A Preliminary Study of Structured Health Education Programmed by Peer Educators as an Alternative Way to Maintain The Dental and Oral Hygiene of School Age Children

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Abstract

Objectives: To differentiate between the control and treatment groups. Structured-health education by peer educators was given to the treatment group. In contrast, health education in unstructured way was given to the control group.

Methods: A quantitative research using a pre-experimental intact group comparison design. Dental and oral hygiene observation used the OHI-S index that was checked by dentists. A dental check up was carried out on children who had mixed teeth (baby milk and permanent teeth), which was done by checking the incisors and molars 1 tooth. A consecutive sampling technique was used to collect the 40 respondents for each group. Students who were chosen as peer educators received training about the right time and correct way to brush teeth by pediatric nurse specialists using demonstration media and a module. Moreover, they received spiritual training regarding thaharah from local Ustad.

Results: The median score on the OHI-S index for the treatment group was 0.9964 (good hygiene) with a range of 0.8372–1.1555 with a 95% confidence interval (CI). The analysing result of the OHI-S difference used the Mann-Whitney test with the p-value of 0.000 (<0.001).

Conclusions: There is a significant difference on the OHI-S index between the treatment and control group after intervention. The peer educator with structured health-education approach is a good combination, which provides a suitable alternative way of improving the knowledge of school age children and creating a situation of mutual support among them in order to maintain good dental and oral hygiene.

Keywords: children, dental and oral, DMFT/def-t, OHI-S, peer

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INTRODUCTION

Dental and oral hygiene is one of the indicators of comprehensive health status (1). Indonesia has used societal empowerment, through empowering societal ability and potency, as a strategy to maximize dental and oral health status (2). Several promotive and preventive efforts have been carried out to achieve clean and healthy behaviour within society in Indonesia (3–7), but it is not considered as resulting in enough positive behavioural changes yet (8). Data from Riset Kesehatan Dasar (RISKESDAS) - research conducted by Ministry of Health Republic of Indonesia - (2018) reported that only 56% of society, who had dental and oral health problems in Central Java Province, were treated by health professionals. The percentage is under the national rate standard – 57.6%.
RISKESDAS also showed that the rate of “right tooth brushing behaviour” among children aged more than three years old in Central Java is also under the national rate (2% of 2.8%). The above brief situation depicts that serious treatment regarding “right tooth brushing” education, particularly towards pre-school age and older children in Central Java, is needed.

Optimum child development may only be reached if there is an improvement in dental and oral health status (9). Parents, especially mothers, have a significant role in maintaining dental and oral health of children (10) but their role is limited to the home (11). Parents’ role cannot be optimum in schools; however, the majority of dental and oral problems are experienced by school age children. Primary school teachers can be actively involved in maintaining dental and oral health at school (12). They can be a storyteller (5) or a health educator who gives an interactive communication and demonstration using manikins to teach dental and oral hygiene (1). On the contrary, research by Khasanah et al. (13) found that 31.1% children with broad knowledge of dental and oral health still did not brush their teeth correctly. The research suggests that continued treatment focusing on habitual actions regarding children’s attitude towards dental and oral care is more important than only focusing on improving their knowledge.

A school environment with good health behaviour (PHBS) can support good habits, which help children to live clean and healthy lives (14). The presence of peer educators at school has been proven to improve knowledge, attitudes and behaviour towards maintaining good dental health (15), and it can increase the ability of children to practise correct tooth brushing (16). A good peer educator is identified by teachers based on their ability to teach and influence others.

Schools are viewed as having the responsibility of providing holistic education that targets not only cognitive aspects but also the spiritual aspect of students (17). Miller (2015) stated that some research showed that there is a relationship between early spiritual development (from birth) and other domains of child development. However, studies related to spiritual development at school were limited due to a naturalistic paradigm and modern era scientists that tend to neutralise the education system (19). Therefore, the treatment within this study aims to provide health education with a spiritual approach through Thaharah. Thaharah is a key element of worship for Moslems (20). The majority of Indonesians are Moslem including in Kembangarum 4 primary school as much as 100% (21). Health education through teaching the importance of Thaharah may be more meaningful for students and allow them to internalize Islamic values in their daily lives. One important aspect of Thaharah is to brush teeth regularly in the correct way.

METHOD

This study is quantitative research using a pre-experimental intact group comparison design that was carried out on school age children who were divided into a control and treatment group. Participant selection was not randomized. At the end of the treatment, both groups were observed and measured using the Oral Hygiene Index-Simplified (OHI-S) index to assess if there was any difference between the 2 groups as a result of the treatment (22). The treatment within this study included a structured-health education programme by peer educators. The peer educators received training regarding the right time and correct way of brushing teeth by pediatric nurse specialists using demonstration media and a module as well as spiritual training on the thaharah concept from local Ustad.

The population in the study involved all students at Kembangarum 4 primary school, which was a total of 86 students and all of the students were Moslems. Therefore the thaharah concept was an appropriate topic to motivate their PHBS in a spiritual way. A consecutive sampling technique was applied in this study by discussing selected samples with teachers (23). At the first time of study, researcher coordination with teachers to make an informed

consent and selected 4 students as a peer educators. The criteria of the Peer educators, were: (a) Have an influencer abilities; (b) Have an average of academic mark at $\geq 75$; and (c) They should committed to be an educator.

Then, peer educators training by pediatric nurses with the following materials: (a) The right time to brush teeth; (b) The right way to brush teeth. Furthermore, the peer educators give a spirituality motivation by local religious figures (Ustad) with the material is Thaharah Concept. The intervention was held in one month, health education by peer educator to the treatment group in groups (1:11); four peer educators are given a guidebook containing a complete explanation of the materials to be explained in stages every Monday and Friday during four weeks.

In one month intervention, monitoring and evaluating was done by pediatric nurse specialist. The nurse monitoring the education process by peer educator and the presences of the students. Students who have presences > 50% (4 meeting) included in treatment group (N=40). In contrast, students who have presences < 50% and there were 2 students who have presences > 50% but not taking post test included in controlled group (N=40). To observed the OHI-S index by dentist to the total of population. Table 1 showed the total of student as a sample of this research study.

Some students in the treatment group, who did not fulfill the minimal presence in the health education process by peer educators, were included in the control group. Assessment of dental and oral hygiene after treatment was observed from the level of debris (plaque) and calculus on the surface of the teeth by dentists (24). The result of the OHI-S analysis in this study used a numerical scale (25).

RESULTS

This study was conducted throughout March and April 2019 at Kembangarum 4 primary school, Demak, Central Java, Indonesia.

The Characteristics of Respondents

These are explained by univariate analysis including age, sex, grade and OHI-S index for each treatment and control group. Table 2 shows the characteristics of respondents based on age and OHI-S index. The median respondents’ age in the control group was younger than in the treatment group. The score of the OHI-S index, which shows the clinical level of dental and oral health in the control group was in the fair level (1.3-3) and in the treatment group is in the good level (0-1.2). Table 3 shows the frequency distribution of respondent’s characteristics based on sex and grade.

It is evident from Table 3 that the overall majority of respondents were female; however, the majority of respondents in the treatment group were male. Data from previous health education reported that the majority of respondents received information on PHBS from professional workers but the clarification done afterwards by teachers reported that the information was limited regarding hand washing. The table also shows that the majority of the father’s jobs were as employees and the mother’s main occupation is as a housewife. The majority of the father’s educational level is senior high school and mother’s educational level is junior high school.

The Analysis of OHI-S Index

This study applied a comparative analysis using the OHI-S index between the control and treatment group. The results of this study were obtained through several stages which were the normality test, transforming data and the Mann-Whitney test. The Saphiro-Wilk test was used to test the normality of data because the sample size of each group was less than 50. The results of the normality test are shown in Table 4, transforming data in Table 5 and the bivariate analysis using Mann-Whitney test in Table 6.
Table 4 shows the results of the normality test of the OHI-S index data where either the Skewness ratio or the Kurtosis ratio is not in the range of -2 to 2. Moreover, ρ value <0.001 means that OHI-S index data is not distributed normally.

Table 5 shows the normality test result of the Log Index OHI-S data that has been transformed. The transforming result shows the geometric mean as much as -1.1687703061 that is obtained from 10.0674. In the table shown, the ρ value < 0.001 means that the OHI-S index data is not normally distributed. Bivariate analysis was then applied using the Mann-Whitney test because of the abnormally distributed data.

The analysing result of the Mann-Whitney tests showed that there is a difference on the OHI-S index either clinically or statistically between the control and treatment group. Statistically, the ρ value < 0.001 means that there is a significant difference between the two groups. Table 6 also shows the difference of median value between the two groups that is that the level of oral and dental hygiene of the treatment group is better than the control group.

**DISCUSSION**

Education is needed to give information or knowledge related to anything that still needs to be improved (26,27). Forming good health behavior (PHBS) amongst school age children is a priority that needs multiple stakeholders in order to be realised. In the case of dental and oral health, it is only 2% of ≥ 3 years old children who brushed their teeth properly (2). Various health education methods have been done to make PHBS become a habit among Indonesian children but it has not yet shown satisfying changes. There was a study conducted related to PHBS as a habitual action but it failed to evaluate whether health education by peer educators can foster a PHBS habit in children or not (28). Based on previous studies, it might be because the time between pre- and post-test was too fast because realistically it needs at least 18 days to evaluate such a habit (29). Furthermore, Wood and Runger(30)stated that two steps are crucial to change a person’s habit i.e. inhibit old habits as habits that are not desirable and encourage new habits as desirable habits.

Peer educators are considered as an effective learning method for all ages(31–33). Peer involvement in learning through playing has benefits to improve mental health and cognitive and social development of children (34). The presence of peers may also be of benefit for disabled children because they can express their feelings and see or copy positive role models from peers (35). Gender also determines the influence of peers especially regarding emotional feelings (36). The male peer group tends to be more rude and messy while the female peer group emphasizes more calm and cooperative playing. Whitebread et al. (37)stated that the peer educator method is more effective if it is done between the same gender i.e. female to female and male to male. As a baseline data, all of the students were moslems, it should be effective to touch their spirituality with Thaharah concept. The majority of them reported have an health education by health worker. Data shows that the majority of the father’s jobs were as employees and the mother’s main occupation is as a housewife. From this, actually mothers have more time to educate children in PHBS. But, data shows that mother’s educational level is junior high school. It shows the level of knowledge majority is not too high. Therefore, lack of education may affect the mother’s way to demonstrate a good PHBS in their daily activity.

Within this study, the statistical analysing process shows that there is a significant difference between the treatment and control group which means that health education using the peer educator method through Thaharah concept may has a positive impact on dental and oral hygiene. Therefore, peer educator roles in schools, as an agent of change in dental and oral health, is suggested as an alternative way. Moreover, peer educators can be directed as executors of...
the School Health Unit (UKS) who are responsible overall for the health of other students particularly in Kembangarum 4 primary school.

Comprehensive and routine health monitoring is crucial for children to prevent any health problems and to monitor child growth and development so that any health problems can be discovered early. Peer educators can execute this monitoring role routinely with guidance from teachers in charge of UKS. The monitoring programme covers monthly body weight and height measurements and daily assessment of PHBS. The peer educator approach takes in hand the Thaharah concept because all of the students are Moslems and the researchers intend to touch on the spiritual side of students to habituate PHBS in their everyday life.

Thaharah means cleanliness or purity and it is the key to worship (38). Thaharah is carried out by performing wudu (the Islamic procedure for cleansing some parts of the body) and brushing teeth is sunnah (the way of the prophet) before wudu. That is, maintaining oral hygiene is also part of worship. Health education regarding brushing teeth through the Thaharah approach may be more insightful for children. Children can internalize the value of Iman and Islam and be more excited to maintain dental and oral hygiene (39).

Thaharah is not only done to worship but also to maintain the health of the human body (20). The Thaharah concept includes cleanliness of the body, clothing and house so applying Thaharah can lead to improved physical health. Healthy children will produce more productive and excellent children academically. A health status can be achieved through a healthy lifestyle therefore adults, especially health professionals, have an important role to improve child health status. Achieving the healthy child status can be started by health education related to right tooth brushing and it is expected to help maintain the child’s dental and oral hygiene. The Thaharah approach, which was done within this study, involved religious figures from local society. The explanation of Thaharah application in daily living was delivered in the local language, so the explanation/information was easily understood by children. Almost all the children said that they were very excited by the materials given regarding Thaharah. This strategy, involving religious figures, is recommended for other forms of health education since they have strong influence in motivating people in society including children.

School age children (6-12 years old) are considered to have a short attention span, they are fast learners, and they are able to hold objects, draw and colour books (40). In terms of the psychosocial development, the children are in the industry versus inferiority phase where the children start to explore education formally as well as socializing with peers (41). If this phase is disrupted, the children may feel insecure. However, the positive side of this stage is that children are enthusiastic to learn new skills.

In the psycho-intellectual stage, children begin to think logically and structurally, and are able to see things from others’ perspectives. In addition, children are able to solve problems according to their own perception because they already have the ability to think through the cause and effect relationship and recognize many solutions to solve their problems. This stage is called the operational concrete thinking stage (42).

Teachers, as well as parents, have a role in building the emotional development of school age children (43) because schools are considered as the second home of children in Indonesia: they spend more time (playing and studying) at school than at home. In terms of physical development, school age children are characterized by 2-3 kg per year of weight gain and 6-7 cm per year height increase. Regarding tooth growth, within this period, one by one baby (primary) teeth will fall out (shed) and be replaced by permanent teeth (44). Problems that often come at this stage are dental caries and gingivitis (45). Generally, Narulita et al. (2016) state that dental and oral hygiene status can be checked using the Oral Hygiene Index Simplified (OHI-S). A low OHI-S score indicates healthy teeth. The peer
The structured health education program through the Thaharah concept of dental and oral hygiene was found to be effective in improving children’s knowledge and discipline. Future research should consider a larger sample size to achieve more significant results.

Nursing care, particularly in primary services, is expected to support and promote good dental and oral hygiene for school-aged children. Innovations in health promotion programs and teachers’ roles regarding dental and oral hygiene need to improve to promote good health behavior (PHBS) in students. Universities or other educational institutions need to actively engage in programs that improve public health status such as community services or research, which is carried out by lecturers or college students. It is hoped that future researchers will conduct more routine, active, and innovative health education activities by peer educators so that they can minimize respondents’ exclusion during the study while it is being conducted. Lastly, studies with a larger number of respondents may be needed in order to get a more significant result of the effect of health education using the peer educator’s method through the Thaharah concept of dental and oral hygiene.

There are significant differences in the OHI-S index between the treatment and control group (p<0.001). It is suggested that the next study could do a pre- and post-test in order to analyze the effectiveness of the treatment given. Furthermore, it may be good to do a similar study using randomization, involving more respondents and extending the study time (average in 4 months between pre-post tests).

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<table>
<thead>
<tr>
<th>Age</th>
<th>Total students</th>
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<th>Total respondents</th>
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<td>6</td>
<td>2 students excluded due to absence in post test</td>
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</tr>
<tr>
<td>7</td>
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Table 2: The distribution of respondents based on age and OHI-S index at Kembangarum 4 primary school from March to April 2019 (n=80)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Control group (n=40)</th>
<th>Treatment group (n=40)</th>
<th>Total (n=80)</th>
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</thead>
<tbody>
<tr>
<td>Age</td>
<td>8 (6–14)</td>
<td>10 (8–12)</td>
<td>10 (6–14)</td>
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<tr>
<td>OHI-S index</td>
<td>1.7 (0–6)</td>
<td>1.08 (0–1.83)</td>
<td>1.3 (0–6)</td>
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Table 3: The distribution of respondents based on sex and grade at Kembangarum 4 primary school, Demak, from March to April 2019 (n=80)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Control group n (%)</th>
<th>Treatment group n (%)</th>
<th>Total n (%)</th>
</tr>
</thead>
<tbody>
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<td>Sex</td>
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<td></td>
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<tr>
<td>Male</td>
<td>16 (41.0)</td>
<td>23 (59.0)</td>
<td>39 (48.8)</td>
</tr>
<tr>
<td>Female</td>
<td>24 (58.5)</td>
<td>17 (41.5)</td>
<td>41 (51.2)</td>
</tr>
</tbody>
</table>

Previous health education

| Yes              | 35 (46.7)           | 40 (53.3)             | 75 (93.7)   |
| No               | 5 (100.0)           | 0 (0)                 | 5 (6.3)     |

Father’s occupation

| Unemployed       | 10 (71.4)           | 4 (28.6)              | 14 (17.5)   |
| Employee         | 20 (52.6)           | 18 (47.4)             | 38 (47.5)   |
| Self-employment  | 10 (35.7)           | 18 (64.3)             | 28 (35.0)   |

Mother’s occupation

| Housewife        | 15 (45.5)           | 18 (54.5)             | 33 (41.2)   |
| Employee         | 21 (67.7)           | 10 (32.3)             | 31 (38.8)   |
| Self-employment  | 4 (25.0)            | 12 (75.0)             | 16 (20.0)   |

Father’s education

| Primary school   | 8 (72.7)            | 3 (27.3)              | 11 (13.7)   |
| Secondary school | 13 (43.3)           | 17 (56.7)             | 30 (37.5)   |
| Senior high school | 19 (48.7)     | 20 (51.3)             | 39 (48.8)   |

Mother’s education

| Primary school   | 7 (46.7)            | 8 (53.3)              | 15 (18.8)   |
| Secondary school | 22 (53.7)           | 19 (46.3)             | 41 (51.2)   |
| Senior high school | 10 (43.5)     | 13 (56.5)             | 23 (28.7)   |
| University       | 1 (100.0)           | 0 (0)                 | 1 (1.3)     |

Table 4: The normality test result of OHI-S index data

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Skewness ratio</th>
<th>Kurtosis ratio</th>
<th>ρ value</th>
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</thead>
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<td>OHI-S index</td>
<td>6.55</td>
<td>9.97</td>
<td>0.000</td>
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</table>

Table 5: The normality test result of Log Index OHI-S data
Table 6: The analysing result of Mann-Whitney test

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Median (minimum–maximum)</th>
<th>p value</th>
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</thead>
<tbody>
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<td>OHI-S index of control group (N=40)</td>
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<td>0.000</td>
</tr>
<tr>
<td>OHI-S index of treatment group (N=40)</td>
<td>1.08 (0–1.83)</td>
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</tr>
</tbody>
</table>

Mann-Whitney test. The mean rank of control group is 50.51 and of treatment group is 30.49.