

Effectiveness of Line communication application as a social media on changes in tooth brushing behavior of junior high school students in Banjarmasin

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ABSTRACT

Background: There were only 10.7% of junior school students in Banjarmasin brushing their teeth before bedtime. Using Line (as one of the social media) can be assumed as an effective strategy to spread information. **Purpose:** This study aimed to reveal changes in tooth brushing behavior before bedtime in students of class VII in all state junior high schools in Banjarmasin after receiving information disseminated through Line. **Method:** Pre and post test technique with control group design was used in this research. **Result:** One week before the treatment, the mean frequency of tooth brushing behavior before bedtime in the Line group was 1.90, while in the poster group was 1.93. During the treatment, the mean frequency of tooth brushing behavior before bedtime in the Line group was 4.78 in the first 7 days, 5.07 in the second week, and 5.67 in the third week. On the other hand, the mean frequency of tooth brushing behavior before bedtime in the poster group was 4.66 in the first 7 days, 4.61 in the second week, and 5.18 in the third week. **Conclusion:** Messages/ information disseminated through both of Line and poster can give a significant change in tooth brushing behavior before bedtime. Nevertheless, Line can trigger better effectiveness than poster in stimulating a change in tooth brushing behavior before bedtime.

Keywords: social media; Line; poster; tooth brushing behavior before bedtime

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INTRODUCTION

Tooth decay will affect the overall health status of the body, resulting in disruption of daily activities. The impact of tooth decay can also be considered as one of the obstacles in improving both the quality of human resources and the standard of human life, especially in finding certain professions. Oral health condition in Indonesia is still poor. The prevalence of oral and dental problems in Indonesia was 25.9% with a national DMF-T Index value of 4.85.¹ The prevalence of oral and dental problems in South Kalimantan Province even was 36.1%, the second largest after South Sulawesi (36.2%). The prevalence of oral and dental problems in Banjarmasin is 38.2% with a DMF-T Index value of 5.54, the second highest in the

province of South Kalimantan after Barito Kuala based on WHO criteria.²

Dental health promotion in Banjarmasin is usually conducted through direct outreach and dissemination of information using conventional media, such as posters. Unfortunately, these methods cannot be conducted evenly and continuously since the area of Banjarmasin City is mostly surrounded by rivers and swamps. As a result, inadequate health workforce and geography become major obstacles for health personnel in running the health center service outside the building, resulting in unoptimal health education.³ The number of people in Banjarmasin City brushing teeth before bedtime was only 36.7%. Meanwhile, the number of junior high school students brushing teeth before bedtime was only 10.7%.² Such conditions require

appropriate strategies to improve the behavior of the junior high school students in the city of Banjarmasin, South Kalimantan Province, especially in brushing teeth properly before bedtime at night.

A theory most commonly used in health education and health promotion is health belief model (HBM) theory. The basic concept underlying HBM theory is health behavior determined by personal beliefs or perceptions about the disease, as well as strategies to reduce the occurrence of disease. HBM depicts the considerations of a person before they adopt healthy behaviors. It means that HBM serves as a prevention model or preventative one. HBM can also be considered as a cognitive model demonstrating an individual's behavior influenced by cognitive processes. These cognitive processes are influenced by several factors, such as demographic variables, sosiopsychological characteristics, and structural variables. Demographic variables include class, age, and gender. Meanwhile, sosiopsychological characteristics involve personality, peers, and group pressure.⁴

Social media has an important role in changing human behavior. The existence of social media can make communication between users increasingly closer. A research on SMA Negeri 4 Manado found that the use of social media can change learning behavior, resulting in improvement of school achievement scores. The learning behavior change is due to changes in motivation of the future (in order motive) that can be achieved.⁵ The interaction and communication among users in social media can be used to facilitate dissemination of information, motivation, and promotion in various business sectors, including health sector. Line as one of social media is an instant messaging application using internet medium that is free of charge. Line application can be used in various electronic devices, such as smartphones, tablets, and computers. Various features are contained in Line application, none of which is found on other applications, thus, it appeals to users and makes Line developed very rapidly.⁶ Features in Line include free call, Line cards, stickers in the form of emoticons, and onLine games without any cost, as a result, Line is very popular among the youth, including school-age children.⁷

In addition, Line also allows students as its users to make a group of peers (peers group). Therefore, related to the theory of HBM on the sosiopsychological characteristics of peer age, Line can be assumed as a social media that can influence the health behavior change in students. By forming a group in Line, the students can interact with each other as well as invite each other to change their health behavior.⁸ Line is the most widely used type of social media at the young age, including school age with the age range of 12-24 years, reaching to 41.4%. Motivation to use social media at the young age is mostly to make the social media as means of disseminating information.⁹

Thus, those various facilities and excellent features offered in Line as social media trigger this research to focus on the effectiveness of Line as a social media in changing

the tooth brushing behavior before bedtime at night in those students of class VII in all state junior high schools in Banjarmasin compared to poster as the conventional media. Consequently, all information or messages disseminated via Line as the social media as well as poster as the conventional media in this research were focused on the benefits of tooth brushing before bedtime at night, the effects of the absence of tooth brushing before bedtime at night, and the benefits of brushing teeth diligently before bedtime at night.

MATERIALS AND METHODS

This study used pre and posttest technique with control group design. Samples in this research divided into two treatment groups with two different media. The first treatment group was exposed to information/ messages disseminated via a social media, Line. Meanwhile, the second treatment group was exposed to information/ messages disseminated via a conventional media, poster. The second group was used as a comparison group to the first group.

Moreover, this research was performed in four treatment periods, namely the first 7 days, the second 7 days, the third 7 days, and the fourth 7 days after the treatment was discontinued. Independent variables in this research were the provision of information about the benefits of tooth brushing before bedtime at night, the effects of the absence of tooth brushing before bedtime at night, and the benefits of brushing teeth diligently before bedtime at night, transmitted/ disseminated via Line and posters. Meanwhile, dependent variables were changes in the tooth brushing behavior before bedtime at night.

Sampling was carried out in all state junior high schools in Banjarmasin with several criteria. First, the schools had to have internet connection. Students had to have a Smartphone with Line application. Their score of Health Belief Model questionnaire regarding dental health students had to be less than four. Sampling of the population who met the criteria was performed using multistage random sampling technique¹⁰ on students of class VII in all of the state junior high schools in Banjarmasin that met the criteria. The total of samples obtained were 360 students, divided into two groups, 180 of which were in the Line group, and 180 of which were in the poster group. Those samples were from four different state junior high schools in the city of Banjarmasin, namely 100 students from SMP Negeri 1, 120 students from SMP Negeri 6, 70 students from SMP Negeri 7, and 70 students from SMP Negeri 26. This research then was conducted for 28 days, from June 6th to July 3rd, 2016.

Furthermore, this research also used a sheet of tooth brushing activity to measure changes in their tooth brushing behavior related to frequency of tooth brushing activity before bedtime at night. The sheet of tooth brushing activity was filled by parents of those samples every night,

and then collected at the end of each period. The scale of measurement was in the form of ratio with a range of 0 (zero) up to 7 (seven). Measurements then were made during those four periods, namely the first 7 days, the second 7 days, the third 7 days, and the fourth 7 days.

The measurement on the first 7-days (from June 6th to June 12th, 2016) was performed by disseminating information about the benefits of tooth brushing before bedtime at night via posters and Line. The posters were distributed to the poster group every day during school hours. On the other hand, for the Line group, the information was disseminated through messages via Line every evening at 21.00 pm.

The measurement on the second 7 days (from April 13th to June 19th, 2016) was carried out by disseminating information about the effects of the absence of tooth brushing before bedtime at night via posters and Line. Similarly, the posters were distributed to the poster group every day during school hours, while for the Line group, the information was disseminated through messages via Line every evening at 21.00 pm.

The measurement on the third 7 days (from June 20th to June 26th, 2016) was conducted by disseminating information about the benefits of brushing teeth diligently before bedtime at night via posters and Line. Like in the previous measurements, the posters were distributed to the poster group every day during school hours. For the Line group, the information was disseminated through messages via Line every evening at 21.00 pm.

The measurement on the fourth 7 days (from June 27th to July 3rd, 2016) was focused on the frequency of tooth brushing activity before bedtime at night in both the Line and poster groups after the provision of information via both posters and Line was discontinued. The data then were collected at the end of this period.

RESULTS

Data obtained in this research were about the frequency of tooth brushing activity before bedtime at night, measured before the treatment, during the treatment, and after the treatment. Data about the frequency of tooth brushing activity before the treatment were collected from questionnaires distributed during the selection of samples that met the criteria with a certain range of scores, from 0 (zero/ never brushed their teeth) to 3 (rarely brushed their teeth). The data collected then were compared between the frequency of tooth brushing activity before the treatment, the frequency of tooth brushing activity during the treatment, and the frequency of tooth brushing activity after the treatment was discontinued.

Kolmogorov-Smirnov test and Shapiro-Wilk test were performed to analyze the normality of the data with a significance value of 0.05. Results of the test showed that the significance value obtained was 0.001, less than 0.05. Thus, it indicates that all the data about the frequency of tooth brushing activity before the treatment, the frequency of tooth brushing activity during the treatment, and the frequency of tooth brushing activity after the treatment was discontinued in both the Line and poster groups were not normally distributed.

The results of this research also demonstrated that the mean frequency of tooth brushing activity before the treatment in the Line group was 1.90, while in the poster group was 1.93. Those mean frequencies of tooth brushing activity then increased during the treatment in both the Line and poster groups. The mean frequency of tooth brushing activity on the first 7 days in the Line group was 4.78, greater than in the poster group, about 4.66. Results of the Mann Whitney test conducted with a significance value of 0.05 indicated the significance value obtained was 0.340, more than 0.05. It means that there was no significant

Table 1. Change in the frequency of tooth brushing behavior before the treatment, during the treatment, and after the treatment in the Line group and the poster group

Mann Whitney test analysis	Media	Before the treatment	During the treatment			After the treatment
			The first seven days	The second seven days	The third seven days	The fourth seven days
	Line	1.90	4.78	5.07	5.67	5.52
	Poster	1.93	4.66	4.61	5.18	4.15
	Sig.	0.934	0.340	0.002	0.001	0.001

Table 2. Change in the mean frequency of tooth brushing behavior before the treatment, during the treatment, and after the treatment in the Line group and the poster group

Change in the mean frequency of tooth brushing behavior before bedtime at night				
Media of the treatment	During the treatment			After the treatment was discontinued on the fourth seven days
	The first seven days	The second seven days	The third seven days	
Line	2.88	3.17	3.77	3.62
Poster	2.73	2.68	3.25	2.22

difference in the increased frequency of tooth brushing activity before bedtime at night between in the Line group and in the poster group (Table 1).

Furthermore, the results of this research also indicated that the mean frequency of tooth brushing activity on the second 7 days of the treatment in the Line group was 5.07, greater than in the poster group, about 4.61. Results of the Mann Whitney test conducted with a significance value of 0.05 showed the significance value obtained was 0.002, less than 0.05. It means that there was significant difference in the increased frequency of tooth brushing activity before bedtime at night between the Line group and the poster group.

The results of this research also showed that the mean frequency of tooth brushing activity on the third 7 days of the treatment in the Line group was 5.67, greater than in the poster group, about 5.18. Results of the Mann Whitney test conducted with a significance value of 0.05 showed the significance value obtained was 0.001, less than 0.05. Like on the second 7 days, it indicates that there was significant difference in the increased frequency of tooth brushing activity before bedtime at night between the Line group and the poster group.

Meanwhile, the mean frequency of tooth brushing activity on the fourth 7 days after the treatment was discontinued in the Line group was 5.52, greater than in the poster group, about 4.15. Results of the Mann Whitney test conducted with a significance value of 0.05 showed the significance value obtained was 0.001, less than 0.05. Similarly, it means that there was significant difference in the increased frequency of tooth brushing activity before bedtime at night between in the Line group and in the poster group.

In other words, changes in the mean frequency of tooth brushing activity before bedtime at night in the Line group were greater than in the poster group after the treatment was discontinued. The greatest change in the mean frequency of tooth brushing activity before bedtime at night was in the Line group on the third seven days when the messages or information disseminated were about the benefits of brushing teeth diligently before bedtime at night. Meanwhile, the smallest change in the mean frequency of tooth brushing activity before bedtime at night was in the poster group on the second seven days (2.68) when the messages or information disseminated were about the effects of the absence of tooth brushing before bedtime at night (Table 2).

DISCUSSION

On the first 7 days of the treatment, the messages/ information disseminated in Line and posters were about the benefits of tooth brushing before bedtime at night. Consequently, the frequency of the tooth brushing activity increased after the provision of the messages/ information about the benefits of tooth brushing. This finding is in

accordance with the HBM theory stating that a person's behavior will change if given an understanding of the perceived benefits.¹¹

The provision of information about the perceived benefits of brushing teeth diligently could be pushed them to take an action (cues to action). The expected results to be obtained if they always brushed their teeth before going to bed at night, then it would persuade themselves (self-efficacy). As a result, they would soon make a change in behavior. The dissemination of the messages/ information was also expected to increase knowledge and awareness of those school children to adopt healthy behaviors. In other words, knowledge or cognition is the most essential domain in shaping a person's behavior.⁴

On the second 7 days of the treatment, the messages/ information disseminated in Line and posters were about the effects of the absence of tooth brushing before bedtime at night. Similarly, the frequency of tooth brushing activity also increased during the second 7 days. This finding is in accordance with the belief component of the HBM theory stating that a person's behavior will change if the individual is given an understanding of the seriousness of the disease as well as the severity of the disease, so preventive action must be taken (perceived severity).

Perceived severity component is in conjunction with the behavior change of theory transtheoretical model theory¹² stating that most people have no desire to change their behavior because they do not realize that they have behavior problems and find no problem with unhealthy behaviors that they do. Those school children in this research refused to brush their teeth diligently since they did not have problems with dental health so that they did not have a thought or consideration for brushing their teeth diligently. The provision of information containing the effects of the absence of tooth brushing before bedtime at night would give a dramatic relief impact, related to negative feelings, such as fear or anxiety about the risks if not brushing their teeth diligently. Thus, those school children would discover and learn new facts supporting changes in their behavior into healthy one.

Furthermore, on the third 7 days of the treatment, the messages/ information disseminated in Line and posters were about the benefits of brushing teeth diligently before bedtime at night. Like the results on the first and second 7 days, the frequency of tooth brushing activity also increased since they have an expectation of rewards in their future. In other words, the rewards had a positive influence on their independence.¹³ The biggest change in the mean frequency of tooth brushing behavior was found on the third 7 days of the treatment on which the messages/ information disseminated in both Line and posters were about the benefits of brushing teeth diligently before bedtime at night. A theory from Skinner¹⁴ states that most of child's behavior is operant response, response to an expectation. It means that expectation to gain rewards or prizes will trigger children to change their health behavior after receiving the advice.

The increased frequency of tooth brushing activity before bedtime at night in this research results is also due to a right precipitating factor, which is the messages/information disseminated through the media directly by their PE teachers. The right precipitating factor actually can strengthen individual to carry out the recommended action. This finding is also in conjunction with the HBM theory stating that one of the fundamental aspects of health behavior is a right precipitating aspect used as a reminder over and over again.

Nevertheless, the results of this research revealed that there was a significant difference in the frequency of tooth brushing activity between on the third 7 days of the treatment and on the fourth 7 days after the treatment was discontinued ($\text{Sig}=0.001 < \alpha: 0.05$). The frequency of tooth brushing activity began to decline again after the dissemination of the messages/information through poster as a conventional media as well as Line as a social media discontinued. Thus, it can be said that unhealthy behavior is a chronic disease with remission and relapse. It means that although there are minimal and intensive interventions for healthy behavior, the targets generally will relapse and require repeated intervention before they can finally really manage themselves to behave healthy.¹² Therefore, maintenance stage is necessary to maintain changes in their behavior that have been made for the next 6 months by adding a reminder to make the targets stick to healthy behavior. In other words, the message/information must continuously and repeatedly be delivered or disseminated without a break to change a person's behavior, as a result, the behavior change will really become permanent.¹⁵

The results of this research also showed that there was a significant difference in the effectiveness of Line and posters as a means of disseminating information ($\text{Sig}=0.002 < \alpha: 0.05$). The effectiveness of Line was higher than posters. It indicates that the provision of information on school children will be more effective when delivered in an interesting and attractive way, such as using a visual means of pictures that appeal to them.¹⁶ Besides, the larger changes in the frequency of the tooth brushing activity in the Line group is also because of the timely dissemination of the messages/information, which is before bedtime. Consequently, they could remember more easily. Timely delivery of messages/information is more effective to change a person's behavior.¹⁷

On the other hand, the dissemination of the messages/information via the posters is one-way delivery. As a result, the recipients of the posters cannot respond or interact with fellow receivers and the senders of the poster. Meanwhile, the dissemination of the messages/information via Line as a social media is easier and more interesting for students. Health education through Line uses an extension method or a two-way method, consequently, fellow recipients of the messages can exchange comments and remind each other via Line Group already formed.¹⁸ Another advantage of disseminating messages/information via Line as a

social media is that students can be involved actively and directly in response to messages/information delivered and explained visually, thus, making them easy to understand. Besides, Line is more popular among the youth, including school-age children, than posters. Images delivered via social media can be used as emoticons in Line as well as status that can be disseminated to other users and be looked everywhere and every time.⁷

In general, the findings of this research are in accordance with Nowak dan Warneryd model theory stating that one of the elements considered in delivery of messages/information is channel. Therefore, channel used must be selected based on the characteristics of recipients and the type of messages delivered. To influence a person's behavior, it will be more effective to use media with interpersonal channels, e.g. social networks like Line. The effectiveness levels of Line as a social media in the delivery of information based on calculation of AISAS model are 91% for attention, 83% for interest, 83% for searching, and 80% for sharing. And, the effectiveness in delivering the most fundamental information before influencing a person's behavior actually starts from the addition of knowledge first.¹⁹

In conclusion, information about the benefits of tooth brushing disseminated via Line is effective to change the tooth brushing behavior before bedtime at night in those students of class VII in all state junior high schools in Banjarmasin; information about the effects of the absence of tooth brushing disseminated via Line is also effective to change the tooth brushing behavior before bedtime at night in those students of class VII in all state junior high schools in Banjarmasin; information about the effects of brushing teeth diligently disseminated via Line is also effective to change the tooth brushing behavior before bedtime at night in those students of class VII in all state junior high schools in Banjarmasin; information disseminated in Line as a social media is more effective than in poster as a conventional media to change the tooth brushing behavior before bedtime at night in those students of class VII in all state junior high schools in Banjarmasin; information about the benefits of brushing teeth diligently disseminated via Line has the highest effectiveness in changing the tooth brushing behavior before bedtime at night in those students of class VII in all state junior high schools in Banjarmasin.

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