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THE DEFERENCES OF XYLITOL CHEWING GUM AND MOUTHWASH ON XEROSTOMIA IN CHRONIC RENAL FAILURE PATIENTS

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ABSTRACT
Increased blood urea or uremic levels often experienced by patients with Chronic Renal Failure can lead to decreased salivary secretion and xerostomia. Xerostomia is a common symptom of difficulty in chewing, swallowing, decreased taste, speaking, increased oral mucosal lesions, and limited tolerance of dentures. This problem will have an impact on increasing thirst sensations that affect the patient to increase fluid intake that leads to an increase Interdialytic Weight Gain and lead to decreased Quality of Life patients. The aim of this research was to know the effect of chewing gum xylitol and mouthwash on xerostomia in chronic renal failure patients. The design was quasi experiment involving 30 respondents selected by consecutive sampling technique and divided into two groups. Xerostomia measured four times in each session of hemodialysis. The results of study showed there was no differences in the four xerostomia measurements in both intervention groups with p-value> 0.05. However, it is seen from the patient's development chart that the xylitol gum intervention reduced xerostomia faster than the mouthwash intervention. The conclusion of this research was xylitol chewing gum and mouthwash had same effect to reduce xerostomia in patients with chronic renal failure. The results of this study can be recommended to be applied as an intervention to resolve xerostomia in chronic renal failure patients.

Keyword: chronic renal failure; mouthwash; xerostomia; xylitol chewing gum

INTRODUCTION
The decreasing of glomerular filtration rate (GFR) indicates a decrease in kidney function as a result of healthy kidney tissue unable to maintain the stability of the body's internal condition, so that this condition causes a change to severe stage, Chronic Renal Failure (CRF) (Moinuddin & Leehey, 2013). The US Renal Data System Annual Data Report 2015 reported more than 660,000 Americans were diagnosed with CRF (National Kidney Foundation, 2015). While, the Indonesian Renal Registry (IRR) reported the percentage of CRF patients in Indonesia increased significantly from 2007 until 2012. The percentage of CRF patients was 13,213 people (83%) in 2012. The prevalence of CRF in the first position was West Java; 3,359 people, East Java 2,796 people, DIY 1,656 people, and Central Java was in the ninth position with 366 people (IRR, 2012).

Patients with decreased kidney function experience various abnormal conditions of kidney function. Metabolic changes in CRF; increasing in serum urea levels known as uremia (Himmelfrab & Sayegh, 2010). The majority of uremia sufferers experience oral conditions changes, which are symptoms that are usually felt as discomfort and dryness in the mouth (Pindborg, 2009). Several studies have found that CRF patients have a greater risk of experiencing oral conditions, such as burning mouth, bleeding gums, bad taste in the mouth, halitosis, candidiasis, and xerostomia (Oyetola et al., 2015; Yadav et al. ., 2015).

Xerostomia is a symptom of difficulty chewing, swallowing, decreased taste, speaking, and increased oral mucosal lesions caused by decreased saliva or changes in salivary quality (Thomson et al., 2011; Bossola & Tazza, 2012). The average prevalence of xerostomia in CRF patients is around 28.2 ─ 66.7% of the total population in the world and will continue to increase every year. This increase was due to the increasing incidence of CRF (Neville et al., 2009; Yadav et al., 20115). The further impact of xerostomia is an increased sensation of thirst which stimulates the patient's desire to consume excess fluids which can lead to an increase in Interdialytic Weight Gain (IDWG) resulting in a decrease in Quality of Life due to excess fluid intake (Bossola & Tazza, 2012). Overhydration or excess fluid in patients with kidney failure often appears and becomes a serious problem.

The basic of xerostomia management is by increasing the mechanical production of saliva through masticatory power. Mechanical stimulation of the salivary glands through chewing can use rubber harvesters (Bossola & Tazza, 2012). Research by Said & Mohammed (2013) states that chewing gum can reduce xerostomia and increase the salivary flow rate of CKD patients. Another study conducted by Azizah (2014) showed that giving xylitol gum nine grains per day was more effective at increasing the flow rate of saliva compared to a dose of three grains per day.

In addition, oral health can also affect saliva production. Mouthwash is a non-sterile solution that is often used as a mouth freshener or mouth antiseptic. Gargling using mouthwash is intended to maintain moisture and oral health so that it is expected to increase salivary secretion (Halperin, Perez, & Brady, 2008). Research by I-Chen et al. (2016) said that gargling with licorice mouthwash can reduce xerostomia and increase the average salivary flow rate in hemodialysis patients.

METHOD

This study used a Quasy Experiment design with pre and post-test design techniques. Thirty CRF patients who experienced xerostomia were determined by consecutive sampling technique and were divided into two intervention groups based on shift hemodialysis; morning hemodialysis shift was given xylitol gum intervention and afternoon shift mouthwash intervention. Xylitol gum is routinely given 3 times a day for 2 items after a big meal and brushing your teeth. While mouthwash intervention is given regularly by rinsing for 60 seconds 10 cc of mouthwash solution after eating large meals and brushing your teeth. Both interventions were carried out routinely for 2 weeks. The mouthwash used is a mouthwash with non-alcoholic content and contains green tea. Xerostomia measurements were carried out in four stages (first, second, third, and fourth HD sessions) for 2 weeks. Xerostomia measurements used the Summated Xerostomia Inventory-Dutch version (SXI-D) instrument. Prior to data collection, an ethical test was conducted by the ethics team of the University of Indonesia so that it was declared fit for continued research.

Data analysis on variables in this study was carried out by univariate, bivariate and multivariate methods. Bivariate analysis using Friedman test with post hoc Wilcoxon to identify the effect of xylitol gum on xerostomia and the effect of mouthwash on xerostomia. Meanwhile, to compare the effect of giving the two interventions namely xylitol gum and mouthwash on xerostomia using the General Linear Model Repeated Measure test. Meanwhile, multivariate analysis was conducted to assess the relationship between confonding variables, namely age, sex, comorbidities, use of certain drugs, and blood urea levels on the effect of xylitol gum and mouthwash interventions on xerostomia.

RESULTS AND DISCUSSION

Table 1.
Respondents data according age and blood urea level

Variable	Group	Mean ± SD	Min-Max	95% CI
Age	Xylitol chewing gum	49,13 ± 8,30	36-65	44,54 – 53,73
	Mouthwash	45,53 ± 9,50	32-64	40,27 – 50,79
	Both of group	47,33 ± 8,95	32-65	43,99 – 50,68
Blood urea level	Xylitol chewing gum	114,25 ± 29,79	56,80-158,30	97,75 – 130,75
	Mouthwash	105,67 ± 29,49	54,30-158,30	89,34 – 122,00
	Both of group	109,96 ± 29,45	54,3-158,3	98,97 – 120,96

The mean age of respondents experiencing xerostomia was 47.33 years old with a standard deviation of 8.953, with the youngest being 32 years old and the oldest being 65 years (95% CI). The table above also explains the average blood urea level of CKD respondents who experienced xerostomia of 109.96 mg / dL with a standard deviation of 29.45, with the lowest urea level of 54.3 mg / dL and the highest of 158.3 mg / dL (95% CI).

Table 2.
Respondents data according gender, using of certain drugs, and comorbidities

Variable	Sum	Percentage (%)
Gender		
Male	22	73,3%
Female	8	26,7%
Using of certain drugs		
No use	19	63,3%
Use	11	36,7%
Comorbidities		
No	4	13,3%
Yes	26	86,7%

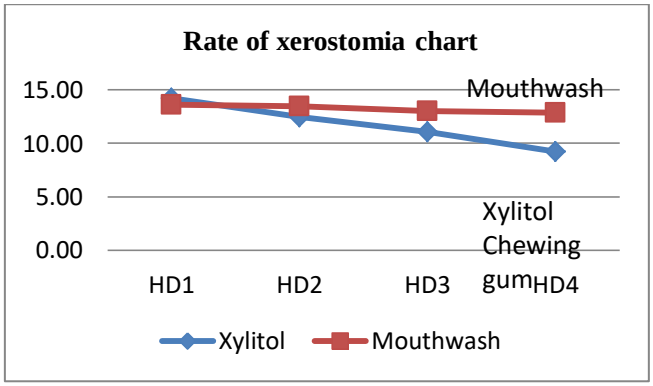
It was found that 22 (73.3%) respondents experiencing xerostomia were male and 8 (26.7%) female. Of the 30 CKD respondents who experienced xerostomia, 19 respondents (63.3%) did not use certain drugs that affected saliva production and 11 respondents (36.7) used certain drugs. In addition, from 30 respondents there were 26 respondents (86.7%) who had comorbidities with CRF and 4 respondents (13.3%) did not have comorbidities.

Table 3.
Differences in xerostomia before and after intervention

Xerostomia	Xylitol chewing gum(n=15) Mean ± SD	Mouthwash (n=15) Mean ± SD	Difference of mean (95%CI)	*p-value*
Session 1	14,20 ± 2,40	13,73 ± 2,69	0,47 (-1,44 ─ 2,37)	0,62*
Session 2	12,47 ± 2,36	12,40 ± 2,29	0,07 (-1,67 ─ 1,81)	0,93*
Session 3	11,07 ± 2,22	11,47 ± 2,23	-0,40 (-2,07 ─ 1,27)	0,63*
Session 4	9,20 ± 2,62	10,20 ± 2,34	-1,00 (-2,86 ─ 0,86)	0,28*

Uji *General Linear Model* p=0,206. *Analisis *post hoc.*

The results of the General Linear Model test on xerostomia measurement in both groups obtained p value 0.62 (first HD session), 0.93 (second HD session), 0.63 (third HD session), and 0.28 (fourth HD session) with $\alpha = 0.05$. So it can be concluded that the two interventions are equally able to reduce xerostomia in patients with CRF.



However, the average xerostomia graph shows that the xylitol gum intervention group showed a greater decrease in xerostomia than the reduction in xerostomia in the mouthwash intervention group. The results of the multivariate analysis of all confounding variables p value> 0.05, so it can be concluded that there is no correlation between confounding variables (age, sex, use of certain drugs, comorbidities, and blood urea levels) to decrease xerostomia.

The effect of giving xylitol chewing gum and mouthwash on xerostomia

The results of the study concluded that giving xylitol gum was effective in reducing xerostomia in patients with CRF. Chewing gum routinely is able to stimulate chemoreceptors and pressure receptors in the tongue and oral cavity and deliver a stimulus to the medulla of the brain stem which then sends the stimulus back through efferent fibers to the salivary glands to increase its secretion (Sherwood, 2013).

In addition, the results of the study said that giving mouthwash was able to reduce xerostomia in CKD patients. Oral hygiene interventions using mouthwash can maintain moisture and oral hygiene. So the salivary glands are able to work to produce saliva normally. The results of this study are in accordance with the research of Jang & Shin (2016). The purpose of this study was to identify the effect of giving xylitol gum and mouthwash on xerostomia. The results concluded that the two interventions were equally effective in reducing xerostomia in patients with CRF. However, the graph of the mean reduction in xerostomia between the two intervention groups showed that the xylitol gum intervention group showed a greater decrease in xerostomia than the mouthwash intervention group. This is due to the influence of other factors such as inadequate self-awareness of patients implementing fluid restrictions according to instructions, work, or implementing interventions that are not according to procedures that are not detected due to the limitations of the researcher.

Relationship between age, sex, use of certain drugs, comorbidities, and blood urea levels to xerostomia

The incidence of xerostomia was not related to old age. The results of this study are reinforced by a study which states that CRF patients who experience xerostomia have an average adult age of 24 - 69 years (Al-yassiri, 2014). Gender is not related to xerostomia. These results are in line with research which states that the ratio of the number of male and female respondents is almost equal (Said & Mohammed, 2013). Other studies have obtained

the same comparison between male and female respondents who experience xerostomia (I-Chen, 2016). The results of this study indicate that there is no association between the use of certain drugs and decreased xerostomia. According to the assumptions of researchers based on relevant references, this is due to the use of antihypertensive drugs consumed by respondents having adjusted to the condition of kidney failure, namely ACEI or ARB group antihypertensives. Both classes of drugs work to inhibit the conversion of angiotensin I to angiotensin II without central effects or affecting the central nervous system (Monhart, 2013; O'Callaghan, 2009; Tedla et al., 2011).

This study says there is no association of comorbidities with xerostomia. Probably because respondents routinely undergo hypertension and diabetes mellitus treatment. The assumption of researchers based on several studies concluded that the adequacy of hypertension control was recommended to reduce the burden of CRF (Singapore & Lea, 2010) and improve the quality of life of patients (Soni et al., 2011). This study states that the decrease in xerostomia is not influenced by blood urea levels. These results can be said that the decrease in xerostomia in the respondents may be influenced by the implementation of hemodialysis twice a week. Research data from Kalantar-Zadeh (2014) in Daugirdas, Blake & Ing (2015) show that kidney failure patients who undergo hemodialysis twice a week improve the condition of kidney function again. In addition, hemodialysis was given to respondents for 5 hours / hemodialysis or 10 hours / week. This policy is in line with the opinion that states that the ideal time for hemodialysis implementation is 10-12 hours / week is related to patient survival and reduces the risk of death and hospitalization (Tentori et al., 2012). Based on the above opinion, the researcher assumed that the respondents' urea levels were in normal conditions at the time of this research.

CONCLUSION

Comparison between xylitol gum and mouthwash against xerostomia concluded that the two interventions did not have a significant difference in xerostomia. This means that both interventions are equally effective in reducing xerostomia in patients with CRF.

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