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Application of diet to eliminate Gastroesophageal complications in people suffering from heartburn

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A B S T R A C T

Obesity and overweight are risk factors of heartburn and esophageal erosions. Consumption of appropriate diet that has reduced quantities of fats, carbohydrates and proteins helps reduce gastroesophageal disease (GERD). This study assesses the effect of medication and diet on relieving gastroesophageal symptoms caused by excessive production of gastric acid. Physical observations on lifestyle of participants were made. A questionnaire with a reflux symptom score index was used to monitor the severity of symptoms. The body mass index (BMI) of respondents was determined. One group of participants was subjected to prescribed diet and medication. The other group was given prescribed diet and placebo. Medication and prescribed diet reduce gastroesophageal symptoms.

Introduction

Heartburn is the backward flow or regurgitation of stomach contents passing up into the esophagus (Berardi, 2006). Heartburn begins as a burning pain in the middle of the chest, behind the breast bone, often after taking a big meal. Since different foods contain many different nutrients, it is important to select food wisely, plan diets properly and come up with methods of preparing foods for maximum absorption. Heartburn has become a problem in Zimbabwe as many people are succumbing to it. Consumption of fast foods is on the increase in Zimbabwe perhaps because more and more women are working in industries and prefer fast and convenient foods that save them from the labour of selecting, planning and preparing family meals.

Apart from diet, heartburn can also be caused by some medical drugs such as

ARV tablets like stuvudine, which is administered in combination with lamuvidine and nevirapine (Silverman, 1992). Some medications such as bisphosphalates, iron salts, potassium salts, and certain pain medication and antibiotics potentially make people more susceptible to heartburn (Berardi, 2006).

Burgess (2008); Vakil (2010) and Alvarenga et al (2009) revealed that obesity ranks high on the list of contributing causes of heartburn because the adipose tissue in the abdomen crowds the stomach, so that food does not settle down totally into the stomach area. Several recent cross-sectional studies have demonstrated a positive association between heartburn and high body mass index (BMI). The physiopathology for the association of heartburn and BMI can be explained by inappropriate lower esophageal sphincter relaxation arising from hiatal hernia or increase in intra-abdominal pressure, both leading to increase in acid reflux (Hampel et al., 2005). Serious heartburn if not taken care of could cause burning chest pains, blotted full stomach, experience of early satiety, an acid or bitter taste at the back of the throat, bad breath, an increase in pain severity when lying down or bending over, headache, nausea, vomiting, weakness of the body and could develop into ulcers of the esophagus and cancer (Burgess, 2008).

Several diet recommendations for people who are prone to heartburn or GERD are available. Hopewood (1996) recommended intake of alkaline forming foods such as avocados, bananas, grapes, honey, lemons, maple fruit, millet, mellows, molasses, oranges, raisins, white meat and all types of vegetables. These foods neutralize body acids thereby reducing changes for the development of heartburn. Phosphorus and sulphur act as buffers to maintain pH so it is highly recommended to eat 50% of raw fresh fruits and vegetables especially cabbage.

Several lifestyle interventions have been reported in literature as ways of reducing GERD. Avoiding chocolate, alcohol, coffee and tobacco is recommended for GERD treatment (Kaltenbach et al., 2006). Medications such as antacids (Pettit, 2005). Histamine H2-receptor (Khan et al., 2007) antagonists (ranitidine, famotidine, cimetidine, nizatidine) and proton pump inhibitors (PPI) such as pantoprazole, lansoprazole, esomeprazole, omeprazole and rabeprazole (Shaheen et al., 2006). Antacids and histamine H2-receptor antagonists provide temporary relief. The use of these medicines for treatment induces body tolerances within two weeks. PPIs are more effective for the treatment of GERD than antacids. Surgical interventions were cited as another way of treating GERD (Ip et al., 2005). Low carbohydrate has been reported (Yancy et al, 2001; Yudkin, et al., 1972; Austin et al., 2006) as alternatives to GERD treatment.

People suffering from silent GERD also experience respiratory infection symptoms. These symptoms include excess throat mucus, coughing, wheezing, chronic hoarseness of vocal cords, troublesome annoying and tight chest pain (Wong and Fass, 2004; Dickman and. Fass, 2006). Chronic hoarseness of vocal cords is caused by the reflux of gastric contents.

Heartburn is now a widespread problem in Zimbabwe. Usai et al (2013) prescribed a diet that that reduces and in some cases eliminates GERD symptoms without taking medication. In this study the use of prescribed diet in conjuction with cimetidine to eliminate serious aesophageal complications is investigated. The study

aims at achieving self directed care to prevent heartburn through exercise and taking proper diet.

Methods

Five respondents were put on diet and GERD medication (cimetidine). Another group of five participants were put on prescribed diet. An antibiotic was administered to all the participants to relief pain during the assessment period. The participants were monitored over a period of four weeks. All participants were assessed for BMI. The reflux symptom index was used to assess manifestations of esophageal complications before and after treatment. A questionnaire was used to gather information from the participants. Physical observations on living conditions and lifestyles of the participants were made.

Results

Demographic data

The demographic data of the participants is shown in Table 1. There were 2 males and 8 females. The respondents were in the age group 29 to 55 years.

Lifestyle of participants

The lifestyles and living conditions for the participants are shown in Tables 2 and 3. Male participants A and D did not quit smoking during the course of treatment. All participants stopped taking alcohol during treatment. All respondents except for D had adequate accommodation. Four participants (A, B, G, I) who were not involved in any form of meaningful exercise before treatment engaged in exercises such as playing, tennis, football, netball and jogging during treatment.

Diet

Table 4 shows sample menu for heartburn sufferers before treatment. The diet taken before treatment had excess quantities of proteins, carbohydrates and fats. The diet provided too much energy which leads to heartburn complications. There was therefore a need to design a dietary regimen for heartburn sufferers. The sample menu (Berardi, 2006) for heartburn sufferers was prescribed during treatment (Table 5). Dietary adjustment is first line therapy for reducing heartburn and related symptoms. The prescribed diet aims at reducing fat, protein and carbohydrate daily intake. The modified diet is based on the premise that certain foods and beverages and lifestyle factors alter the body's antireflux defense mechanism.

Clinical symptoms

The symptoms of participants on diet and medication before and after treatment are shown in Table 6. Respondent E had a horse voice problem before treatment which disappeared after administering medication. There was an improvement on throat clearance for C and E whilst there was absolute recovery for A and B after taking medication. The problem of excess throat mucus for respondents D and E improved significantly after taking medication. Swallowing of food problems improved for respondent B after taking medication. Breathing difficulties or choking episodes, annoying cough, sensation of something sticking in the throat, chest pain, heartburn and indigestion improved significantly from severe to mild for afflicted respondents after treatment. The relief can be attributed to the effect of cimetidine, improved diet and lifestyle. Cimetidine is an H2 blocker which decreases acid production in the body.

Following prescribed diet eliminates bacteria, improves digestion and decreases excess nutrients. Regular exercises burns excessive calories and improves blood flow.

The symptoms of participants on diet and placebo before and after treatment are shown in Table 7. The respondents were given antibiotics to relieve pain. The prescribed diet reduced esophageal symptoms. Ginger promotes digestion by increasing saliva and gastric secretion and contains large quantities of digestive enzymes that assist with digestion and reduce the occurrence of acid reflux. Ginger enhances the normal intestinal activity that moves food through the digestion track. This quality of ginger may reduce acid reflux by speeding the movement of food out of the stomach and into the small intestines. Ginger reduces acid reflux by absorbing excess stomach acid (Avery, 2003). Inclusion of pistachio nuts also helps reduce digestive illnesses such as gastritis and peptic ulcer disease. Pistachio nuts destroy Helicobacter pylori (Alma et al., 2004) that are responsible for causing digestive illnesses. Pistachios are a rich source of essential nutrients, fiber and protein, low in saturated fat and cholesterol free.

Comparative effects of diet and medication versus diet only on symptoms

Table 8 shows the cumulate scores on the reflux symptom index for respondents on different treatment regimes. Respondents on medication and diet had lower symptoms than those on diet and placebo except for respondent E. Symptoms for respondent E reduced markedly (78.6%). This could be explained in terms of different people responding differently to diet. Diet with medication was more effective because cimetadine decreases acid production. However the drug provides short term relief.

Anthropometric measurements

Table 9 shows anthropometric measurements of respondents that were under cimetidine treatment and the prescribed diet. There was a slight weight drop for respondents C and E while BMI of respondents A and B remained constant before and after taking medication. The BMI of participant D increased from 14 to 18. The increase in BMI can be attributed to consumption of a balanced diet during the assessment period.

Table 10 shows anthropometric measurements for participants on placebo (antibiotic) and the prescribed diet. The antibiotics were taken thrice daily, after taking a meal in the morning, afternoon and supper at least an hour before bedtime. There was no change in BMI for respondents G and I while that of F, H and J decreased. The decrease in BMI was due to taking of a balanced diet and changes of lifestyle.

Conclusion

The study has shown that prescribed diet, lifestyle and medication play a crucial role in relieving GERD symptoms. The knowledge on selection of heartburn reducing foods played an important part. The human mind also played a part in helping respondents on placebo to recover as they thought that there were on GERD treatment. Although antibiotics are not drugs that target heartburn symptoms they help destroy bacteria in the respondents' system and also help alleviate pain caused by heartburn. Lifestyle changes such as daily exercises, taking moderate alcohol, eating small frequent meals, reducing taking

Table.1 Age distribution of GERD participants

Age (years)	Sex	
	M	F
21-30	0	2
31-40	0	1
41-50	2	4
51-60	0	1

Table.2 Living conditions and lifestyle of respondents before treatment

Lifestyle	Participants									
	A	B	C	D	E	F	G	H	I	J
Alcohol	yes	no	yes	yes	no	yes	no	no	no	no
Smoking	yes	no	no	yes	no	no	no	no	no	no
Accomodation	ample	ample	ample	not	ample	ample	ample	ample	ample	ample
Exercise	no	no	yes	yes	yes	yes	no	yes	no	yes

Table.3 Living conditions and lifestyle of respondents during treatment

Lifestyle	Participants									
	A	B	C	D	E	F	G	H	I	J
Alcohol	no	no	no	no	no	no	no	no	no	no
Smoking	yes	no	no	yes	no	no	no	no	no	no
Accomodation	ample	ample	ample	not	ample	ample	ample	ample	ample	ample
Exercise	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Table.4 Sample menu for heartburn sufferers before treatment

Breakfast	Lunch	Dinner
1 Fruit (orange, apple, banana, peaches, paw paw, pear)	Beef burgers (2)	Green salad
Whole grain cereal (2 cups)	Rice (3 cups)	Vinegar and oil dressing (1 tablespoon)
Whole wheat toast (4-6 slices)	Maize meal (3 cups)	Beef (200 g)
Margarine (3 teaspoons)	Chicken (quarter)	Maize meal (3 cups)
Jam (3 tablespoons)	Sausages (2)	Fried green vegetable (1 cup)
Full cream milk (250 ml)	Beef steak (200 g)	Margarine (1 teaspoon)
Tea, coffee (2 cups)	Chips (2 cups)	Tea, coffee (2 cups)
Eggs, sausage, beef steak, bacon, liver (200 g)	Green vegetables	Bread (2 slices)

Table.5 Prescribed menu for heartburn sufferers during treatment

Breakfast	Lunch	Dinner
1 Fruit (orange, apple, banana, peaches, paw paw, pear)	Beef burgers (1)	Green salad
Whole grain cereal (half cup)	Ginger rice (1 cups)	Vinegar and oil dressing (1 tablespoon)
Whole wheat toast (2 slices)	Maize meal/millet (1 cups)	Beef (60 g)
Margarine (1 teaspoon)	Ginger chicken casserole (100 g)	Maize meal/millet (1 cup)
Jam (1 tablespoons)	Sandwiches (2 slices)	Steamed mixed vegetables (1 cup)
Skimmed milk (1 cup	Beef steak (60 g)	Low fat margarine (1 teaspoon)
Apple juice (half cup)	Grilled/mashed potatoes (1 cup)	Roibos tea or lemon tea (2 cups)
Eggs, sausage, beef steak, bacon, liver (60 g)	Green vegetables	Bread (2 slices)
Roibos tea or lemon tea (1 cup)	Egg roll (1)	Medium apple
Low fat yoghurt (half cup)	Low fat yoghurt (half cup)	Low fat yoghurt (half cup)
Pistachio nuts (1 cup)	Pistachio nuts (1 cup)	Pistachio nuts (1 cup)

Table.6 Symptoms of gastro esophageal complication scores before and after treatment

Symptoms	Scores									
	Before					After				
	A	B	C	D	E	A	B	C	D	E
Hoarse voice	0	0	0	0	1	0	0	0	0	0
Throat clearance	1	1	5	0	2	0	0	2	0	1
Excess mucus	0	0	0	2	3	0	0	0	1	2
Swallowing problems	0	3	0	0	0	0	1	0	0	0
Coughing after lying down	0	0	3	0	4	0	0	1	0	2
Chocking episodes	5	0	0	1	0	2	0	0	1	0
Annoying cough	0	0	2	2	3	0	0	1	1	1
Throat lump	1	3	0	3	4	1	2	0	1	2
Heartburn	4	5	3	3	3	2	2	2	1	2

Table.7 Symptoms of gastro esophageal complication scores before and after treatment

Symptoms	Scores									
	Before					After				
	F	G	H	I	J	F	G	H	I	J
Hoarse voice	3	0	0	0	0	2	0	0	0	0
Throat clearance	2	1	0	1	1	1	0	0	0	0
Excess mucus	1	1	2	3	3	0	0	2	2	1
Swallowing problems	1	3	0	0	1	0	3	0	0	0
Coughing after lying down	1	0	0	2	2	0	0	0	1	0
Chocking	2	0	0	2	2	2	0	0	1	0
Annoying cough	3	0	0	2	0	1	0	0	1	0
Throat lump	2	2	4	4	1	0	1	3	3	1
Heartburn	1	4	4	4	4	2	3	2	3	1

Table.8 Comparison of symptoms reflux cumulative score results for individuals on different GERD treatment

Respondent	Score (drug and diet)		Decrease (%)	Score (placebo and diet)		Decrease (%)
	Before	After		Before	After	
A	11	5	63.6	-	-	-
B	12	5	58.3	-	-	-
C	13	6	53.8	-	-	-
D	11	5	63.6	-	-	-
E	20	10	50.0	-	-	-
F	-	-	-	14	8	34.9
G	-	-	-	11	7	36.4
H	-	-	-	11	8	27.3
I	-	-	-	18	11	38.5
J	-	-	-	14	3	78.6

Table.9 Anthropometric measurements for respondents on diet and cimetidine

Measurement	Score	Respondents				
		A	B	C	D	E
Height (m)	Before	1.60	1.70	1.65	1.66	1.61
	After	1.60	1.70	1.65	1.66	1.61
Weight (kg)	Before	95.0	67	79.6	40.1	105.0
	After	95.0	67	75.0	48.0	95.1
BMI (kg/m^{-2})	Before	38	24	30	14	40
	After	38	24	28	18	38

Table.10 Anthropometric measurements for respondents on diet and placebo

Measurement	Score	Respondents				
		F	G	H	I	J
Height (m)	Before	1.65	1.65	1.56	1.60	1.60
	After	1.65	1.65	1.56	1.60	1.60
Weight (kg)	Before	76.0	78.0	74.0	59.7	75.0
	After	68.0	78.0	67.0	60.0	72.0
BMI (kg/m^{-2})	Before	29	29	32	24	30
	After	25	29	28	24	29

heartburn inducing foods and quit smoking eliminated heartburn symptoms. An extended assessment period on the effect of prescribed diet and lifestyle could give more valuable information on ways of eliminating GERD.

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