy eating habits; (2) potential to influence food choice; (3) negative effects on emotional well-being; and (4) no influence on eating habits. Table II presents these themes and their subthemes; each theme and subtheme are presented alongside quotations in the following section.

Potential to support healthy eating habits

Participants revealed that FRSMC facilitated their adherence to healthy eating. Participants C and E described how FRSMC boosted their motivation to practice healthy eating habits. The content also helps them to adopt a positive mind-set towards food. The benefits of FRSMC are captured in the following responses:

"It just increases my spirit to do better. I mean to do better in terms of losing some weight. So, I'm motivated." (Participant C)

"Most importantly, it changes my mindset on how I see food and calories. Maybe it's about how I look at some food that I used to find delicious but now when I look back at it, I don't really think that it's delicious." (Participant E)

Some participants described how FRSMC provides them with ideas for healthy recipes. They explained that FRSMC provided them with practical ideas and tips about healthy cooking which, in turn, boosted their creativity in cooking. The ideas and tips for healthy cooking include replacing commonly used food ingredients with healthier options and minimizing oil in cooking:

"I normally watch cooking videos. 'This is how they make it. Wow!' Then, I'm thinking about it and can make some the next day." (Participant B)

"I find out that some people would substitute some ingredients with other stuffs to make healthy meals. To make them interesting and fun to eat. I also try to minimize oil usage in my cooking and not using sugar in my cooking." (Participant C)

"I got to learn a lot of new recipes of different cuisines. When I am exposed to different cultures and cuisines like recently, I tried to make the tteok-bokki (Korean simmered rice cakes). I get to learn something new and I made it." (Participant F)

In addition, FRSMC was mentioned as a tool to dispel myths and establish real nutritional facts.

"It's nice to see the knowledge that most people think it's a myth, but actually, it's true. People think that one needs to eat lesser than daily requirement to lose weight, the truth is we can eat more but still within our daily requirement." (Participant E)

Potential to influence food choice

Participants revealed how FRSMC helps in making changes to their eating habits. Participants A, C, E and J described how FRSMC helped them in choosing healthy food and expanding their food interests. The participants mentioned learning about healthy food choices:

"It does affect my eating habit, when I watch YouTube, I see that eating this food will make you healthy, so I will try my best to eat that food." (Participant A)

"I'm more careful with what I consume, like how much protein to eat. I am more knowledgeable on how to plan my meals. I have learned how to replace my unhealthy snacks with healthy snacks." (Participant E)

"I saw videos about okra, so I start trying it. I would try more vegetables. I eat less sugar nowadays. I won't eat fish last time; I just ate plain rice with a lot of eggs. I'm

open to eating fish." (Participant J)

On the other hand, participants B, F, G, H and I described how food promotions and food vouchers cause them to increase unhealthy food consumption. These responses represent the views expressed:

"I am dieting, I want to stick to my 2000 kcal but suddenly the doughnut ad comes in, I feel like eating doughnuts, I think I deserve a doughnut. I buy it at the end." (Participant F)

*Dieting mentioned by the participant is not a therapeutic diet for any particular diagnosis or disease.

"It brings the bad side to my eating habits because they always recommend me unhealthy food. There are vouchers or promotion on the app, it's so worth it, so I would order the food most of the time." (Participant H)

"When they have promotion, you know, people are greedy, I would want to buy it and buy more for a lower price." (Participant I)

In addition, few participants mentioned that FRSMC caused food cravings and increased appetite. Exposure to content of delicious food arouses the urge to eat, thus, leading them to consume more food. Their feelings are captured in the following responses:

"The food shown on social media looks appetizing and delicious. It makes me feel hungry, so I will get food from the kitchen to satisfy my food craving." (Participant G)

"The contents will lift up your appetite. When I saw it, it makes me want to find something to eat. I will take some biscuits as snacks. It will make me want to take supper." (Participant I)

Negative effects on emotional well being

Participants perceived that FRSMC could negatively affect their emotional well-being. Viewing FRSMC seemingly provoked some participants to compare these with their eating habits and feel guilty when they did not match up. Their feelings were articulated as follows:

"I watch this youtuber, in her YouTube video, she will vlog about the whole day and what she eats in a day. She eats very little a day. That's like what I eat for one meal. Then I feel guilty and self-conscious, maybe I am eating a lot." (Participant F)

"There's a lot of social media influencers will post what they eat. I will wonder how are they so thin when they eat these kinds of greasy food. This would impact my eating habits sometimes because I think I eat too much rice; I'm scared that I will gain weight." (Participant J)

The demotivating effect of FRSMC was identified by a few participants. A participant who watches "What I Eat in a Day" or "mukbang (eating broadcast)" videos often struggle with her relationship with food. Another participant reported being left with negative feelings

after reading unhealthy quotes from some influencers. "I don't feel good. I feel like I don't even want to watch the video anymore. Let me just not eat today." (Participant F)

"Some influencers' advices are full of toxic quotes. They're quite harsh in their words, so it's not really effective on some people. It's triggering." (Participant E)

Issues in using FRSMC

Interview findings regarding issues faced by study participants in using FRSMC are presented under 5 key themes: (1) unrealistic and untrustworthy content; (2) difficult and repetitive content; (3) poor adherence to healthy diet; (4) profit-oriented content; and (5) social media algorithms. Each theme and subtheme are presented alongside quotations in the following section.

Unrealistic and untrustworthy content

Participants perceived that the FRSMC was unreliable. Some participants mentioned that food advertising caused dissatisfaction about food due to misleading or inaccurate representation of the food. The actual food product differs from the advertised food product in terms of size and aesthetic appearance. Their feelings were articulated as follow:

"The food is not as good as they advertise it. The colour, shape and taste of the food is really good but not same as my expectation." (Participant A)

"I watch the advertisement; the burger looks so tasty and big. After I get myself the burger, that is not what I was hoping for. It would be a disappointment but luckily the taste was there." (Participant B)

Few participants pointed out that it was difficult to trust the nutrition-related content, especially those with no references. Nutrition-related content from different sources was also confusing due to a lack of standardization.

"Some social media influencers don't give that kind of insights on how to prepare a healthy meal. I had to do my research. Some of them are giving misleading advice." (Participant E)

"It's quite confusing for me because different pages have different information. I don't know which one to follow. As a viewer, I don't know whether the information provided is correct. The accuracy of information is not guarantee." (Participant H)

Difficult and repetitive content

Participant described that some nutrition-related content was hard to comprehend. The difficulty level of some nutrition-related content was too high. Participant perceived that the content was not engaging because he could not understand the content.

"It's not engaging because it's too difficult to be understood. They used too many scientific words."

(Participant I)

In addition, some participants perceived that repetitive food advertisements were annoying. They would skip or ignore those content.

"They do promotions on their social media pages, so I keep seeing the ads pop up on my feeds. It's quite annoying. I just skip it." (Participant D)

"I'm getting a lot of advertisements on social media, which annoys me a lot." (Participant G)

Social media algorithms

Participant input highlighted that posts on healthy food are generally not part of social media feed or timeline if not engaging much for such content. Hence, might miss out on important and useful healthy food preparation information due to social media algorithms.

"Some social media influencers don't give that kind of insights on how to prepare a healthy meal. I had to do my research. I think this information should be more promoted, but I don't see it until I searched for it." (Participant E)

Algorithms may be helpful in suggesting the best content for one's interests. However, it becomes problematic when algorithms recommend all kinds of unhealthy FRSMC. The issue with algorithms can be seen in this response:

"I would search for food promotions. I also followed the milk tea pages, so these kind of unhealthy food posts always pop out on my feeds." (Participant H)

Strategies to improve FRSMC

Interview findings regarding strategies to improve FRSMC are presented in line with two key themes: (1) trustworthy content; and (2) engaging content.

Trustworthy content

Participants desire for more healthcare professionals to get involved in creating and sharing educational and informative FRSMC. Participants expressed preferring health and nutrition related content shared by professionals. They hope that professionals can provide more practical information and tips on healthy food preparation. Content shared by professionals could counter myths about nutrition and health.

"They should give more insight on how they should prepare their meals; how should they count their calories based on their body weight. Breaking the myths about food-related content. If they break the myth, they educate me on the right facts." (Participant E)

"Doctors can post about nutrition. The content creator, Doctor Mike shares a lot of food and health related content. His explanation is detailed and easy to understand. It makes me want to watch till the end." (Participant G)

"I think it's more convincing to have doctors or pharmacists to explain about health issues because they are certified and know more about this field." (Participant H)

Participant input suggested that nutrition-related content should be explained in layperson's terms for better understanding.

"I like and I want information related to health. However, I don't want this in a complicated scientific explanation." (Participant I)

In addition, one participant perceived that there was more foreign FRSMC compared to Malaysian food content. Local content creators should create more nutritional content about Malaysian cuisine. The view is expressed as follow:

"When I see information posts on social media, I noticed the content are mostly about Western food like chips. I think they should do more nutritional information of Malaysian cuisine like roti canai and nasi lemak." (Participant J)

Engaging content

Participants suggested that interactive content can increase followers' engagement. Participants input suggested that FRSMC creators should create interactive posts regularly. Participants believed that interactive content and approaches could engage viewers. The suggested interactive content and approaches were expressed as follows:

"I think they can have discounts or giveaways healthy food product. It's the best way for the healthy food to be recognized." (Participant A)

"I think can add some activities like lucky draw, crossword puzzles and contests. I would want to play and learn from the content. I prefer those engaging activities throughout the posts. Something like hashtag competitions would be fun." (Participant D)

"Content creators should interact with their followers to increase engagement. They can post a lot of infographics and do weekly Question-and-Answer. Live session is also good, then they can add the Question-and-Answer sessions to Instagram story highlight." (Participant E)

Participants also mentioned that trendy and innovative content is more attractive. Participants commented that users are more attracted to trendy FRSMC. In addition, captivating animation could be used to improve user comprehension of nutritional knowledge.

"I would say keep up with the trend. I feel like it is a smart way to attract people. For the ads, promotion and nutritional info, they have to be trendy and up to date with what people are into, the hype." (Participant F)

"I think they should improve in decorating their posts. They can create interesting animations for better understanding." (Participant I)

Participant input suggested innovation in food aesthetics

and presentation for promoting healthy diets. This response represents the view expressed:

"I think maybe they can try to make the healthy food look like fast food. If the food looks appetizing, I think people will go for it." (Participant A)

DISCUSSION

FRSMC influence towards eating habits

The first objective of this study is to identify types of FRSMC used among participants. The results demonstrate that the participants engaged mostly with food advertising and promotions, cooking tutorials, and food and nutrition information.

The study's second objective is to understand how FRSMC influences the participants' eating habits. The results show that most participants cited both positive and negative outcomes. Positive outcome where FRSMC potentially supports healthy eating habits. Online health information on participants' social media feeds is perceived to be useful. The content assisted and motivated the study participants to practice healthy eating habits like reducing or eliminating junk food. These findings confirm existing literature highlighting the helpfulness of online nutrition or healthy diet information as guidance for healthy lifestyle decisions (29). Study results also demonstrate FRSMC to have a positive influence on food choice made by the participants. As many social media platforms utilize mobile applications, results from this study have overlap with research documenting use of mobile application leading to increased consumption of fruits and vegetables (30).

Conversely, the findings from this study indicate that FRSMC can have a negative impact on food choices that the participants made. The findings suggest that undergraduates' exposure to unhealthy food brands advertisement raises their purchase intention and likelihood of consuming unhealthy foods and drinks. The findings have similarities with a previous study on junk food advertising where participants' urge to eat increased when exposed to food advertising (31). The findings from Kidd & Loxton's (31) study suggested that exposure to junk food advertising may lead to maladaptive eating behaviours. However, earlier research indicates that the advertising of healthy food can positively influence eating behaviour. Advertisement of healthy food has been found to be significantly associated with consumption of fruits and vegetables by Malaysian university students (32). In order to promote healthy eating habits, advertising of healthy food could highlight product benefits to the intended audience and consumers (33).

FRSMC was found to negatively affect the emotional well-being of the participants. The findings affirm previous studies demonstrating how undergraduates experience short-term negative mood and body dissatisfaction

due to social media influencers' eating habits (34,35). Research by Holland & Tiggemann (36) highlighted that individuals who are more engaged on social media show a higher level of body-related and eating concerns. Another previous study also suggested that a high percentage of social media users who followed health food accounts met criteria of eating disorder, with higher social media usage associated with more symptoms (37). However, the current study differed from a study by Eow and Gan (38) where Malaysian undergraduates with or without eating disorder show no difference in social media usage. It can be deduced that social media usage can have both positive and negative implications on eating habits. However, eating habits and disorders could also be influenced by other factors such as increased cost of food and beverages, changes in family organization as well as perceived pressure and peer comparison with regards to physical appearance (39,40).

Issues faced in using FRSMC

This study's third objective is to identify issues faced by participants when using FRSMC. The findings demonstrate that participants are troubled by unrealistic and untrustworthy content. These findings affirm existing literature documenting that laypersons often face difficulties in assessing the accuracy and trustworthiness of online health information (41). Therefore, health and nutrition information provided by healthcare professionals might seem more credible compared to such information being delivered by non-healthcare social media creators (42,43). On the other hand, participants in this study often could not understand scientific terms used by healthcare professionals for FRSMC. It can be deduced that positive health outcomes from FRSMC may require both credibility and clarity of message.

Another issue identified by this study relates to poor adherence to a healthy diet. The findings demonstrate that some participants could not adopt a healthy diet due to low accessibility to healthy food. This finding affirms existing literature documenting that a lack of healthy food options on campus can affect eating habits of undergraduates (5). The current study found that failure to eat healthily can be due to dislike for nutritious food options. This study findings have similarities with a previous study on barriers towards healthy eating among Malaysians. In the previous study, healthy food choices are perceived by some Malaysians to be boring, tasteless, bland and unappealing (44). Previous studies cited that personal attitude, health consciousness and subjective norms are important factors that influence one's purchase and consumption of healthy food (45,46). Participants also pointed out how social media algorithms determine the FRSMC directed to their social media feeds or timelines. Participants who rarely search for food and nutrition content might have less of such content directed to them on social media.

Health and nutrition promoters might need to tailor efforts accordingly to disseminate useful FRSMC to such consumers. This finding underscored the importance of employing advanced algorithms to enhance the reliability and utility of health-related content available to the public on social media platforms, aligning with existing literature (47).

Strategies to improve FRSMC

This study's fourth objective sought to elicit from participants, strategies to improve FRSMC. Participants generally perceived FRSMC created by healthcare providers to be more trustworthy compared to content from non-expert sources. The findings mirror research by Kunig & Breves (41) where scientists are perceived to possess relevant expertise compared to laypersons. However, based on earlier research, it is important to note that professional background alone may not guarantee likability, the credibility of health information and users' intention to read the health information and share it via social media (41).

This study's findings suggest that trendy, innovative and interactive nutrition-related content could increase user engagement. The findings contrast with research by (48). where engagement with health and nutrition related content is perceived to be meaningful when users are actively seeking and sharing health information. Further research could study the seeking and sharing of nutrition content that satisfies relevant engagement criteria.

This study's findings could provide valuable feedback for healthcare professionals in creating effective FRSMC to promote healthy eating habits. Healthcare professionals can adapt social media strategies like hashtags, facilitating Question-and-Answer sessions, and providing health information references for higher engagement. These findings also lay the groundwork for future quantitative studies testing the link between FRSMC and eating habits, potentially leading to improved interventions. As Heldman et al. highlights, engagement on social media humanizes communications and demonstrates a commitment to public health (49).

This study faced limitations due to the inherent challenges of qualitative research conducted by a single researcher within constrained timeframes. As a result, the sample size remained small, exclusively comprising CE undergraduate students from one university. However, sufficient interviews are carried out to capture dominant themes in a homogenous sample.

Another study limitation is that this study's exclusive focus on consumers' perspectives towards FRSMC. To enhance data validity, future research can incorporate input from content creators (50). Additionally, the sensitive nature of the topic related to personal eating habits may introduce potential participant bias in feedback. However, confidentiality measures were

implemented to mitigate this concern.

Due to limited research regarding eating habits and FRSMC, further research could involve a larger sample of students and different Malaysian demographic groups. Moreover, further research is needed to elucidate how FRSMC influences eating habits, potentially through quantitative cohort studies exploring causal links with factors such as emotional health, income level and the accessibility to healthy food options.

CONCLUSION

In this paper, the responses from participants fulfilled the study aims of evaluating the exposure and understanding towards FRSMC among engineering students at USM. The FRSMC that attract and engage participants the most were identified, namely food advertising and promotions, cooking tutorials and, food and nutrition information. It was found that FRSMC potentially supports the healthy eating habits of undergraduates. However, FRSMC has its advantages and disadvantages. Some FRSMC negatively influences the food choice and emotional well-being of undergraduates. Unrealistic, untrustworthy, and repetitive content are issues commonly faced by participants in using FRSMC. Profit-oriented content and social media algorithms are unique issues faced by the participants. They proposed for FRSMC to be educational, informative, credible and trendy for better engagement.

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REFERENCES

1. World Health Organization. (18 4, 2019). Retrieved from Malaysia and WHO call for more investment in primary health care the 21st century: <https://www.who.int/malaysia/news/detail/08-04-2019-malaysia-and-who-call-for-more-investment-in-primary-health-care-the-21st-century>
2. Hernández-Jaca S, Huber-Pérez T, Palma-Leal X, Guerrero-Ibacache P, Campos-Nucez V, Zavala-Crichton JP, Jorquera-Aguilera C, Sadarangani KP, Rodríguez-Rodríguez F, Cristi-Montero C. Effect of a Single Nutritional Intervention Previous to a Critical Period of Fat Gain in University Students with Overweight and Obesity: A Randomized Controlled Trial. *Int J Environ Res Public Health*. 2020 Jul 16;17(14):5149. doi: 10.3390/ijerph17145149.
3. LaCaille L. Eating Behavior. In: Gellman, M.D., Turner, J.R. (eds) *Encyclopedia of Behavioral Medicine*. 2013. Springer, New York, NY. doi:10.1007/978-1-4419-1005-9_1613
4. Deliens T, Clarys P, De Bourdeaudhuij I, Deforche B. Determinants of eating behaviour in university students: a qualitative study using focus group discussions. *BMC Public Health*. 2014;14:53. doi: 10.1186/1471-2458-14-53.
5. Stok FM, Renner B, Clarys P, Lien N, Lakerveld J, Deliens T. Understanding Eating Behavior during the Transition from Adolescence to Young Adulthood: A Literature Review and Perspective on Future Research Directions. *Nutrients*. 2018 May 24;10(6):667. doi: 10.3390/nu10060667.
6. Gahagan S. Development of eating behavior: biology and context. *J Dev Behav Pediatr*. 2012 Apr;33(3):261-71. doi: 10.1097/DBP.0b013e31824a7baa.
7. Adamski M, Truby H, Klassen K, Cowan S, Gibson S. Using the Internet: Nutrition Information-Seeking Behaviours of Lay People Enrolled in a Massive Online Nutrition Course. *Nutrients*. 2020 Mar 12;12(3):750. doi: 10.3390/nu12030750.
8. Childs LM, Martin CY. Social media profiles: striking the right balance. *Am J Health Syst Pharm*. 2012 Dec 1;69(23):2044-50. doi: 10.2146/ajhp120115.
9. Ventola CL. Social media and health care professionals: benefits, risks, and best practices. *P T*. 2014;39(7):491-520. Retrieved from https://www.researchgate.net/publication/264431747_Social_Media_and_Health_Care_Professionals_Benefits_Risks_and_Best_Practices
10. Dada IO, Ajayi K, Werimagbe M. Exploring Mass Media to Improve Fruit Consumption Pattern of a Section of Nigerian Adult Population. *Annals of the Romanian Society of Cell Biology* 2021;25:4604-4616
11. Klassen KM, Douglass CH, Brennan L, Truby H, Lim MSC. Social media use for nutrition outcomes in young adults: a mixed-methods systematic review. *Int J Behav Nutr Phys Act*. 2018 Jul 24;15(1):70. doi: 10.1186/s12966-018-0696-y.
12. Vaterlaus J M, Patten Ev, Roche C, Young JA. Getting healthy: The perceived influence of social media on young adult health behaviors. *Computers in Human Behavior*, 2015;45:151–157. doi:10.1016/j.chb.2014.12.013
13. Li J, Powdthavee N. Does more education lead to better health habits? Evidence from the school reforms in Australia. *Soc Sci Med*. 2015 Feb;127:83-91. doi: 10.1016/j.socscimed.2014.07.021.
14. Choudhary S, Nayak R, Kumari S, Choudhury H. Analysing acculturation to sustainable food consumption behaviour in the social media through the lens of information diffusion. *Technological Forecasting and Social Change*, 2019;145:481–492. doi:10.1016/j.techfore.2018.10.009
15. Corbin J, Strauss A. Practical Considerations for Getting Started. In *Basics of Qualitative Research (3rd ed.): Techniques and Procedures for Developing Grounded Theory* (p. 39). 2008. SAGE Publications, Inc. doi:10.4135/9781452230153

16. Chen H. College-Aged Young Consumers' Perceptions of Social Media Marketing: The Story of Instagram. *Journal of Current Issues and Research in Advertising*, 2018;39(1), 22–36. doi: 10.1080/10641734.2017.1372321
17. Sogari G, Velez-Argumedo C, Gymez MI, Mora C. College Students and Eating Habits: A Study Using An Ecological Model for Healthy Behavior. *Nutrients*. 2018;10(12):1823. doi: 10.3390/nu10121823.
18. Pope C, van Royen P, Baker R. Qualitative methods in research on healthcare quality. *Qual Saf Health Care*. 2002 Jun;11(2):148-52. doi: 10.1136/qhc.11.2.148.
19. Guest G, Namey E, Chen M. A simple method to assess and report thematic saturation in qualitative research. *PLoS One*. 2020;15(5):e0232076. doi: 10.1371/journal.pone.0232076.
20. Brown S, Opitz MC, Peebles AI, Sharpe H, Duffy F, Newman E. A qualitative exploration of the impact of COVID-19 on individuals with eating disorders in the UK. *Appetite*. 2021;156:104977. doi: 10.1016/j.appet.2020.104977.
21. Aldiabat KM, Le Navenec CL. Data saturation: The mysterious step in grounded theory methodology. *Qualitative Report*, 2018;23(1):245–261. doi:10.46743/2160-3715/2018.2994
22. Malterud K, Siersma VD, Guassora AD. Sample Size in Qualitative Interview Studies: Guided by Information Power. *Qual Health Res*. 2016;26(13):1753-1760. doi: 10.1177/1049732315617444.
23. Palinkas LA, Horwitz SM, Green CA, Wisdom JP, Duan N, Hoagwood K. Purposeful Sampling for Qualitative Data Collection and Analysis in Mixed Method Implementation Research. *Adm Policy Ment Health*. 2015;42(5):533-44. doi: 10.1007/s10488-013-0528-y.
24. Harvey W S. Strategies for conducting elite interviews. *Qualitative Research*. 2011;11(4):431–441. doi:10.1177/1468794111404329
25. Moser A, Korstjens I. Series: Practical guidance to qualitative research. Part 3: Sampling, data collection and analysis. *Eur J Gen Pract*. 2018;24(1):9-18. doi: 10.1080/13814788.2017.1375091.
26. Fereday J, Adelaide N, Australia S, Eimear Muir-Cochrane A. Demonstrating Rigor Using Thematic Analysis: A Hybrid Approach of Inductive and Deductive Coding and Theme Development. *International Journal of Qualitative Methods*, 2006;5(1):80–92. doi:10.1177/160940690600500107
27. Swain J. A Type of Thematic Analysis Using an Example of Interview Data About an Adult Learning Mathematics. In *A Type of Thematic Analysis Using an Example of Interview Data About an Adult Learning Mathematics*. 2019. SAGE Publications, Ltd. doi:10.4135/9781526486578
28. Braun V, Clarke V. Using thematic analysis in psychology. *Qualitative Research in Psychology*, 2006;3(2):77–101. doi:10.1191/1478088706QP063OA
29. McKinley CJ, Wright PJ. Informational social support and online health information seeking: Examining the association between factors contributing to healthy eating behavior. *Computers in Human Behavior*, 2014;37:107–116. doi:10.1016/j.chb.2014.04.023
30. Syrkiewicz-Światała M, Detyna B, Sosada N, Detyna J, Światała R, Bitkowska A, Szkutnik J. Mobile applications and eating habits among women and men – Polish experiences. *Biocybernetics and Biomedical Engineering*, 2021;41(3):1093–1106. doi:10.1016/j.BBE.2021.07.003
31. Kidd C, Loxton NJ. Junk food advertising moderates the indirect effect of reward sensitivity and food consumption via the urge to eat. *Physiol Behav*. 2018;188:276-282. doi: 10.1016/j.physbeh.2018.02.030.
32. Sulaiman Y, Mohamad ZS, Ismail MYS. Factors influencing food consumption among university students. *WSEAS Transactions on Business and Economics*, 2021;18:501–510. doi:10.37394/23207.2021.18.51
33. Mohammad M, Majid M, Faizal M, Badyalina B, Ramdhan A, Mohammad N. Factors Influencing the Purchase Intention of Young Consumers Towards Healthy Food Products in Malaysia. *Advances in Business Research International Journal* 2021; 7(2):182-189. doi: 10.24191/abrij.v7i2.15201
34. Easton S, Morton K, Tappy Z, Francis D, Dennison L. Young People's Experiences of Viewing the Fitspiration Social Media Trend: Qualitative Study. *J Med Internet Res*. 2018;20(6):e219. doi: 10.2196/jmir.9156.
35. Karsli Y, Karsli TA. Media Effects on Body Image and Eating Attitudes of the Women Living in Metropolitan and Rural Areas in a Turkish Population. *Procedia - Social and Behavioral Sciences*, 2015;205:99–102. doi:10.1016/j.SBSPRO.2015.09.030
36. Holland G, Tiggemann M. A systematic review of the impact of the use of social networking sites on body image and disordered eating outcomes. *Body Image*. 2016;17:100-10. doi: 10.1016/j.bodyim.2016.02.008.
37. Turner PG, Lefevre CE. Instagram use is linked to increased symptoms of orthorexia nervosa. *Eat Weight Disord*. 2017;22(2):277-284. doi: 10.1007/s40519-017-0364-2.
38. Eow SY, Gan WY. (2018). Social media use, body image, and body weight status: comparison between university students with and without disordered eating in Universiti Putra Malaysia. *International Journal of Public Health and Clinical Sciences* 2018;5(1):129-145.
39. Svantorp-Tveiten KME, Torstveit MK, Rosenvinge JH, Sundgot-Borgen C, Friborg O, Bratland-

- Sanda S, Pettersen G, Sundgot-Borgen J. Effect of A Healthy Body Image intervention on risk- and protective factors for eating disorders: A cluster randomized controlled trial. *Mental Health and Prevention*, 2021;24(6):200225. doi:10.1016/J.MHP.2021.200225
40. Vidal L, Brunet G, Curutchet MR, Girona A, Pardicas V, Guerra D, Platero E, Machado L, González F, Gugliucci V, Ares G. Is COVID-19 a threat or an opportunity for healthy eating? An exploration of the factors that moderate the impact of the pandemic on eating habits in Uruguay. *Appetite*. 2021;167:105651. doi: 10.1016/j.appet.2021.105651.
 41. Kunig L, Breves P. Providing health information via Twitter: professional background and message style influence source trustworthiness, message credibility and behavioral intentions. *Journal of Science Communication*, 2021;20(4):1–18. doi:10.22323/2.20040204
 42. Bautista JR, Zhang Y, Gwizdka J. Healthcare professionals' acts of correcting health misinformation on social media. *Int J Med Inform*. 2021;148:104375. doi: 10.1016/j.ijmedinf.2021.104375.
 43. Swire-Thompson B, Lazer D. Public Health and Online Misinformation: Challenges and Recommendations. *Annu Rev Public Health*. 2020;41:433-451. doi: 10.1146/annurev-publhealth-040119-094127.
 44. Sharkawi I, Mohamed Z, Rezai G. Healthy Eating: Preventive Factors among Malaysians. *Journal of Economics, Business and Management*. 2014;4(4):257-261. doi:10.7763/JOEBM.2014.V2.135
 45. Mamun AA, Hayat N, Zainol NRB. Healthy Eating Determinants: A Study among Malaysian Young Adults. *Foods*. 2020;9(8):974. doi: 10.3390/foods9080974.
 46. Wang X, Pachó F, Liu J, Kajungiro R. Factors Influencing Organic Food Purchase Intention in Developing Countries and the Moderating Role of Knowledge. *Sustainability*, 2019;11(1):209. doi:10.3390/SU11010209
 47. Shah N, Srivastava G, Savage DW, Mago V. Assessing Canadians Health Activity and Nutritional Habits Through Social Media. *Front Public Health*. 2020;7:400. doi: 10.3389/fpubh.2019.00400.
 48. Mirzaei T, Esmaeilzadeh P. Engagement in online health communities: Channel expansion and social exchanges. *Information and Management*, 2021;58(1):103404. doi:10.1016/J.IM.2020.103404
 49. Heldman AB, Schindelar J, Weaver JB. Social Media Engagement and Public Health Communication: Implications for Public Health Organizations Being Truly "Social". *Public Health Reviews*, 2013;35(1):1-18. doi:10.1007/BF03391698
 50. Carter N, Bryant-Lukosius D, DiCenso A, Blythe J, Neville AJ. The use of triangulation in qualitative research. *Oncol Nurs Forum*. 2014;41(5):545-7. doi: 10.1188/14.ONF.545-547. PMID: 25158659.