

**THE EFFECTIVENESS OF ORAL CARE USING HONEY AND 0.12%
CHLORHEXIDINE ON THE RISK OF ASPIRATION PNEUMONIA IN STROKE
PATIENTS WITH DECREASED CONSCIOUSNESS**

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ABSTRACT

Background: The increase of stroke prevalence is still a big challenge for the world every year. Stroke often requires a prolonged treatment because most stroke patients have decreased consciousness. Hospitalized patients who experience decreased consciousness are at risk of nosocomial pneumonia originating from aspiration pneumonia. Prevention of aspiration pneumonia can be done with adequate oral care. Generally, oral care is performed using chemical materials, including 0.2% chlorhexidine, 0.12% chlorhexidine, 0.9% NaCl, and alcohol-free mouthwash. Oral care with natural ingredients is still rarely used in hospitals. **Aim:** The aim of this study was to compare the effectiveness of oral care with honey and 0.2% chlorhexidine to the risk of aspiration pneumonia in stroke patients with decreased consciousness. **Methods:** This study was a quantitative study with a quasi-experimental method. The study design used a pre and post-test with control group. The dependent t-test and independent t-test was used for data analysis. **Results:** The results showed that there was a significant difference between the effectiveness of oral care using honey and 0.2% chlorhexidine on the risk of aspiration pneumonia in stroke patients with decreased consciousness (p-value. (0.029) < 0.05). **Conclusions:** In conclusion, the findings highlight that oral care with honey has more significant effect in reducing the risk of aspiration pneumonia in stroke patients with decreased consciousness. The use of honey as an oral care doesn't only have benefits as an anti-microbial, but also makes the color of the gums and teeth become brighter in stroke patients with decreased consciousness.

KEYWORDS: Honey, 0.2% chlorhexidine, stroke.

INTRODUCTION

Stroke is defined as clinical signs and symptoms that arise quickly from the presence of focal and global disruption of brain function that occurs more than 24 hours and can cause death without other causes other than vascular factors.^[1] In the United States, the prevalence of stroke that occurs is around 3% of the total adult population. This estimated number is equivalent to 7 million people.^[2] The prevalence of stroke in Indonesia is 12.1 per 1,000 population. Compared to the number in 2007, it increased as much as 8.3%.

Stroke often requires a prolonged treatment and rehabilitation process, thereby increasing the length of the patients' hospitalization time is needed. Another aggravating condition is a decreased consciousness. Decreased consciousness is a state of being unresponsive to self and the environment. Hospitalized patients who experience decreased consciousness are at risk of

nosocomial pneumonia originating from aspiration pneumonia. Aspiration pneumonia is an infection of the respiratory tract that one of the causes is when the gastric content or gastric fluid which is secreted through the oropharynx, accidentally enters the trachea and goes.^[3]

Aspiration pneumonia in stroke patients with decreased consciousness is due to the inability of patients in maintaining oral hygiene. Poor oral hygiene results in the accumulation and the thickening of plaque as well as changes in oral mucosa. This condition can lead to the increase of microbes.^[4] Generally, oral care is using chemicals material, including 0.2% chlorhexidine, 0.12% chlorhexidine, 0.9%, NaCl and alcohol-free mouthwash^[5].

Current facts show that more attention has been paid to natural ingredients as an alternative to improving health. This fact also applies to improving health through oral care. One alternative solution to the use of natural

ingredients in oral care at hospitalized patients is honey. Honey is a nectar which is collected from many plants and processed by honey bees.^[6]

Oral care using honey has been previously studied with the result that honey can reduce the incidence of mucositis in patients with radiotherapy treatment in the head and neck area for 6 weeks.^[7] The use of natural ingredients in oral care at hospitals has not been done much at this time. Finally, this study is interested in comparing the effectiveness of oral care with 0.2% chlorhexidine and honey in the risk of aspiration pneumonia at stroke patients with decreased consciousness.

METHOD

The type of research was a quantitative study with a quasi-experimental method. The study used pre and post-test with control group. The study was conducted at Stroke Unit of Gatot Soebroto Army Hospital, Jakarta, Indonesia. Respondents were obtained using probability simple random sampling technique. The total respondents were 36 stroke patients who were divided into control groups and intervention groups. Each group consisted of 18 respondents.

RESULTS

Table 1: Respondent's characteristics.

No	Characteristics	Total (N)	Percentage (%)
1	Age		
	a. 26-35 years old	2	5,6
	b. 36-45 years old	9	25,0
	c. 46-55 years old	17	47,2
	d. 56-55 years old	8	22,2
2	Types of stroke		
	a. Hemorrhagic	17	47,2
	b. Ischemic	19	52,8
3	Smoking history		
	a. No	25	30,6
	b. Yes	11	69,4
4	Sex		
	a. Female	23	63,9
	b. Male	13	36,1
5	GCS score		
	a. 10-12	18	50%
	b. 13-14	18	50%
6	Upper arm circumference		
	a. 65-90	12	33,3%
	b. 91-115	10	27,7%
	c. 126-145	14	38,8%

Table 1 showed that most of respondents' age was between 46-55 years old, with total of 17 respondents (47.2%). Most respondents were patients of ischemic stroke with the total of 19 respondents (52.8%). The majority of respondents did not smoke, with the total of

The Bedside Oral Exam (BOE) questionnaire was used to measure the risk of aspiration pneumonia in stroke patients with decreased consciousness^[8]. The risk of aspiration pneumonia data was taken twice, before and after 3 consecutive days of oral care. The control group received oral care with 0.2% chlorhexidine and the intervention group received oral care with honey. Measurement of the risk of aspiration pneumonia was carried out before and after oral treatment with 0.2% chlorhexidine and honey for three consecutive days. The measurement includes an assessment of the ability to chew; observing the mucous membranes of the lips, tongue tissue, gums, salivary conditions, teeth; and smell of breath. The measurement results include a score with the lowest score of the measurement was 8 and the highest score was 24. The 8 score indicated of minimal risk and the 24 score indicated a higher risk for aspiration pneumonia.

Data collection used in this study was primary data and secondary data. Primary data was obtained by examining and evaluating directly to respondents such as BOE measurement, examination of nutritional status by measuring upper arm circumference, and GCS score. Secondary data was obtained using respondent's medical records such as stroke type, age, and smoking history. Data analysis was performed using the parametric test, which is the dependent t-test and independent t-test.

25 respondents (30.6%). Most respondents were female with total of 23 respondents (63.9%). GCS scores of respondents in a range of 10-12 and 13-14 had the same number, with total of 18 respondents each (50%). The majority of respondents had upper arm circumference

values in a range of 126-145 cm with the total of 14 respondents (38.8%).

Table 2: The difference in risk of aspiration pneumonia before and after oral care using 0.2% chlorhexidine and honey based on BOE measurement.

BOE score	Total (N)	Mean	SD	P-value
Oral care with 0.2% chlorhexidine				
Before	18	11,67	2,11	0,002
After	18	15,00	3,25	
Oral care with honey				
Before	18	11,17	1,79	0,102
After	18	12,22	2,77	

Table 2 showed if there was a significant difference in the risk of aspiration pneumonia before and after oral care with chlorhexidine 0.2% as indicated by the p-value (0.002) < 0.05. These results had differences with oral

care using honey, which could be concluded if there was no significant difference in the risk of aspiration pneumonia before and after oral care. That results indicated by p-value (0,102) > 0.05.

Table 3. The difference in risk of aspiration pneumonia after oral care between two groups based on BOE measurement.

BOE score	Total (N)	Mean	SD	P-value
Oral care with 0.2% chlorhexidine	18	15,00	3,25	0,029
Oral care with honey	18	13,05	2,77	

The results of the data analysis were shown in table 3, with the significance value was (0.029) < 0.05. It can be concluded if there were significant differences between the two groups after oral treatment using 0.2% chlorhexidine and honey. These results also proved that respondents given oral care using honey showed a minimal increase in the risk of aspiration pneumonia, with mean score 13,05 in intervention group dan 15.00 in control group.

DISCUSSION

The results showed the risk of aspiration pneumonia identified in the initial assessment of the control group had a mean score of 11.67. Whereas, in the intervention group it was known that the mean score was 11.17. These data indicate if stroke patients who have decreased consciousness are in a high risk of aspiration pneumonia. Stroke patients who have decreased consciousness will experience a decreased ability to control swallowing and breathing reflexes, and decreased motor function in the lower esophageal sphincter, so it is very risky to cause aspiration pneumonia.^[9]

The results of this study showed that there were significant differences before and after oral care using 0.2% chlorhexidine with a significance value (0.002) < 0.05. The mean score of risk of aspiration pneumonia before oral treatment using 0.2% chlorhexidine was 11.67. Whereas, after oral care, the risk of aspiration pneumonia increased to be 15.00. The increase of the mean score indicates that there is an increased risk of aspiration pneumonia in patients with oral care using 0.2% chlorhexidine.

The observation results on the respondents showed if the mucous membranes and saliva of the patients became dry, and there was a change in the color of the patients' tongue due to frequent use of 0.2 % chlorhexidine. This condition makes the risk of aspiration pneumonia increased in the control group respondents. These observations are supported by another study showing that the use of 0.2% chlorhexidine for a long time can cause discoloration in the base of the tongue and teeth, and cause a burning sensation on the tongue^[10]. In addition, the negative impact of 0.2% chlorhexidine as an oral care is that the normal flora in the mouth will be damaged by long-term use.

The results of this study concluded that there was no significant difference in the risk of aspiration pneumonia before and after oral care with honey in stroke patients who had decreased consciousness, with a significance value (0.102) > 0.05. This can be seen from the mean score before taking the oral care with honey which was 11.17, while after oral care with honey the mean score was 12.2. This result suggests that patients given oral care with honey show a minimal increase in the risk of aspiration pneumonia or tend to persist.

The results of oral care with honey also show the success of achieving oral care goals like maintaining moisture in the tissues around the mouth, cleaning bacteria from saliva and cleaning teeth and tongue from food scraps, also preventing the appearance of plaque. Plaque is associated with disease because it contains microorganisms. Thus, the act of stimulating the gums, cleaning teeth and rinsing the mouth every day can prevent plaque and reduce the risk of disease.^[11]

The results of this study are supported by previous studies which concluded that honey can treat infections in the mouth because it contains anti-bacteria so that honey can heal wounds in the mouth, periodontal disease, stomatitis in radiotherapy patients, can overcome bad breath, and can prevent dental caries.^[12] The results of this study indicate that respondents who used oral care with honey showed that the mucous membranes of the lips, gums and tongue were moister, so the skin did not look dry and crack as before oral care.

The results showed that stroke patients who experienced decreased consciousness in the intervention group had a risk of aspiration pneumonia lower by 2.78 units compared to the control group. Data analysis results between the two groups also showed a significant difference between the two groups after being given oral care using 0.2% chlorhexidine and honey. The results of this study conclude that oral care using honey is effective in reducing the risk of aspiration pneumonia in stroke patients who have decreased consciousness.

The results of this study also showed that respondents in the intervention group had pink gum and brighter teeth than those in the control group. The results of this study are supported by previous studies which state that the benefits of gargling with honey can prevent gingivitis and dental plaque in patients who are receiving orthodontic treatment^[13]. Other supporting study is comparing honey, chlorhexidine gluconate, and xylitol in reducing plaque and calculus. Each group in this study measured plaque index. The results obtained show that honey and chlorhexidine mouth rinse can significantly reduce plaque formation compared to xylitol.^[14]

Basically, honey contains anti-microbial agents. Honey can kill microbes directly in two ways, which is peroxidative anti-bacterial and non-peroxidative anti-bacterial. Honey has peroxidative antibacterial properties because it is influenced by the presence of a hydrogen peroxide agent produced by the glucose oxidase enzyme. Another anti-bacterial mechanism is non-peroxidative antibacterial. It is because honey has an acidic pH which can inhibit bacterial growth.^[15]

Honey also contains high concentrations of flavonoids and other phenolic antioxidants, so honey has an antioxidant effect. Antioxidants function does not only counteract free radicals and reactive oxygen species (ROS) but also improve tissue growth.^[16] Substances contained in honey as an antioxidant besides flavonoids are glucose oxidase, catalase, ascorbic acid (vitamin C), carotenoid derivatives, amino acids and melanoidin.^[15]

CONCLUSIONS

Oral care using honey provides a significant effect in minimizing the increased risk of aspiration pneumonia in stroke patients with decreased consciousness. The use of honey as oral care does not only provide protection

against pathogenic microorganisms but also can maintain oral and dental hygiene by preventing plaque.

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