Original Research

Natural Peer Group Approach as a Learning Strategist for Maximizing Dental Health Education in School-age Children

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Abstract

Aim: To find out a natural peer group approach toward the knowledge of the dental and oral fields effectively. **Materials and Methods:** This research is a quasi-experimental research with before–after study design. This study comprising 77 students for total sampling method was conducted on grade 4–5 students (aged 10–11 years). Data collection method used is by way of pretest and posttest for measuring data of oral and dental health knowledge. Sociometric questionnaire was administered to the students in order to identify the condition of the formation and reference character of natural peer group. The third data are the primary data obtained directly from the research respondents. The researcher provided dental and oral health intervention to the peer group reference before the peer group reference was allowed to mingle with peer group members without control and supervision during the effective 2x day school. The evaluation process was confirmed the shared information from the group leader with Oral Health questionnaire. This method conducted to find out the effectiveness of Oral Health Education counseling through Natural Peer Group teaching method. The data were analyzed by the comparative method using Statistical Package for the Social Sciences software version 17.0 (SPSS, Chicago, IL). **Results:** There is an increase in grade averages in grade 4 ($P = 0.783$) members' score, and a decrease in grade 5A ($P = 0.202$) and 5B ($P = 0.725$) members' score. In both grade 4 and 5 leader students, all the posttest values increase, but only grade 5 has a significant difference ($P = 0.047$ an $P = 0.006$). **Conclusion:** Natural peer group learning is not suitable for dental health education counseling method.

Keywords: Dental Health Education, Learning Strategist, Natural Peer Group

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Introduction

The behavior of Indonesian children in maintaining oral health is still low.[1] Such behavior arises due to the lack of knowledge about the importance of oral and dental care; hence, they neglect oral hygiene. This is one of the reasons why oral health problems often occur in school-age children.[2] The results of Riskesdas (Basic Health Research) 2013 showed that the proportion of dental problem in the 5–9 year age group is 28.9% and in the 10–14 age group is 25.2% 3. However, based on education, the proportion of dental problems in the non-primary-school population is 29.2% and in the primary-school graduate population is 28.6%.[3] These data show that the proportion of dental problems in Indonesia at the age of 5–14 years and in primary-school education above the national prevalence of dental and mouth problems is 25.9%.

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One of the ways to increase knowledge of dental and oral health is through Dental Health Education (DHE) counseling. DHE aims to change the attitude and behavior of individuals or groups of people, which include knowledge, attitudes, and actions that lead to healthy living efforts. The change of attitude and behavior can be pursued through a learning process where the process requires resources either the teaching staff or the person who is able to provide information, facilities, and infrastructure, as well as the time required for the ongoing

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process.[4] Children aged 6–12 years (middle childhood) are categorized in the age of primary-school children.[5] This age group is divided into two subgroups, namely the age group of 6–9 years (early middle childhood) and the age group of 10–12 years (late middle childhood). At school age, the development of speech ability is developing very rapidly, including vocabulary, and sentence structure, this is also believed to influence the increase in understanding and acceptance of information. With this rapid development in its infancy, it is hoped that the information provided can be better absorbed and improve children's learning about basic knowledge deemed important for the adaptation process. In the middle of childhood, children have a great interest and curiosity about new things. They ask a lot to expand and establish what they do not know. Sometimes middle-aged children are more likely to channel their emotions outdoors (among their friends or at school) than at home. As a result, children spend more time with friends, either to play or share experiences.[5,6]

Student motivation during the learning process is important in ensuring that students have adequate desires to successfully complete the task and acquire the skills or knowledge.[7] Today, many interactive learning models have been developed to maximize student learning and achievement. Slavin[8] mentioned that cooperating learning is a learning model that has been known for a long time, where at that time the teacher encourages students to work together in certain activities such as peer tutoring. The level of student activeness increases because students are motivated by their theories. The learning process helps students to understand more about the material presented and the impact on the value or the learning outcomes of students.[9]

At the age of 6–12 years, the age of primary-school children, the child's attention is on the desire to be accepted by peers so that the child tends to conform to the standards agreed by the group in terms of appearance, speech, and behavior.[10] A study also showed an increase in learning outcomes that are very significant after following the learning by peer teaching method. This increase in learning results occurs because by using the peer teaching method, students learn with tutors who are their own friends, so the learning process becomes more interesting and fun.[11] This lesson can be run effectively with the guidance and supervision of the supervising teacher.

Peer tutors as the most commonly used strategies to help students who have learning difficulties or difficulty in information processing with group formation are very small and focus on a narrow range of materials.[12] In its application, peer tutor strategies are widely used by teachers in school subjects (biology, mathematics, geography, etc.), reading, economics, the arts, and business and have been shown to improve student-learning outcomes.[13] The term tutor is used for a child who acts as a teacher. Selection of tutors tailored to the material to be delivered. One way of selecting tutors is to see the intensity and the way to communicate between members and tutors.[14] A tutor should be able to bring the direction of the conversation and is someone who has a lot of influence in a group. This is so that the selected tutors are able to provide materials to their members appropriately.[11]

Oral diseases have a serious impact on the quality of life of a large number of individuals and can affect many aspects of life including oral cavity function, the function of several other organs, appearance, and interpersonal relationships. Oral diseases such as dental caries and periodontal disease are common diseases and have consequences not only physically but also affected the economic, social, and psychological life of the community.[15] The field of oral and dental health is not an academic subject in school, but not making it less important in the support of child development. Peer group learning strategies have never been implemented in schools to improve children's knowledge about oral health. In addition, it has never been reported that the field of oral hygiene has been applied in peer group learning strategies.

Naturally there are peer groups that are formed based on the similarity of hobby and interpersonal interest commonly called gangs of children. When a child is in his natural peer group, the child's conversation is not too egocentric, but rather social conversations such as hobbies, home and family, games, television shows, and group activities.[16] In this natural peer group, the term tutor is more commonly known as the leader or reference character. According to David,[17] the way children interact with friends and the environment around them are very influential on receiving information.

On the basis of some of the above facts, the question arises whether oral and dental areas can be applied naturally in natural peer groups. The author intends to conduct a study to find out whether a natural peer group can improve the knowledge of the dental and oral fields effectively.

Materials and Methods

This is a quasi-experimental research with before–after study design. This study comprising 77 students from grade 4-5 (aged 10-11 years) in Elementary School in Surabaya.

This research used pre and post-test group design. The respondents were given pre-test in advance. Meanwhile, sociometric questionnaire was administered to the students in order to identify the condition of the formation and reference character of natural peer group. The third data are the primary data obtained directly from the research respondents.

This research was carried out within two months. The first stage was coordinated with the school. Then the respondent's informed consent was filled out, followed

by the pretest and the sociometric questionnaire was administered to determine the student's natural group peer. The group leader of each group is given guidance and knowledge about oral health, which will then be used as material for exchange of information to group friends. In the following week, a posttest and discussion of dental and oral health materials were given and questions were asked to find out whether knowledge of dental and oral health material was caused by an intervention in the peer group reference figures.

The pretest and posttest material includes minimum number of toothbrushes in a day, good time to do toothbrushes, examples of foods and drinks that can make healthy teeth, examples of foods and drinks that can make cavities, how to brush teeth properly in the anterior and posterior teeth, the shape of the toothbrush is well used, and the amount of toothpaste is good to use.

The sociometric questionnaire that was used to determine natural peer groups comprised the following questions:

1. Mention some friends in class that you like to be invited to play and learn. This question serves to find out the picture of the peer group formed between respondents.
2. Choose one among the friends mentioned above. Who is the most popular? Some theories state that a leader or leader of a peer group can have a big influence and tends to be a role model in the peer group.
3. Choose one among the friends mentioned above. Who is the smartest to talk?
4. Choose one among the friends mentioned above. Who is most wanted to visit when they are sick?
5. Choose one of the friends mentioned above. Who is the most active and energetic?

The answers to these questions can describe the formation of natural peer groups. A peer group can be said to be formed if there are at least five people comprising leaders and members.

The researcher provided dental and oral health intervention to the peer group reference before the peer group reference was allowed to mingle with peer group members without control and supervision during the effective 2× day school. To evaluate the success of the information delivery method, checks are made to group members. Checks are carried out to see whether the information provided by the group leader is effective in reaching the group members. This research is expected to be able to see whether the peer group reference has succeeded in intervening to its members about dental and oral health materials. This can be known by asking directly (cross-check) on the leader and members.

Statistical Analysis

The statistical analysis conducted in this study was the comparative method by comparing pretest and posttest score using paired *t*-test for both group leaders and group members. The comparative analysis was performed with $P < 0.05$ and 95% of confidence interval. The data were analyzed using Statistical Package for the Social Sciences software version 17.0 for Windows (SPSS, Chicago, IL).

Results

A total of 77 respondents were included in the study for total sampling method. Among them, 31 were grade 4 elementary-school students and 46 were grade 5 elementary-school students. A total of 33 students were female respondents and 44 students were male respondents [Table 1].

On the basis of sociometric questionnaire, 77 students (respondents) naturally formed peer group for 14 groups. A natural peer group formed in grade 4 elementary school as many as five peer groups and five students in five SD class. Leaders of grade 4 students amounted to five students in accordance with the peer group formed, so that the number of grade 4 students (non-leader) is 26. Leaders of students in grade 5 amounted to eight students, so that the number of grade 5 students (non-leader) is 38.

There is an increase in grade averages in grade 4 students and a decrease in grade 5 students. The result of statistical test shows that the significance value of the three classes is sig. > 0.05, meaning that there is no significant difference. The average of the pretest value of peer group members of grades 4–5 is 69.9 and the average of posttest value of peer group members of grades 4–5 is 68.86 [Table 2].

In both grade 4 and 5 leaders, all the posttest values increase. The result of statistical test shows that the significance value in grade 4 is sig. > 0.05, meaning that there is no significant difference, whereas in grade 5 the significance value is sig. <0.05, meaning that there are significant differences. The average of the pretest value of peer group members of grades 4–5 is 65.67 and the average of the posttest value of peer group members of grades 4–5 is 89.22 [Table 3].

The leaders and members who have performed cross-check show that all leaders claimed never provide

Table 1: Respondent's Distribution

	Numbers	Percentage
Sex		
Male	44	42.86%
Female	33	57.14%
Grades		
4th*	31	40.25%
5th**	46	59.75%

*Respondent's age ranging from 9 to 10 years

**Respondent's age ranging from 11 to 12 years

information were related to oral health, as well as all members claimed to never get information were related to oral health.

Discussion

The formation of peer groups in this study is based on combining the theory of children's gang characteristics, which are formed by the children themselves naturally based on peers. In this study called natural group peer[18] or group of tutors who are in the same class.[19] The conclusion of the above three theories is that this research takes a sample of natural peer group. Each peer group has a tutor or leader in the same group and class. The kind of sociometric question that is proposed depends on the terminology used, which is in accordance with the conceptual framework that can be responded by the students of grade 4–5 SD.

The average difference in the pretest value (69.9) as compared to the posttest values (68.86) is very small, that is, within 1.04 points. The paired *t*-test indicated that $P = 0.570$ (more than $\alpha = 0.05$). Thus, it can be concluded that there is no difference in the level of knowledge of dental and oral health after the intervention to the reference figure peer group.

"Peer Learning Teaching Strategy to Improve Learning Outcomes of Children Mathematics Learning Class IIIA SD Negeri Kepatihan Surakarta" on Nur Afifah's research in 2011, "Application of Peer Teaching Model In Sociology Subject," on Ningrum Posporini research in 2011, and "Application of Method Peer Tutor Learning to Increase Understanding Content Text of Student's Tale VIIA Class At SMP Negeri 3 Sawan" on I Wayan Budi research in 2010 had shown that peer group learning method/peer tutor can improve students' knowledge in academic field of mathematics, sociology, and literature.[9,13,14]

Table 2: The average number of pretest and posttest members (non-leader) and paired *t*-test analysis

	Pretest (average)*	Posttest (average)*	Sig.
Grade 4	65.64	65.88	0.783
Grade 5A	71.93	70.18	0.202
Grade 5B	71.23	70.53	0.725
Total	69.9	68.86	0.570

*Average score from maximum 100

Table 3: Number of pretest and posttest leader values and paired *t*-test analysis

	Pretest (average)*	Posttest (average)*	Sig.
Grade 4	72	82.67	0.212
Grade 5A	68.33	95	0.047
Grade 5B	56.67	90	0.006
Total	65.67	89.22	0.088

*Average score from maximum 100

This research takes the field of oral and dental health to be applied in peer group learning method. In some of the above studies, generally the peer group learning method is run by forming small groups of 5–10 children and teachers as learning facilitators. The role of the teacher is to equip the peer group reference and give instruction according to the composition of the learning design to the reference figure at each learning discussion meeting.

In contrast to previous research, this study was conducted on natural peer groups or groups of learning and play that have been formed naturally so that the reference figure is not instructed to conduct discussions related to the field of dental and oral health materials with members of the peer group. Basically, if a child is instructed to be a leader in a peer group, then there is a sense of responsibility to carry out the full obligation in the process of peer group learning so that the learning process can work well. This study overrides this and focuses more on natural factors that are suspected to be the main factor causing the ineffectiveness of the peer group learning process.

Nature in this research means the action of peer group without teacher instruction/supervisor peer group, that is, play and learn outside school hours. The content of natural peer group talks includes talk of home and family, games, sports, movies, television shows, group activities, and about the courage of peers who can cause accidents. Dental and oral hygiene promotion has been featured on several television commercials, but in reality peer groups in this study do not consider dental and oral hygiene to be a subject of concern in their natural peer groups. The results of the discussion in each group showed different interests between men and women. In women's groups, children are more likely to discuss characters in television shows or programs. Whereas in boys' groups, they tend to discuss about games.

The way of delivering dental and oral health learning materials from researchers to peer group references is also a very important thing in the process of peer group learning. In most peer group methods, teachers provide learning materials simultaneously to reference figures and peer group members to shape their perceptions first about the learning materials to be discussed in peer groups. However, in this study, the provision of learning materials only submitted to the reference figure so that only a reference figure to find out whether oral and dental materials can be one of the ingredients of conversation in a natural peer group.

Submission of learning materials from researchers to the reference figure of peer group is also an important factor implementation of natural peer group learning process. In the discussion of peer group of researchers with reference

figures, researchers make a peer group conversation flow in general, which is about television programs and games that lead to conversation of oral and dental health. In the process, it can be seen that all reference figures, whether male or female, are not interested in the dental and oral health talks shown by passivity, not much comment, just listen when researchers are talking about dental and oral health materials and a little more divert the conversation to material that peer group considered more interesting. The failure of this process is to be one cause of the nondelivery of dental and oral health information in natural peer group from peer group reference to peer group member.

It should be oriented with reference figures for the first few days before delivering dental and oral health materials in order to see the dynamics of peer group conversations that are formed. The orientation will be better if separated between male peer group and peer group of women to focus more on the content of peer group conversations based on gender and can be known as gap to include dental and oral hygiene materials on peer group discussion.

Level of Knowledge between Leaders and Members

The level of knowledge of group leaders is expected to reach a comprehensive level, which is to be able to convey information (in this case dental and oral health information) received to peers in the group. The student leader has been conditioned to understand the object and must be able to explain the dental and oral health material and provide good and correct toothbrushing example.

However, measuring the achievement level of understanding (comprehension) is still difficult to be implemented because lack of tools or method of assessing knowledge levels. This can be overcome by repeating the material two to three times until the leader is able to understand the given material.

Peer groups are expected to reach the level of knowing, that is, peer groups should be able to recall something specific from the overall dental and oral health materials studied.

The result of pretest and posttest differences on peer group members is not significant. Significant results ($P < 0.05$) were seen from the pre-test and post-test scores of the group leaders who experienced an increase.

In this study, group leaders are expected to be able to deliver explicit oral health education to peers in one group. The purpose of not giving it to introduce to members peer group to look naturally, dental and oral health materials can enter into the discussion of students in the school environment.

The length of time to give leaders a chance to communicate with member about dental and oral health materials is 2 × 1 school days. This is indeed because the memory warning the child to store items or things just lasted a few hours only; this is with the delivery of materials from extension to the leader. This fixed time is in accordance with the theory of the time of giving information and its evaluation. The length of the interval relates to the retention power. The longer the interval, the less strong the retention, or in other words the retention power decreases.[20]

The interval, that is, activities that exist or that fill in the interval, will damage or disrupt the memory trace so that the possibility of individuals will experience forgetfulness. However, 1 × 1 elementary-school days, which consists of 3.5 h and half an hour of rest, are quite likely that the time is informed by the leaders to the members. Given that the child's memory (leader) is not long enough because it has long experienced 2 × 1 day school lesson, the information submitted by the leader to the members did not experience a decrease in information distortion.

Posttest is performed at the same time by all leaders and members. The result of this pretest and posttest on the posttest sheet added a few questions about the scientific term of dentistry (enamel, dentin, and calculus), which are used as keywords. The keyword question is a temporary reference which will be viewed later when cross-check is used as a reference to whether the leader has informed dental and oral hygiene materials on its members. At this time, the posttest members will be increasing leaders who have provided dental and mouth health information to their members. However, there were no significant differences in the pre-test and post-test scores of group members. This is due to lack of interaction between the group leader and peers, as well as inserting messages on dental and oral health education in daily conversation.

On the basis of reference, peer-group teaching is not always suitable for every aspect or applied in any teaching method. People who are normally the leaders within the student group may take charge too much, meaning that others do not get a chance to take part in the teaching side. This can demotivate the group member to take a role in group learning.[21] Also, peer learning can be used as a simple didactic method to prevent frustration by mental over or underload in strongly heterogeneous learning collectives.[22] In this study, dental and oral health education is not favorable topic for the children to discuss with each other.

After cross-checking information on leaders and members, data obtained from all leaders do not provide dental and oral health information in each peer group. Therefore, group members also did not receive information about good oral health from the group leader.

It can happen because according to the respondents, dental and oral hygiene material is not included in one of the discussion material peer group while playing or learning so any communication contact between leaders

and members who discuss dental and oral health when playing or learning together. In previous studies, it was said that the capacity or ability of the brain in children is only able to absorb new information in a few minutes. Therefore, it is needed a group leader who has the ability or capacity higher than his peers in order to deliver dental and oral health education properly and effectively.

Limitation of this study is the number of respondents and inclusion criteria, such as age of respondents. This research has also lack of variables. In the future, we can expand the study scope in another level of school grade.

Thus, it can be concluded from the study that natural peer group learning is not suitable for dental health education counseling method.

Ethical policy and institutional review board statement

Ethical approval for this study was obtained from Research Ethics Committee of Faculty of Dentistry, Universitas Airlangga (No. 203/KKEPK.FKG/XII/2014).

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Conflicts of interest

There are no conflicts of interest.

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