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RESEARCH ARTICLE

RELATIONSHIP BETWEEN APPENDICITIS AND LIFESTYLE; DIETARY AND HYGIENE IN SAUDI ARABIA.

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Abstract

Acute appendicitis (AA) is considered as one of the most common causes of surgical emergencies worldwide (1). The gold standard treatment for AA is Appendectomy (2). About 6% of the population during their lifetime, will suffer from acute appendicitis (3,4). Males suffer from acute appendicitis than females (8.6% and 6.7% respectively) (5,6). Acute appendicitis rarely causing death; with a mortality rate ranges from zero up to 2.4% (8). However, more attention has been directed for early diagnosis and intervention. A cross-sectional study was conducted to assess the relationship between appendicitis and lifestyle ; dietary and hygiene in Saudi Arabia. This study showed defects in Dietary life style for acute appendicitis patients including, low consumption of water, a significant decrease in the containment of fiber at the usual food.

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Introduction:-

Acute appendicitis (AA) is considered as one of the most common causes of surgical emergencies worldwide (1). The gold standard treatment for AA is Appendectomy (2). About 6% of the population during their lifetime, will suffer from acute appendicitis (3,4). Males suffer from acute appendicitis than females (8.6% and 6.7% respectively) (5,6). Acute appendicitis rarely causing death; with a mortality rate ranges from zero up to 2.4% (8). However, more attention has been directed for early diagnosis and intervention.

Appendicitis secondary to hyperplasia of the appendiceal lymphoid follicles as a result of a bacterial or viral infection is the most common etiology of appendicitis in children. While the appendicitis as a result of fecal material or fecalith occurs more commonly in adults (14, 15). There are different factors are responsible for acute appendicitis perforation in different age groups and this can be explained by the difference in immune status and appendicitis aetiologies (8). The industrialized nations have registered increased happening of appendicitis, constipation, diverticulitis, irritable bowel syndrome (IBS), and colon cancer (16).

In the AA management, the key for successful management is early diagnosis and prompt surgical intervention (9). The late diagnoses of could lead to gangrene and perforation. The perforation occur within 8 - 24 hours in children, while it occur within 36 hours in young children and adolescents (8). Causes of delayed diagnosis include; home remedies, homeopathic, local doctors, quacks, and medical practitioners, (8).

The most common symptom of AA is abdominal pain. According to the National Institutes of Health, the pain begins typically near the belly button, and then it moves to the abdomen lower right side, usually along a period of (12 – 24) hours. The pain gets worse often if the patient moves around, coughs, takes deep breaths, or sneezes (10). There are many other diseases of gastrointestinal tract which mimic AA making it difficult in diagnosis. (11,12). Diagnosis difficulties arise in females at reproductive age , very young, and elderly patients because they are more possible to have an atypical presentation. They also have many other conditions may mimic acute appendicitis (13).

In spite of the fact that the acute appendicitis etiology and many etiologic factors have been subject of discussion and speculation, multiple factors are probably included in the disease pathophysiology are still unknown. These include non-specific factors, as well as bacterial, fungal, and viral infections and dietary regimens with low fiber (16). Therefore this study was conducted to assess the relationship between appendicitis and lifestyle ; dietary and hygiene in Saudi Arabia .

Objectives:-

- To describe the characteristics of the patient with appendicitis.
- To determine the relationship between appendicitis and life style (dietary and hygiene).
- To determine the relationship between appendicitis and medical and surgical problems.

Subjects and Methods:-

A cross-sectional study was conducted to assess the relationship between appendicitis and lifestyle ; dietary and hygiene in Saudi Arabia . During the period from 1, August 2016 to 8, September 2016, in **the following** hospitals; King Fahad university hospital in Al- khobar, Dammam central hospital, Imam Abdurrahman Bin Faisal hospital (Dammam National Guard), King Fahad specialist hospital in Dammam, king Fahad medical military complex, king Fahad central Hospital in Jizan, Abu Areash General Hospital, king Fahad general hospital in Medina, National Guard hospital Medina, National Guard hospital in Jeddah, Alansar hospital in Medina, Al-rass general hospitals in Qassium, Prince Sultan Armed force hospital in Medina, Qatif central hospital in Qatif, Dammam medical complex, King Khalid hospital, Hail general hospital, King Fahad medical city Qassium, king Fahad hospital in AlHassa, Bin Jalawi Hospital in AlHassa, Dammam medical center, King Fahad Medical City, king Faisal specialist hospital & research center, and King Abdul-Aziz hospital in Jeddah.

Data were collected by data collectors by means of personal interview with the sampled patients, after obtaining their consents and hospital approval to participate in the study, using a predesigned questionnaire. Each patient was interviewed separately, and confidentiality was assured. It has been to maintain the confidentiality of the information for each patient. The questionnaire designed by researchers, its contains four sections. The first section is about socio-demographic characteristics which includes Gender, Age (years), Marital status, Place of residence, Weight (kg), and Length (cm). Second section includes the questions regarding dietary life style. While third section to assess the hygiene life style. And Fourth section is including questions about chronic medical and surgical problems. The study included (923) patients whose diagnosed with appendicitis postoperatively and were attending certain hospitals in Saudi Arabia. The patients more 60 years old or less than 12 years were excluded. Collected data were coded and analyzed using statistical analysis program (SPSS v.22), in addition to using of necessary statistical methods to achieve the objectives of the study including frequencies, percentages, graphs, and chi-square test.

Results:-

Table (1) shows the appendicitis patients distribution according to their personal data, as 59.4% of them were males, while 40.6% of them were females.

Their ages were distributed according to the following age groups, 39.2% of them were between (18- 25) years old, 25.9% of them were less than (18) years old, while 22.1% of them were between (26- 35) years old.

And their distribution according to their marital status; most of them were not married with a percentage of 64.4%, while 35.6% of them were married.

And according to their weights; 41.4% of them had weights less than (60) K.g, 29.3% of their weights were in the range (61- 75) k.g, 20.1% of their weights were between (76- 90) k.g, and 9.3% of their weights were more than (90) k.g.

And finally their distribution according to their length; 35% of their lengths were between (161- 170) cm, 34.6% of them were between (150- 160) cm, and 20.5% of them were between (171- 180) cm.

Table 1:- Personal data for the patients (n = 916).

Variable		No.	%	P-value
Gender	Male	544	59.4	0.00**
	Female	372	40.6	
Age (years)	Less than 18	237	25.9	0.00**
	18- 25	359	39.2	
	26- 35	202	22.1	
	36- 45	75	8.2	
	More than 45	43	4.7	
Marital status	Single	590	64.4	0.00**
	Married	326	35.6	
Place of residence	Eastern Region	255	27.8	0.00**
	Western Region	243	26.5	
	North Region	36	3.9	
	Southern Region	130	14.2	
	Central Region	215	23.5	
	Outside the kingdom	37	4.0	
Weight (kg)	Less than 60	379	41.4	0.00**
	61 – 75	268	29.3	
	76 – 90	184	20.1	
	More than 90	85	9.3	
Length (cm)	Less than 150	53	5.8	0.00**
	150 – 160	317	34.6	
	161 – 170	321	35.0	
	171 – 180	188	20.5	
	More than 180	37	4.0	

**Chi Square test - Significant at the 0.01 level

Table 2:- Dietary life style

Question		No.	%	
Daily water consuming	cup, small bottle	141	15.4	
	Less than 6 cups	498	54.4	
	6- 12 cups	243	26.5	
	More than 12	34	3.7	
Total		916	100.0	
How many times do you eat vegetables daily?	Once	756	82.5	
	Twice	122	13.3	
	Three	26	2.8	
	More	12	1.3	
Total		916	100.0	
How many times do you eat fruits daily?	Once	800	87.3	
	Twice	91	9.9	
	Three	21	2.3	
	More	4	0.4	
Total		916	100.0	
How many times do you eat grains daily?	Once	736	80.3	
	Twice	143	15.6	
	Three	26	2.8	
	More	11	1.2	
Total		916	100.0	
Do you prefer adding chili to your	Yes	Every meal	199	21.7

food?	Sometimes	384	41.9
	No	333	36.4
Total		916	100.0
Do you have particular food system?	Yes	55	6.0
	No	861	94.0
Total		916	100.0
Do you eat in bronchial restaurants?	Yes	669	73.0
	No	247	27.0
Total		916	100.0
Do you eat in fast food restaurants?	Yes	808	88.2
	No	108	11.8
Total		916	100.0

We conclude from the above table that 54.4% of Appendicitis patients consuming less than (6) cups of water a day, and 82.5% of them eat vegetables just once a day, and 87.3% of them were consuming fruits once a day, and 80.3% of them eat grains once a day.

As we conclude that 21.7% of Appendicitis patients preferred adding hot sauce to all of their meals, while 41.9% of them prefer that for some of their meals, and 36.4% of them didn't prefer to add hot sauce to their meals.

And also conclude from the above table that 94% of Appendicitis patients didn't follow specific food system, and 73% of them eat from bronchial restaurants, and 88.2% of them eat from fast food restaurants.

Table 3:- Hygiene life style.

Question		No	%
Do you wash your hands before eating?	Yes	461	50.3
	No	83	9.1
	Sometimes	372	40.6
Total		916	100.0
Do you eat foods from peddlers?	Yes	224	24.5
	No	313	34.2
	Sometimes	379	41.4
Total		916	100.0
Do you use bathrooms too much (in public places or in crowded home)?	Yes	424	46.3
	No	492	53.7
Total		916	100.0
What type of bathrooms do you use?	Old ones (Arabian)	427	46.6
	Chair bathrooms	489	53.4
Total		916	100.0

We conclude from the above table that 50.3% of Appendicitis patients they wash their hands before each meal, and 24.5% of appendicitis patients eat foods from peddlers. and 46.3% of them always use public bathrooms or crowded home bathrooms, and 53.4% of them use chair bathrooms, while 46.6% of them used old ones (Arabian).

Table 4:- Chronic medical and surgical problems.

Question	Yes No. (%)	No No.(%)
Do you suffer from chronic constipation?	161 (17.6%)	755 (82.4%)
Did you diagnosed for any of this disease before feeling the pain?		
- Chronic inflammatory bowel disease	5 (0.5%)	911 (99.5%)
- Inflammation of the respiratory tract	54 (5.9%)	862 (94.1%)
- Parasitic infection in the digestive tract	40 (4.4%)	876 (95.6%)
- Colon tumor	8 (0.9%)	908 (99.1%)
- Appendix tumor	32 (3.5%)	884 (96.5%)
- Stomach injury(accident, beating or stap)	29 (3.2%)	887 (96.8%)
- A surgery in the right side abdomen	44 (4.8%)	872 (95.2%)

We conclude from the above table that 82.4% of Appendicitis patients didn't suffer constipation, and the 9% of them suffer from inflammation of the respiratory tract, and 4.8% of them had already conduct surgery in the right side abdomen, also 4.4% of Appendicitis patients suffered from parasitic infection in the digestive tract.

Also we conclude from the table that 3.5% of Appendicitis patients suffered from appendix tumor, and 3.2% of them suffered from abdomen injury, and 0.9% of them suffered from colon tumor, finally 0.5% of them suffered from chronic inflammatory bowel disease.

Discussion:-

Acute appendicitis continues to be the commonest cause of surgical abdominal emergency (1). There are different factors are responsible for acute appendicitis perforation in different age groups (8). These include non-specific factors, as well as bacterial, fungal, and viral infections and dietary regimens with low fiber (16). Consequently this study aimed to to assess the relationship between appendicitis and lifestyle ; dietary and hygiene in Saudi Arabia .

In a report for World Health Organization, it was estimated that adult females needed of water 2.2L/day and males 2.5L/day (17). Equivalent to 8-8.5 cups of water daily, but in our study more than half of appendicitis patients consume less than 6 cups of water daily, and the most of them follow this rate of water consumption more than 2 months ago. This low consumption of water contributes at causing the slow bowel movement followed by constipation and thus lead to appendicitis. Case study reported that, Low water intake may also be a causative influence of appendicitis (18).

Concerning fiber consumption, results of this study showed a significant decrease in the containment of fiber at the usual food for acute appendicitis patients. Also there was a significant proportion of acute appendicitis patients weren't going to defecate daily. Our finding compatible with Imanieh et al., found that a high rate of constipation in patients with lower fiber intake, (16).which is consistent with the hypothesis indicating the role of dietary fibers in lowering the incidence of appendicitis. Whereas the water content of dietary fiber is three times its density(16), it forms softer and heavier stools with a larger volume and reduced passage time (19), it also increase mucus production by the intestinal mucosa (20),and to decrease contraction frequency of the cecal circular muscle (21). Thus lowering the probability of contracting appendicitis as compared to stools with lesser fiber (16). Volz was the first to describe the relationship between the presence of fecalith and inflammation of the appendix. The belief that luminal obstruction is an important factor in the pathogenesis of acute appendicitis is based on the finding of fecalith in many patients with advanced disease (22).

Most of our appendicitis patients eat grains only one time daily, Cummings and colleagues 14 found bran to cause the greatest increase in fecal weight of the dietary fibers they studied (23).

A beneficial role of spices has been reported in obesity, cardiovascular and gastrointestinal conditions, various cancers, neurogenic bladder, and dermatologic conditions (24), but spices also exhibit antibacterial activity and affect gut microbiota populations (25). This means that the spices have both beneficial and harmful effects on the digestive system. In the present study most of acute appendicitis patients preferred having spicy meals, But not on a daily basis, or continuously.

Also the most of our participants consume food restaurants, whether bronchial restaurants or fast food. It is known that food restaurants contains high levels of fat and low in fiber and this in turn hinders the process of digestion and aggravate constipation and thus increases the likelihood of suffering from acute appendicitis.

The causes of appendicitis have been hypothesized to be multifactorial, with diet considered to be a major predisposing factor and viral agents, bacteria, or environmental pollutants playing a secondary or precipitating role (26). In our study the participants showed moderate Hygiene life style. It is natural that this moderate Hygiene life style increase the chances of bacteria and viruses infection, which in turn increase the chances of acute appendicitis. Contrary to previous statements there is no evidence that disease rates were greatly influenced by the dietary changes in the second world war. It is concluded that dietary changes do not explain the time trends in appendicitis and that the epidemiology of the disease is more readily explained by a primarily infectious aetiology (27).

Knowing that appendicitis is difficult to diagnose in the steroid dependent patients who are taking steroids for other illnesses like Chronic inflammatory bowel disease and Inflammation of the respiratory tract due to anti-

inflammatory and immunosuppressive effects of steroids. Also steroids Inhibits pain so it hinder the diagnosis of acute appendicitis. The most of our participants didn't suffer from Chronic medical and surgical problems.

Conclusion:-

This study showed defects in Dietary life style for acute appendicitis patients including, low consumption of water, a significant decrease in the containment of fiber at the usual food. This lead to a significant proportion of acute appendicitis patients weren't going to defecate daily. Also the acute appendicitis patients showed moderate hygiene life style, this could contributes in increasing the probability of appendicitis patients. There was low prevalence of chronic medical and surgical problems among acute appendicitis patients including.

Recommendation:-

- Work on community awareness of risk factors that increase the chances of acute appendicitis.
- Guidance of children in schools on healthy diet and the importance of drinking water and personal hygiene because they are the most vulnerable to appendicitis.
- Adult females need 2.2L of water per day while males need 2.5L of water per day.
- The daily diet should contain a sufficient amount of fiber.
- Work to avoid constipation and treated as soon as it happens.
- Maintaining personal hygiene as much as possible.

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