

Investigating the Effect of Sugar-Free Candies on the Intensity of Thirst and Dry Mouth in Patients Undergoing Hemodialysis

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Abstract

Introduction: Chronic renal failure (CRF) is a progressive and irreversible disorder in which the body's ability to maintain fluid and electrolytes disappears and leads to uremia or azotemia. It seems that sucking sugar-free candy, which has no complications, is the best way to control thirst and reduce the dry mouth of hemodialysis patients. The present study was conducted in order to scrutinize the effect of sugar-free candies on the intensity of thirst and dry mouth in patients undergoing hemodialysis.

Method: It seems that sucking sugar-free candy, which has no complications, is the best way to control thirst and reduce the dry mouth of hemodialysis patients. The present study was conducted in order to scrutinize the effect of sugar-free candies on the intensity of thirst and dry mouth in patients undergoing hemodialysis.

Result: The mean age of patients in the intervention and control groups were 51.93 and 53.07 years in order. 65% of subjects in the intervention group were women and 35% were men and 85% of the control group subjects were women and 15% were men. The following table shows the mean and standard deviation of dry mouth in both groups before and after the intervention. Based on the results of Wilcoxon test, there was a significant difference before and after the intervention in the candy group ($P=0.001$); however, there was no significant difference between the dry mouth of the patients before and after the intervention in the control group ($P=0.44$).

Conclusion: Using candies and chewing gums, which are not sugar-free, might have an adverse effect on their disease. According to the results of the present study and the significant reduction in thirst and dryness of the hemodialysis patients by using sugar-free candy, using sugar-free candies is highly recommended for all patients with oral complications, especially dry mouth and thirst, and especially hemodialysis patients.

Keywords: sugar-free, hemodialysis, zabol

INTRODUCTION

Chronic renal failure (CRF) is a progressive and irreversible disorder in which the body's ability to maintain fluid and electrolytes disappears and leads to uremia or azotemia (1). More than 200,000 people in the United States and more than 1 million people in the world with chronic renal failure continue to live through dialysis, which is the most commonly used treatment for patients with renal insufficiency (2 and 3). Although hemodialysis is an effective therapeutic method for these patients, it has acute and unpleasant effects (4), and cannot protect the health, or guarantee the survival, of the patient by itself in the long term; it, also, does not change the natural course of kidney disease (5). Therefore, observing the diet and limiting the use of fluids are complementary treatments for hemodialysis patients (6); so, along with hemodialysis diet, fluid restriction and dietary regimen are the main pillars of treatment for chronic renal failure (6-7). These patients might suffer the accumulation of fluids in the body if they don't pay enough attention to the amount of liquid intake (8), which might lead to various complications such as hypertension, acute pulmonary edema, congestive heart failure, and early death in the long term (7). Recommended guidelines for reducing fluid intake and weight loss between two dialysis are: The administration of renin converting inhibitors to angiotensin converting enzyme (ACEI), increasing the frequency of dialysis, sodium intake

and reducing protein intake, and fluid constraints as the most effective method (3-9). Intense thirst is due to the limitation of fluid intake which can cause dry mouth in hemodialysis patients (10-11). More than 30% of patients with dialysis suffer from uncontrollable thirst (12). Main causes of the incidence of thirst include osmolality of the plasma, decreased blood volume, an increase in angiotensin II, an increase in sodium levels and an increase in anti-urogenital hormone (13); the desire to drink water is intensified under the influence of dry mouth and esophagus (14). Patients with dry mouth use more water to facilitate swallowing and talking. In addition, dry mouth has a positive relationship with thirst and can act as a stimulant for drinking water at intervals between two dialysis (9). Dry mouth occurs for a variety of reasons in hemodialysis patients, including observing a limited diet of liquids in the intervals between two dialysis, the formation of uremia due to the accumulation of waste materials in the body and the production of toxin, and the use of medicines such as antihypertensive, analgesics, diuretics, antidepressants and anti-inflammatory drugs, which are commonly used in these patients. However, this feeling of thirst is manageable through a variety of ways, including limitation of salt intakes, eating fruits and vegetables, oral care, and sucking candy and pieces of ice (11). Given that the majority of dialysis patients have to observe strict diet, restricting salt intake cannot be helpful enough (7). Using boiled food is

recommended to reduce potassium intake in dialysis patients, a fact which restricts the use of raw fruits and vegetables (3). The results of Saied Reza Mazloom study showed that the ice chip has no effect on controlling thirst and dry mouth in hemodialysis patients (16). Sucking candy increases saliva by 17 times (17) which, in turn, might be helpful in reducing thirst and dry mouth. Therefore, it seems that sucking sugar-free candy, which has no complications, is the best way to control thirst and reduce the dry mouth of hemodialysis patients. The present study was conducted in order to scrutinize the effect of sugar-free candies on the intensity of thirst and dry mouth in patients undergoing hemodialysis.

MATERIALS AND METHODS

The present semi-experimental study was conducted in order to scrutinize the effect of sugar-free candies on the intensity of thirst and dry mouth in patients undergoing hemodialysis in Zabol. The sample size, 40 subjects who were divided in two groups of control and intervention, was determined using Cochran's formula and based on the Mazlumi et al study (16). Being 18 to 65 years old, a minimum 6 months and a maximum of 8 years treated with hemodialysis (weekly 2-3 times each time for 3 to 4 hours), the desire to use candy, and the lack of clear mental disorder, cognitive impairment and emotional mood that prevent effective communication were the main inclusion criteria. Required data was collected through demographic characteristics form, dry mouth assessment tools (XI), and an instrument for measuring the intensity of thirst (VAS). Dry mouth questionnaire includes 11 questions; it is filled out before dialysis and measures the intensity of dry mouth from the end of the previous dialysis session to the end of the current dialysis through 5-scale Likert rating system. A score of 11 indicates non-dryness of the mouth and score of 55 indicates intense dry mouth. Thirst intensity visual assessment measure consists of a 100-millimeter line that measures thirst intensity between 0 and 100. Zero indicates the lack of thirst and 100 indicates intense thirst. Content Validity of thirst duration Questionnaire, dry mouth questionnaire, and thirst intensity visual assessment tools was examined in Hajar Ebrahimi Rigi and Seyed Reza Mazloom (16) study; additionally, the reliability of these questionnaires was examined through re-test method and turned out to be 0.742, 0.763 and 0.919 in order. Initially, a written consent form for patients was obtained and a demographic questionnaire was filled out using patients' records file and interviewing with them and dry mouth and thirst were measured before using the research tools in

patients. Patients in the intervention group used sugar-free candies at the time of dry mouth and thirst for one week, but control group patients did not receive any intervention during this period. At the end of a week, the questionnaires were completed again by the patients and collected data was analyzed using SPSS 22.

FINDINGS

The mean age of patients in the intervention and control groups were 51.93 and 53.07 years in order. 65% of subjects in the intervention group were women and 35% were men and 85% of the control group subjects were women and 15% were men.

The following table shows the mean and standard deviation of dry mouth in both groups before and after the intervention. Based on the results of Wilcoxon test, there was a significant difference before and after the intervention in the candy group ($P=0.001$); however, there was no significant difference between the dry mouth of the patients before and after the intervention in the control group ($P=0.44$). Kruskal Wallis test was used to compare mean and standard deviation of dry mouth in both groups before and after the intervention. The results showed that there was no significant difference between the two groups before the intervention ($P= 0.72$). But the results after intervention showed that there was a significant difference in regard with the mean dry mouth of the patients in both groups ($P= 0.001$). Considering the mean and standard deviation obtained for each group, it can be concluded that dry mouth decreased significantly in the candy consumer group. (Table 1)

The following table shows the mean and standard deviation of the intensity of thirst in patients in both groups before and after the intervention. According to the results, there was a significant difference in regard with thirst intensity in the candy group before and after the study ($P=0.04$), but this difference was not observed among subjects categorized in the control group ($P= 0.72$). The mean and standard deviation of thirst intensity in both groups was compared using Kruskal-Wallis test before and after intervention. The results showed that there was no significant difference between the two groups before the intervention ($P= 0.58$); however, the two groups turned out to have significant difference in regard with thirst intensity after the intervention ($P= 0.02$). Regarding the mean and standard deviation obtained for each group, it can be concluded that the intensity of thirst in the candy group is lower than the control group. (Table 2)

Table1. Comparison of dry mouth means and SD before and after intervention

Variable	group	Before intervention	After intervention	P value
		Mean± SD	Mean± SD	
Dry mouth	Intervention (candy)	5.95 ± 44.12	25.78±6.10	0.001
	Control	42.82±6.78	46.61±7.32	0.44
P-value		0.72	0.001	-

Table2. Comparison of thirst intensity means and SD before and after intervention

Variable	group	Before intervention	After intervention	P value
		Mean± SD	Mean± SD	
Thirst intensity	Intervention (candy)	18.21 ± 72.81	14.71 ± 46.13	0.04
	Control	74.31 ± 14.34	12.18 ± 76.04	0.72
P-value		0.58	0.02	-

DISCUSSION

Based on the results of the present study, using sugar-free candy led to a significant reduction in the dry mouth and thirst intensity in patients undergoing hemodialysis ($P < 0.05$). The findings of Lam et al study, which was conducted on patients undergoing radiotherapy for thyroid cancer, using lemon candy decreased thirst intensity, dry mouth, and, even, salivary gland caused by radiation immediately and 24 hours after surgery; additionally, this study found that sucking candy had a direct effect after radiation therapy (18). Lam's study was consistent with the present research in regard with decreased dry mouth and thirst intensity after the intervention. In another study by Christou on patients with thyroid carcinoma, it was found that using candy could lead to an increase in the flow of saliva and blood flow to the canine, which, in turn, reduced oral injuries caused by radiotherapy; it may, also, be associated with the acceleration of the withdrawal of radioactive substances (19). Therefore, using candy is quite effective in preventing the side effects of dry mouth and the accumulation of radioactive substances through releasing them as soon and quickly as possible; this is quite consistent with what the present study found. Non-pharmacological methods, such as lemon juice, lemon candy, vitamin E, and salivary gland massage, are effective in improving the flow of saliva, making using candy more effective than others.

Jensdottir study (2013) indicated that using candy increases salivary secretion and improves its flow significantly, which consequently prevents dry mouth, in patients undergoing radiotherapy sessions that might reduce salivary secretion and cause salivary gland damage (17). Jensdottir, in his 2006 study, concluded that patients undergoing radiotherapy can use candy to reduce the symptoms of dry mouth (20). The results of these two studies confirm the positive effect of candy on decreasing dry mouth, which is, also, consistent with the findings of the present study.

Kaae JK study (2016) found out that using sugar-free candies would increase the amount of stimulation of the cornea and saliva which, in turn, would decrease the intensity of dry mouth. Thirst and dry mouth could endanger oral hygiene, resulting in eating problems, increased risk of dental caries and impaired spoken ability. Since these disorders may cause emotional stress, such as anxiety, tension and depression, and social activity limitation (23, 24), controlling and treating these complications is very important. Several drugs, such as amphotericin and pilocarpine, have been used to manage dry mouth and reduce salivary gland damage in patients

which have been shown to have severe and varied complications (25). Therefore, the use of non-pharmacological methods is preferable. On the other hand, various studies have shown the effect of various chewing gums and candies on the reduction of thirst and dry mouth in various patients (21, 22, and 26). But one of the factors leading to the final stage of kidney disease (ESRD) is diabetes mellitus. 10-15% of patients in Europe and 45% in the United States require renal replacement for diabetic nephropathy. Thus, diabetes can also be a risk factor for the deterioration of dialysis patients (26). Therefore, using candies and chewing gums, which are not sugar-free, might have an adverse effect on their disease. According to the results of the present study and the significant reduction in thirst and dryness of the hemodialysis patients by using sugar-free candy, using sugar-free candies is highly recommended for all patients with oral complications, especially dry mouth and thirst, and especially hemodialysis patients.

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