

Use of Instagram® to Educate Adolescents on Nutrition Labelling: A Feasibility Study in Selangor, Malaysia

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ABSTRACT

This study was undertaken to assess the demand and acceptance of an Instagram-based nutrition labelling education (Info-Nutriteen®) among adolescents. In this quasi-experimental study, a series of educational messages was developed and was uploaded on Instagram for 12 weeks. Participants were recruited and randomized into the intervention group or control group. Feasibility was assessed through participants' demand and acceptance of the program. Changes in nutrition knowledge and Knowledge, Attitudes, and Practices (KAP) on nutrition labels were measured at pre- and post-intervention. A total of 125 participants completed the program. Overall, 92.7% of the participants reported positive acceptance towards Info-Nutriteen®. In terms of demand, they suggested using current and trending songs for the videos and bright colours for the info-graphics. The study showed good demand and acceptance of the Instagram based education for adolescents. The Info-Nutriteen® program also effective to improve their attitude and practice on nutrition labels. Thus, this approach is feasible. Nevertheless, Info-Nutriteen® should be improved further to enhance its impact on nutrition labels knowledge and usage among adolescents.

Keywords: adolescents, feasibility study, instagram, nutrition labelling, social media

INTRODUCTION

Social media is a popular means of interaction among adolescents and young adults. It allows them to create, share, and exchange information in virtual communities and networks. Social media platforms are diverse and are continually evolving. Typical platforms include social networking sites, internet forums, blogs and microblogs, photograph or video sharing, crowdsourcing, podcasts, and virtual game or social worlds (Wong *et al.* 2014). Platform users can view and share information in both traditional formats (e.g., text, photos) and interactive formats (e.g., polls, chats, live video), which are free to all the users (Arigo *et al.* 2018).

Social media has transformed social communication immensely, and social

communication is no longer limited to keeping in touch with friends and family. A study has shown that many users nowadays use social media to seek and share healthcare and health-related issues (Househ *et al.* 2014). Indeed, the 2017 Internet Users Survey found that 77.2% of users relied on the Internet to seek health-related information online (MCMC 2017). The most common form of health-related information that users sought after was on symptoms and signs of diseases, health care tips, and available treatment methods.

Social media encourages participation and discussion, allowing the spread of key messages and promoting behaviour change in the community. Social media also helped in reaching people at their convenience, thus improving content availability, and possibly

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influencing satisfaction towards and trust in the health messages delivered (Neiger *et al.* 2012). Furthermore, several studies found that social media interventions improved participant motivation as well as their knowledge, attitude, and practices in various fields of healthcare (Perdana *et al.* 2018; Miller *et al.* 2017; Patel *et al.* 2015).

Social media, therefore, offers an attractive way of disseminating health-related information to adolescents. Currently, limited evidence is available on social media's impact on health communication in specific population groups, particularly among adolescents. As a popular social networking site for photo and video sharing, especially among users 24 years of age or younger, Instagram has attracted more than 1 billion active users since its introduction in 2010 (Statista 2019; Boulos *et al.* 2016). According to Boulos *et al.* (2016), Instagram has a high potential in conveying health information, especially among adolescents based on its user-friendly features that can give health information quickly and more widely. For example, Paul *et al.* (2018) conducted a study to see the effects of using different social media (Facebook, Twitter, Instagram) to raise awareness among youth in reducing the consumption of the foods high in fat and sugar. The study found that participants' engagement on Instagram was the highest based on the number of likes for each health message.

Nutrition labelling is one of the strategies implemented as an effort in the prevention of NCD, especially obesity. In 2013, WHO listed nutrition labeling as one of the key methods in the NCD Prevention Action Plan 2013–2020, which serves to improve individual food choice behavior. According to Miller and Cassady (2015), adequate nutritional knowledge can increase consumer awareness of nutrition labels. Thus, nutrition education on the importance of nutrition labels usage is important to assist consumers in selecting and consuming healthier foods.

This study's scope was to examine the feasibility of an Instagram-based nutrition education media for adolescents using compelling infographics and short videos. Feasibility research was used to assess the practicality of the new media to determine if the participant considered the media to be usable, exciting, and useful for delivering nutrition education among adolescents. According to Orsmond and Cohn (2015),

feasibility studies are important to evaluate the process of developing and implementing an intervention as well as a preliminary examination of participant responses to the intervention. This study was, therefore, aimed to assess the demand and acceptance of an Instagram-based nutrition labelling education (Info-Nutriteen®) among adolescents.

METHODS

Design, location and time

This 12-week study used a quasi-experimental, pre-post design to evaluate the feasibility of an Instagram-based nutrition labelling education (Info-Nutriteen®) among adolescents. It was conducted in Gombak, Selangor, from June to October 2018. Ethical approval was received from the Research Ethics Committee of Universiti Kebangsaan Malaysia (Project code: NN-2017-124).

Sampling

Participants were recruited from five public secondary schools in Gombak, Selangor, with permission from the Ministry of Education, Malaysia, and the Selangor State Education Department. Inclusion criteria were adolescents aged 13–14 years old; with the ability to communicate and understand Malay language; with smartphone and Internet access; Instagram active (at least twice a week); and owned a text message or Whatsapp application. Exclusion criteria included having physical or mental health problems that limited participation in data collection. Written parental permission and adolescent assent were obtained prior to participation.

One hundred and ninety-eight participants were screened at the beginning of the study; however, only 144 eligible and interested participants were invited to participate in this 12-week intervention. Participants were randomly assigned to either the intervention group (n=76) or the control group (n=68).

Data collection

Description of the Info-Nutriteen®. The 12-week intervention was grounded in nutrition labelling to introduce nutrition labels and the skills to interpret nutrition labels to choose healthier foods among adolescents. Content in

Info-Nutriteen® was developed based on the need analysis before this study (Jefrydin *et al.* 2019). Researchers used Microsoft PowerPoint, Affinity Designer, and Powtoon to design the infographics and videos used in this intervention. The educational media was presented to individuals with expertise in health, nutrition and food science, and health education for content validation and verification. The educational messages were divided into 7 main topics, including: (1) Introduction to Nutrition labelling; (2) Serving size and macronutrients; (3) Nutrition Information Panel; (4) Nutrition claims; (5) Energy labelling; (6) Healthier Choice Logo; and (7) Nutrition labelling usage on food choices. Each topic contains one or more lessons in Malay language depending on the content and scope of learning.

Procedures. Participants in both groups initially completed a baseline data collection involving socio-demographic survey; knowledge, attitude and practice (KAP) questionnaires on nutrition labelling; and anthropometry measures (weight, height, and waist circumference). The intervention group additionally received a detailed presentation on the study procedures. Mobile numbers, as well as Instagram accounts of participants, were verified. At the onset of the intervention program, participants were invited via text message or Whatsapp to “follow” an Instagram page created for this study. Researchers, who acted as the page administrators, posted weekly messages to educate participants on nutrition labelling using interesting infographics and short videos.

Weekly education messages were uploaded on the Friday following the entry into the program. Participants received a reminder via text message or Whatsapp from the administrator every time new messages were posted on the Instagram page. Participants were also instructed to turn on Instagram’s notifications when they first followed Info-Nutriteen® page. Additionally, researchers used different Instagram features (Instastory and Instadirect) to encourage more participation through questions and answers sessions, short quizzes, polls, and feedback on the weekly message. Each lesson was followed by invitation to complete a web-based quiz. These quizzes tested participants’ understanding of the lesson covered in each topic and their feedback on the lesson. Meanwhile, participants

in the control group did not receive any form of nutrition education.

Feasibility criteria. The following criteria were established to determine project feasibility: demand and acceptability. Demand examines the extent to which participants will use a new program. Acceptability reflects the degree to which the participants view a program as satisfactory. Researchers also assessed every step of the study procedures (recruitment, intervention, data collection) and the intervention’s effectiveness by keeping a daily log book. A set of close- and open-ended program evaluation survey questions were employed to assess this study’s feasibility. Feasibility was evaluated after completion of the program among the intervention group.

Measurements. Three types of data were collected where two were measured during pre- and post-intervention, namely: (1) anthropometry measures (weight, height, and waist circumference) as well as; (2) self-report questionnaires assessing demographic characteristics, nutrition knowledge, and KAP on nutrition labels; and one during post-intervention which was (3) program evaluation survey using a 24-item questionnaire to assess the intervention group’s acceptance on the entire program, infographics, and videos used in the media; with a 4-point Likert scale and three open-ended questions to assess participants’ demand (feedback, experiences, and suggestions). All of these tools were developed and tested for validation and reliability before the beginning of this study. The maximum score for each domain in the KAP questionnaire was 16 (nutrition knowledge), 8 (knowledge), 40 (attitude), and 12 (practice). Weight, height, and waist circumference were measured twice without shoes and were averaged. Study procedures were monitored through logs maintained by the main researcher.

Data analysis

Descriptive statistics were used to explain the baseline characteristics and the frequency of participant involvement in intervention activities. Changes in anthropometry measures, nutrition knowledge, and KAP on nutrition labels were all assessed using one-way ANCOVA, with group as a between variable, pre to post as within variables, and baseline data as the covariate. Data entry and analysis for the quantitative measures

were conducted using IBM SPSS Statistics for Windows, version 23.0.

Data from the program evaluation survey were analyzed quantitatively by calculating the percentage of subjects who answered 'strongly agree' and 'agree' for each item, indicating that they received the Info-Nutriteen® program well. Meanwhile, the three open-ended questions from the survey were analysed qualitatively. The analysis was done manually (open-coding) using Microsoft Excel by identifying key themes and quantifying instances of specific responses. Two researchers independently coded the open-ended feedbacks from the participants and generated a list of themes. Then, the main researcher reviewed and evaluated for recurring themes regarding barriers and other observations. Results from the analysis were presented in three parts: (1) socio-demographic profile; (2) feasibility-acceptability and demand from the program evaluation survey; and (3) effectiveness from the self-reported questionnaires on nutrition labels' KAP.

RESULTS AND DISCUSSION

Socio-demographic profile

A total of 125 participants (63 in the control group; 62 in the intervention group) completed the program. The majority of participants were females (72.8%) and were from middle-income families (44%). The mean age of participants was 13.7±0.5 years. BMI Z-scores indicated that most participants were normal weight (61.6%), however, 18.4% of the participants were obese. Table 1 shows the baseline characteristics of the study participants.

Acceptability and demand

A total of 13 educational messages have been posted on Instagram in the form of videos (8), infographics (4), and a Googleform quiz. Overall, the results indicated that adolescents receiving the intervention reported positive acceptance of the usage of Instagram to deliver educational messages on nutrition labelling. On analysis, 92.7% of the participants from the intervention group reported positive acceptance towards the information uploaded on the Instagram page. As for the video, 95.6% of participants agreed that videos in Info-Nutriteen® educational media were interesting and easy to understand. Results also showed a positive reception of the messages

in the form of an infographic where 94.4% of participants were satisfied. demand (feedbacks, experiences, and suggestions).

The qualitative analysis further revealed the participants' demand concerning their feedback, experiences, and suggestions on the program. The participants viewed the program as motivating and effective; in parallel to a study done in Saudi Arabia, which concluded that the use of Instagram for the promotion of home exercise program could be attractive and effective in reinforcing adherence and maintaining an appropriate level of physical activity among female undergraduate students (Al-Eisa *et al.* 2016). As a popular social network site for photo and video sharing, especially among users aged 24 years of age or younger, Instagram has drawn more than 1 billion active users since its start in 2010 (Statista 2019). Consequently, Instagram has become one of the most recommended social media platforms to promote a healthier lifestyle among youth (Santarossa & Woodruff 2018; Carceller-Maicas *et al.* 2016).

Two themes arose from the participants' feedback on the Info-Nutriteen® program: nutrition knowledge and health consciousness. Participants indicated that the program enhanced their knowledge on nutrition labels and helped them choose and eat healthier food.

Nutrition knowledge. Some of the participants indicated that Info-Nutriteen® increased their knowledge of nutrition and helped them understand and interpret the nutrient content of packaged food. Some of the responses were:

"I gain my knowledge on nutrition labelling especially on how to interpret the information on nutrition labels." (14-year old boy)."

"This program was interesting because I learned on how to choose healthier food using the knowledge from the lessons. Moreover, I now could understand more about nutrition labels. I hope that this program will be continued to educate others". (14-year old girl)."

Health conscious. Participants also described Info-Nutriteen® as a good program that motivated them to eat healthier. For example, one participant commented:

"I am very satisfied with this program. I can finally limit my unhealthy snacking habit"

Table 1. Baseline characteristics of study participants

Characteristic	Intervention (n=62)	Control (n=63)	Total (n=125)
Age (years; mean±sd)	13.61±0.49	13.70±0.46	13.66±0.48
Sex			
Male	17 (27.4)	17 (27.0)	34 (27.2)
Female	45 (72.6)	46 (73.0)	91 (72.8)
Household income (RM)	3,844.35±2,635.00	4,912.70±4,031.00	4,382.80±3,439.00
Low (<RM2,300)	19 (30.7)	18 (28.6)	37 (29.6)
Middle (RM2300–<5,300)	32 (51.6)	28 (44.4)	60 (48)
High (≥RM5,300)	11 (17.7)	17 (27)	28 (22.4)
BMI for age (z-score) ¹	0.31±1.33	0.51±1.58	0.41±1.46
Underweight (z<-2sd)	1 (1.6)	4 (6.3)	5 (4.0)
Normal (z≥-2sd; z≤1sd)	42 (67.7)	35 (55.6)	77 (61.6)
Overweight (z>1sd; z≤2sd)	11 (17.7)	9 (14.3)	20 (16.0)
Obese (z>2sd)	8 (13.0)	15 (23.8)	23 (18.4)
Waist circumference (cm) ²	69.41±9.79	73.17±11.57	73.17±11.57
Normal	54 (87.1)	50 (79.4)	50 (79.4)
Abdominal obesity	8 (12.9)	13 (20.6)	13 (20.6)

Data are expressed as n (%).

¹WHO Growth Reference 5–19 years; BMI for age 5–19 years

²Poh *et al.* (2011)

and eat healthier food when I read the nutrition labels. This program taught me the importance of reading nutrition labels before purchasing food.” (13-year old boy).”

In addition, another participant responded,

“This program helped me to choose healthier food. Besides, Info-Nutriteen® educates me on nutrients content of a food product and how to choose a healthier food between different brands.” (13-year old girl).”

This observation was parallel to other studies that showed that using Instagram as a health communication tool can motivate people towards a healthier lifestyle (Fardouly *et al.* 2018; Chung *et al.* 2017). Chung *et al.* (2017)

also found that people used Instagram because they wanted to improve their health behaviours and keep a record of activities relevant to their health goals while obtaining and providing social support and information to communities.

Participants also commented on some features of the media (infographics and videos) for Info-Nutriteen® that they dislike, as well as duration of the program, and then provided suggestions for improving the program. Participants suggested using bright colours and readable font sizes for the graphics to attract more attention to the educational messages.

“The infographics will be more interesting if using brighter colours and larger font size to encourage more participants to read and understand the contents.” (14-year old boy).”

They also proposed using trending and current songs as the background music for the Powtoon videos to attract more viewers.

"In my opinion, to make the videos more efficient in delivering the messages, it requires using of the latest and trending tunes as the background music." (13-year old girl)."

Several participants stated that the program's duration was too time-consuming, and they lost interest in the middle of the program.

"For me, this program was too long. I had to wait for a week for the next message to be posted on the Instagram page." (13-year old boy)."

Several important considerations were identified to improve the program to encourage more participation and engagement for the future based on the participants' feedback and suggestions. First, the infographics must be redesigned using interesting graphics, bright colours and readable font sizes to better understand. Furthermore, the use of trending and latest tunes will increase adolescents' interest in watching these videos and comprehending the message better. Studies have revealed that most social media users preferred content in the form of attractive infographics and short videos on a specific topic. The infographics and videos should be able to graphically illustrate a concept or generate emotion to draw the users' attention to the messages because image and video sharing has become popular among social media users for knowledge translation, peer-to-peer learning and education in healthcare (Otten *et al.* 2015; Ramsay *et al.* 2012; Grajales *et al.* 2014). Moreover, according to Otten *et al.* (2015), well-designed infographics allowed viewers to discover patterns quickly, and they are more effective in communicating information than messages with text alone.

Secondly, the program's duration should be revised to maintain participants' motivation and interest throughout the program. One of the viable strategies is to post different educational messages more frequently instead of once a week. According to Wakefield *et al.* (2010), frequent discussion about a particular health issue within social networks in combination with personal

exposure to different messages might reinforce specific behaviour changes.

Nutrition knowledge, and knowledge, attitude and practice on nutrition labels

One-way ANCOVA test was used to assess the effectiveness of Info-Nutriteen[®] on nutrition knowledge and KAP on nutrition labels. Results showed that the intervention program had significant effects on participants' attitudes [F (1.122) = 17.392, $p < .001$] and practices [F (1.122) = 8.206, $p < .001$] on nutrition labels. However, the intervention program had no significant effect on nutrition knowledge [F (1.122) = 3.046, $p > .001$] and nutrition labels knowledge [F (1.112) = 2.296, $p > .001$]. Although there was an increase in the nutrition knowledge and KAP on nutrition labels for both groups after the program, the intervention group showed slightly better scores than the control group. Nutrition knowledge and KAP post-intervention score percentage among participants in the intervention group showed increment to 79%, 76%, 75% and 82% from the baseline percentage of 76%, 69%, 72% and 76%, respectively (Figure 1). This data indicated that the intervention group showed improvement in their nutrition labels understanding and use after exposure to Info-Nutriteen[®] program.

The intervention program had significant effects on the participants' attitudes and practices on nutrition labels in the present study. These findings were consistent with the previous works done among different target populations. A study carried out in South Korea reported a significant improvement in attitudes on nutrition labels among the intervention group participants after participating in nutrition labelling education (Park *et al.* 2010). Different studies also showed increased nutrition labels use and practices among school children and adults at the end of education programs (Wolfe *et al.* 2018; Kollannoor-Samuel *et al.* 2016).

Nonetheless, this study found that the intervention program had no significant effect on nutrition knowledge and nutrition labels knowledge. These findings conflicted with previous studies that reported that nutrition labels educational interventions were effective in improving participants' nutrition knowledge and understanding of nutrition labels (Gavaravarapu *et al.* 2016; Katz *et al.* 2014). The difference may come from the fact that this study was conducted

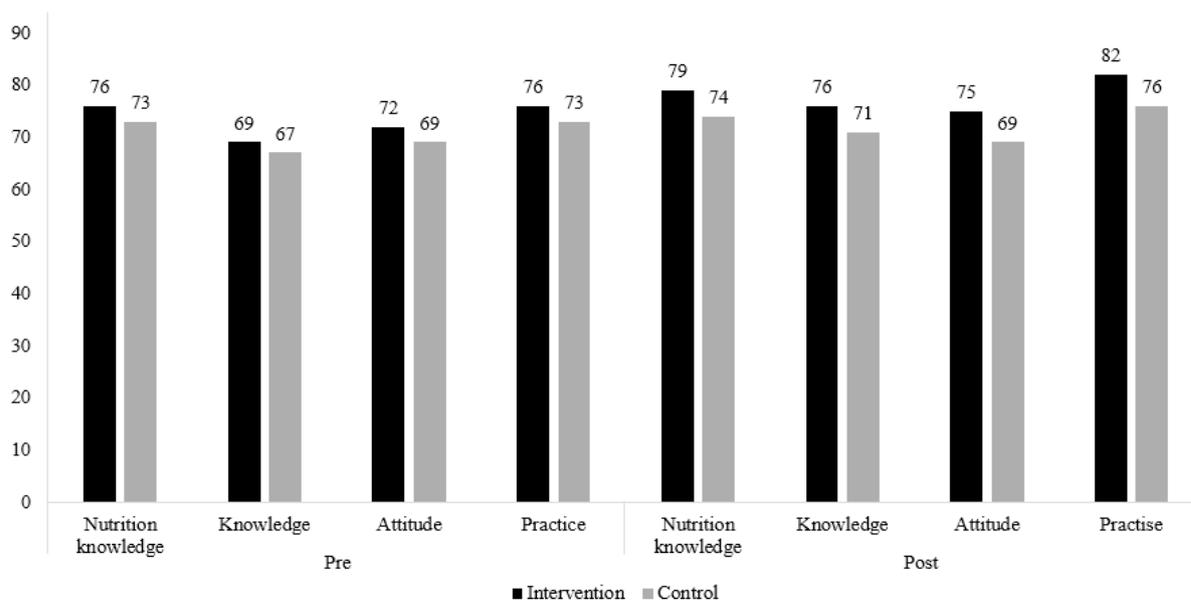


Figure 1. Comparison of nutrition knowledge and KAP score percentage before and after Info-Nutriteen® program between intervention and control groups

in the schools located in the same district where the participants may have known each other or followed each other on Instagram. Nevertheless, a study on Nutrition Detectives and ABC for Fitness programs conducted in the USA also found no significant difference between children in the intervention group and control group on Food Literacy and Label Nutrition Knowledge (FLANKK) score (Treu *et al.* 2017).

Strength and limitation

To our knowledge, this study is the first study to use Instagram as a medium to deliver nutrition education focused on nutrition labels to adolescents in Malaysia. Also, all assessment instruments used in this study have undergone validity and reliability tests before use. Besides, program evaluation has been carried out optimally involving quantitative and qualitative assessment to obtain participants' overview and opinion on the study's feasibility.

However, some limitations should be noted. First, the nutrition education contents must be reorganized so that the participants are not overflowed with information in each lesson. For example, one topic or lesson can be divided into several infographics or videos. According to Pagoto *et al.* (2016), posts with a graphic,

video, or link to an article usually include a brief headline describing the content to attract viewers to read or click on it. Furthermore, a study among adult viewers found that the participants preferred a short and simple video rather than lengthy video segments, without seeing too many words (Ramsay *et al.* 2012).

Second, it is necessary to validate that the participants are familiar with the protocol of the study: from the start of the program i.e., following the Instagram page, prompts, reminders, notifications, commenting, post sharing to the completion of the intervention. Cavallo *et al.* (2016) stated that social media-based interventions should build familiarities between participants at the outset of the intervention to ensure their chances of being completely exposed to the contents. This could be accomplished by providing participants with some guidance on sharing their experiences, thoughts, and comments.

CONCLUSION

The study results showed good demand and acceptance toward the Instagram based nutrition education among adolescents, hence nutrition education using Instagram is seen as

feasible and effective to improve their attitude and practice on nutrition labels. Nevertheless, this study also demonstrated that Info-Nutriteen® should be improved further to enhance its impact on nutrition label knowledge and usage among adolescents.

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AUTHOR DISCLOSURES

The authors have no conflict of interest.

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