

RESEARCH ARTICLE

THE PREVALENCE OF IRRITABLE BOWEL SYNDROME AMONG PRIMARY HEALTH CARE DOCTORS IN MAKKAH AL-MUKARRAMAH. SAUDI ARABIA

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Abstract

..... Background:Irritable Bowel Syndrome is found to be more common among health care workers. There are no studies yet that focuses on this issue among primary health care doctors in Makkah AL-Mukarramah, Saudi Arabia and the definite factors affecting IBS are not yet established.

Aim of Study: To measure the prevalence of Irritable Bowel Syndrome among primary health care doctors in Makkah AL-Mukarramah, Saudi Arabia and to determine associated factors.

Methodology: The study follows a cross-sectional study design, 140 physicians attending primary health care doctors in Makkah AL-Mukarramah were interviewed. A self-administered questionnaire was used for data collection. It included socio-demographic variables and the variables used in Rome IV criteria.

Results: Irritable Bowel Syndrome is found to be common among primary health care doctors in Makkah Al-Mukarramah. The factors that were significantly associated with IBS among participants are social status, social relationships, having first degree relatives with IBS, increased nervousness and pressure at work, change in mood, and loss of interest

Conclusion: The prevalence of IBS (29.7%) among primary health care doctors in Makkah Al-Mukarramahwas quite high compared to other similar studies. The most significant predictor among the said factors was having increased nervousness and pressure at work. Therefore, doctors should be screened routinely for Irritable Bowel Syndrome. Also, these findings will help in the development of a more reliable assessment tool for IBS and its appropriate treatment.

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Introduction:-

Background:

Irritable Bowel Syndrome (IBS) is a persistent condition defined by abdominal pain, irregularities in the bowel movement, and bloating. The understanding of IBS has evolved rapidly in accordance with scientific and medical advancement, although historically, it was already recognized 150 years ago (1).

Corresponding Author:- Dr. Fatimah Yaseen Sabbagh Address:- Family Medicine Resident, MBBS, Makkah, Saudi Arabia. IBS is a common clinical disorder that affects the digestive region in the gastrointestinal system. Its recurrent attributes, signs, and manifestations that range from mild to severe have negative effects on the quality of life of the affected individual particularly their productivity, and already spiraling health situation; therefore, a suitable treatment for these individuals is essential (2). Moreover, of all the gastrointestinal diseases, IBS is the most commonly analyzed ailment and also the most common reason for visiting gastroenterologist (3).

The etiology of Irritable Bowel Syndrome is still uncertain although there are a lot of factors that are deemed to be relating to it. IBS is currently being looked at as an outcome of a complex interrelationship between the central nervous system and the digestive tract or termed as the brain-gut axis (4). In addition, diagnostic investigations or indications for diagnosis of IBS still don't exist, and only the symptoms are the basis for being clinically diagnosed (3).

IBS diagnosing can be challenging because of the overlapping of symptoms with other gastrointestinal diseases. Because of this uncertainty, physicians developed a symptom-based diagnostic as early as the 1970s. The Manning criteria were used and six symptoms were found to be common among individuals diagnosed with Irritable Bowel Syndrome. Through analysis studies, these six symptoms thought to make up IBS, thus, it led to the belief that there is the possibility of IBS as a distinct medical entity. Due to this observation, a Rome I criteria was developed, which has been revised eventually leading to Rome II and Rome III criteria (5).

In the treatment of IBS, both pharmacological and non-pharmacological therapies are being done. For pharmacological therapy, dietary treatment such as those that would relieve abdominal pain and regulate the bowel movement can be used. Drug therapy such as antidepressants and psychotherapy can also be used particularly to patients with anxiety and depression. For non-pharmacological therapy, on the other hand, modification on the lifestyle of the patient is considered such as dietary adjustment and exercise. Therapy with a sworn psychologist may be necessary for some, in fact, there are few studies that showed a reduction in symptoms of IBS because of this (5).

In the study done by Ford et al., they compared and validated the different criteria for the diagnosis of Irritable Bowel Syndrome such as Manning, Rome I, Rome II, and Rome III. Based on the result, all of these criteria performed modestly in differentiating IBS to other gastrointestinal diseases. Although in terms of accuracy, a significant difference still appears. Therefore, the researchers suggested that a more reliable and more accurate way of diagnosing IBS should be made (6).

According to Endo et al., the global prevalence of Irritable Bowel Syndrome is estimated to be 11.2%, a rate that has been consistent for the last 30 years. South America has the highest prevalence of IBS with a percentage of 21%, while Southeast Asia has the lowest prevalence with 7%. There is no precise data for the IBS prevalence in African countries since they lack population-based data. They also found out that IBS seemed to be more common among the female population than in the male population, also, socio-economic status has seen to be of no effect on IBS prevalence although there are some studies that show otherwise (7).

Several studies have been done to assess the prevalence of IBS in different parts of Saudi Arabia. In the AlJouf Area, Northern KSA, the prevalence of IBS was 8.9% and 9.2%. Another study was done at King Abdulaziz University, Jeddah, KSA, among medical students and the prevalence of IBS varies from 9.3% to 35.5%. The same was done among their nurses, and the prevalence rate was 14.4%. Consequently, in the Qassim region, the prevalence of IBS among 300 school teachers is 40.7%, with no significant correlation with gender. Lastly, a study conducted at King Saud bin Abdulaziz University for Health Sciences, KSA among medical students and it resulted in an overall IBS prevalence of 21%. It was also found out from the study that women are more like to have IBS than men (8).

In Saudi Arabia, Irritable Bowel Syndrome was found to be more common among healthcare professionals. Female gender, anxiety, educational level and emotional stress were found to be associated with IBS. Evaluation for stress reduction and psychological problems through stress management is highly suggested for individuals in this profession (9).

Rationale:

1. The researcher has IBS so identifying IBS prevalence among physicians is essential.

- 2. Irritable Bowel Syndrome is a common condition and its analysis will have a significant impact on health studies.
- 3. There is no existing research that focuses on the prevalence of Irritable Bowel Syndrome among doctors in Primary Health Care Centers in Makkah Al-Mukkarramah.
- 4. The researcher selected physicians as the population of this study because the prevalence of IBS is thought to be higher among them since they are more exposed to stress, long working hours, and ill patients on a daily basis.

Aim:

To evaluate the prevalence of Irritable Bowel Syndrome and its associated factors.

Objectives:-

- 1. To measure the prevalence of Irritable Bowel Syndrome among physicians in Primary Health Care Centers in Makkah Al-Mukkarramah from 14 January to 1 February 2018.
- 2. To determine the factors associated with Irritable Bowel Syndrome among physicians in Primary Health Care Centers in Makkah Al-Mukkarramah from 14 January to 1 February 2018.
- 3. To identify the most common type of Irritable Bowel Syndrome among physicians in Primary Health Care Centers in Makkah Al-Mukkarramah from 14 January to 1 February 2018.

Chapter 2:

Literature Review:-

The review of the related literature showed that there are studies from various countries that exhibited an extensive prevalence of Irritable Bowel Syndrome. This chapter summarizes the result of these studies on the basis of country, type of study, the setting of the study, tools used in the study, and major findings.

The Prevalence of Irritable Bowel Syndrome:

In Saudi Arabia, AlAmeel et al. (10) conducted a study relating the prevalence of Irritable Bowel Syndrome among physicians and surgeons. They were asked to complete an internet survey that includes questions with reference to the participants' demographic information, practice, specialty and working hours in a week. Their analysis was composed of 594 subjects, with 419 males and 175 females. Their results showed that the overall prevalence of IBS among doctors in Saudi Arabia was 16.3%. Also, it was found to be more common in women, younger physicians, and those who have longer working hours. Moreover, there was no correlation between practicing a specific specialties and IBS; however, the researchers disclaimed that the lack of relationship between IBS and physicians' specialty may be associated to the comparatively small sample size used from each specialty.

The frequency of Irritable Bowel Syndrome among healthcare professionals in Turkey was also investigated (11). The respondents consist of 394 healthcare professionals and a control group with 207 individuals. They were evaluated according to demographic information, existence of recurrent disease, smoking, drug usage, IBS awareness, alarm features, and the type of IBS they experience. 44 healthcare professionals and 10 individuals from the control group were found to have IBS. The results showed that the prevalence rate of IBS among healthcare professionals and the individuals from the control group is 11.17% and 4.83% respectively. This goes to show that Irritable Bowel Syndrome was more evident in healthcare workers than in the control group.

In Egypt, the prevalence of Irritable Bowel Syndrome was studied at Ain Shams University among medical students from October 2017 to February 2018 (12). 382 students were asked to fill out a questionnaire, and 121 of those were positive with IBS. The prevalence rate of IBS was 31.7%, with a higher percentage among woman and students having relatives that are IBS positive; however, IBS was accordingly less observed among students who regularly exercise. Lastly, it was also observed that there was a statistically significant association between IBS and anxiety.

Irritable Bowel Syndrome was also found to be prevalent in Europe. 255 patients admitted to six varied hospitals near Bristol, UK, were given questionnaires (13). These 255 patients were diagnosed with a gastrointestinal problem. 30% were assessed to have IBS and 14% other have functional diseases. Individuals with IBS were more often female and more often evaluated by their doctors to be polysymptomatic and to have unrecognized symptoms.

In the United States of America, quota sampling and screening interviews via random-digit telephone dialing were done to identify individuals diagnosed with IBS or even the ones that are not formally diagnosed (14). Information

on IBS symptoms, lifestyle, status of health, and how the symptoms affect the individuals' lives was gathered through comprehensive follow-through interviews. The total number of screening interviews done was 5009 and the prevalence rate was 14.1%; of which 3.3% were medically diagnosed and 10.8% were undiagnosed but met the irritable bowel syndrome criteria. Most that suffer from Irritable Bowel Syndrome in the United States of America are undiagnosed; and it should not remain that way because IBS has a significant effect on the individual's well-being and health, as well as socio-economic consequences.

There are also cases of Irritable Bowel Syndrome in Asian countries. In Japan, a large-scale internet survey was conducted to 10,000 subjects to determine the prevalence of Irritable Bowel Syndrome (15). The prevalence of IBS and subtypes were identified and the results were analyzed for correlation. The IBS overall prevalence rate is 13.1%; while the rate of prevalence of IBS with diarrhea subtype accounted for 29% of these cases, IBS with constipation subtype corresponds to 24% of cases, and mixed IBS subtype to 47%.

In India, the prevalence of Irritable Bowel Syndrome was also observed (16). A study was conducted among the slum population of Mumbai, India to determine the prevalence of IBS and to study epidemiological factors relating to it through systematic random sampling with a questionnaire. The prevalence of IBS was found to be 12.27%; 56% of whom were males and 44% were females. Most that experienced IBS were aged between 25 and 44 years old, married; and their most common symptoms were pain relief after defecation and variation in frequency of stools.

Factors associated with Irritable Bowel Syndrome:

Psychological Factors:

Almutatairi et al. (17) determined the factors associated with Irritable Bowel Syndrome among medical students in Qassim, Saudi Arabia, and they found out that depression has a significant impact on the prevalence of IBS. The study also showed that IBS prevalence is more common in students with a high level of anxiety in comparison to those with mild anxiety; nevertheless, there was no numerically significant difference. Consequently, the researchers also stated that although anxiety and depression affect the symptoms of IBS, psychological factors alone affect the abdominal function and reactivity of the intestine.

Afetni et al. (18) conducted a study in Makkah Almukarramah, Saudi Arabia among its adult male population regarding the prevalence of Irritable Bowel Syndrome and its correlated factors. Psychological distress such as anxiety and depression are recognized contributing factor for IBS. Based on the result of the study, there was a significant relationship between psychological upset and loss of interest in things as a manifestation of bad quality of life. The definite effect of psychological stress on abdominal pain and discomfort is yet to be proved; although, many researchers attested that there is an interrelationship between the central nervous system of the brain and the digestive system.

Psychosocial Factors:

In China, Jiang et al. investigated the association between psychosocial factors and the danger of contracting Irritable Bowel Syndrome in college freshmen (19). Psychosocial factors were found to supplement to IBS prevalence among college freshmen. Experience of abuse such as emotional, physical and sexual abuse was also associated with increased exposure to IBS. Consequently, another research also reiterated that people with IBS experienced more abuse compared to those who do not have IBS, and abuse was correlated with cases of increased gastrointestinal symptoms. Moreover, psychological factors such as depression and anxiety are commonly observed among individuals with abdominal discomfort or IBS.

Social and psychological factors can intercede with the interaction between the central and centric nervous systems and it has been proven that it is involved in the commencement of IBS. There is evidence that people who were abused and had a stressful life are prone to gastrointestinal disorders. Two studies concluded that history of trauma and abuse, either a childhood or adult experience, are associated with an increased risk of having IBS (20). In a study involving veteran women, who experienced occupational trauma as well as sexual trauma, the IBS prevalence was 33.5%. Although depressions and traumatic stress were more common in cases of IBS, the association between trauma and the risk of IBS has not yet been proven.

Occupational Stress:

In Northern Saudi Arabia, a lot of psychological factors were found to be associated with the analysis of Irritable Bowel Syndrome (21). In the study done by Alharbi, he stated that the possibility of anxiety as a factor of IBS was analytically significant as well as the risk of emotional stress. The results of his study also showed that the occupational stress level was higher in patients diagnosed with IBS compared to healthy individuals, in fact, IBS was found to be more common in healthcare professionals. Alharbi, therefore, concluded that IBS symptoms are linked with anxiety, depression, and to a less likely chance, may be associated with occupation and daily working hours.

Medical students in Pakistan were surveyed to figure out the prevalence of IBS and the factors affecting it (22). Stress is said to be one of the major contributing factors to IBS since it triggers colonic spasms. Stress is identified to be very common among these individuals; thus, the prevalence of IBS is also common among medical students, in fact, 55.8% of IBS cases were found to be positive for anxiety. According to Naeem et al., (22) anxiety, depression, and sleeping disorders are commonly associated with IBS, so students who regularly experience anxiety and mental stress are more likely to be tested positive with IBS.

Sex-Gender Factor:

In Lebanon, social factors and health behaviors on Irritable Bowel Syndrome prevalence were identified among university students (23). The probability of having IBS is more evident among women than men, among the 22 years old or younger, and those who are living in their own, private home, or dormitory, and those with belong to the middle class society or higher.

The presentation of symptoms as well as treatment may vary for male and female with Irritable Bowel Syndrome since according to studies, there is a sex-gender difference shown in its physiological and psychological factors (24). Gender differences and sex hormones were believed to be a factor in the pathology of IBS; however, its etiology is still unidentified and its association is still limited. In this study, female individuals with IBS have been recorded to feel wear-out, anxious, or depressed than men with IBS. Moreover, there has been proof of differences in the suitable treatment for men and women.

Behavioral Factors:

In the study done by Constanian et al., (23) when it comes to behavioral factors, the result showed that students who do not immerse in physical exercise are more likely to have IBS. According to the researchers, physical activity has a renowned function in managing stress, so it's possible that students who do not exercise don't handle stressful situations very well, thereby increasing their chance of contracting IBS symptoms.

An interventional study was done on increasing the physical activity of IBS patients (25). The result of the study stated that a modest increase in physical exercise relives IBS symptoms. Engaging in physical activities still has not proven to be a treatment for Irritable Bowel Syndrome. One way to look at it is that exercising in order to overcome the IBS gives a feeling of control over that disease.

Chapter 3: Methodology:-Study Design: Cross-sectional

Study Area:

Makkah Al-Mukarramah is a city in the Kingdom of Saudi Arabia. It is the Holy city for all Muslims, and it is located in the western region in an area called the Makkah region. Al-Masjid Alharam (The Holy Mosque) contains Alka'aba representing The Qibla, the guidance for all Muslims in their prayers. Furthermore, the city is divided into four inner and three outer sectors of primary health care. The researcher is concerned with the inner four sectors (Al-Zahir, AlKaakiah, Al-Adl, Al-Sharae'a) it contains about 37 PHCC and 324 Doctors. There are 11 PHCC in Al-Sharae'a sector, 12 PHCC in Al-Adl sector, 11 PHCC in Al-Kaakiah sector, 15 PHCC in Al-Zahir sector.

Study Population:

The Primary Health Care doctors inside Makkah Al-Mukarramah City

Inclusion Criteria:

- 1. All PHC doctors in Makkah Al-Mukarramah
- 2. Males and Females
- 3. All nationalities
- 4. All degrees (resident, specialist, consultant)

Exclusion Criteria:

There are no exclusion criteria

Sample Size:

The total number of physicians working in Primary Care Centers in the Ministry of Health in Makkah Al-Mukarramah is about 324. By using the Raosoft website (sample size calculator), the recommended sample is 105. The prevalence of IBS which ranges from 11.2% (95% CI, 9.8%-12.8%) worldwide according to a meta-analysis was added and to compensate for the nonresponses and incomplete answers from questionnaires, 10% was added also to the sample. Therefore, the sample size of the study is 116 which will be proportionally distributed among physicians.

Sampling Technique:

The researcher distributed the population size of 135 on all primary health care in Makkah city by using stratified random sampling, according to the percentage of the doctors inside all the four sectors in Makkah City. Then, the doctors were randomly chosen by a random sample generation from the exclusive list of all doctors in the four sectors. Their names were checked and compiled and those who were selected were contacted and were asked to fill out the questionnaire.

Data Collection Tool:

Self-administered questionnaires were distributed to all health care providers involved in the study. The first page was about the title of the research and information plus the contact number of the researcher while the second page included consent and confidentiality approval. Then there were three main sections: the first part is concerned with the biography information of the participants (name, age, gender, marital status, nationality, job title).

The second and third section was concerned with the diagnosis of IBS and its associated factors. It was measured using the original Rome IV criteria questionnaire, which is valid and used in many studies. In the diagnosis of IBS, Rome IV criteria require that patients should have chronic abdominal discomfort or paint that lasts for at least 3 days per month for the last 3 months that is combined with two or more of the following symptoms: relieved by defecation, change in stool frequency, and change in stool appearance. Moreover, associated symptoms include the following: altered stool frequency, altered stool form, altered stool passage, leucorrhea and abdominal bloating. In addition, there could be four bowel patterns visible in Irritable Bowel Syndrome. These patterns consist of IBS-D (diarrhea predominant), IBS-C (constipation-predominant), IBS-M (mixed diarrhea and constipation), and IBS-U (unspecified diarrhea and constipation).

The present questionnaire was translated into the Arabic language by Dr. AbduljabbarAlfetni and the necessary modification was made to meet the objectives. It was validated by two family medicine consultants and the reliability was also tested by the internal consistency measurements

Data Collection Technique:

The researcher herself collected the data. Firstly, the doctors were randomly selected. Then, the researcher asked the selected doctors to fill out these questionnaires, which by the way, are self-administered questionnaires. After that, the questionnaires were collected a day after in order to give time to properly answer it and to not disturb the doctors from their work. Also, any unclear questions were explained thoroughly.

Study Variables:

- 1. Dependent variable: prevalence of IBS
- 2. Independent variable: The associated risk factors and socio-demographic information such as age, nationality, and etc.

Data Entry and Analysis:

The data were entered and statistically analyzed using MS Excel and SPSS software version 23 (IBM Corp., Armonk, NY). The demographic data were presented using Mean and Standard Deviation SD. Subsequently, the data were analyzed to test the significance of the statistical difference. For qualitative data, Chi-square test and Fisher's exact test were used. Moreover, the test result was considered statistically significant if the P-value is less than 5% (P < 0.05) at a confidence interval of 95%.

Pilot Study:

A pilot study was conducted in one of the Primary Health Care in Jeddah, and it was done on 12 doctors (10% of population size), with the application of the full methodology and analysis of results to outline the feasibility of data collection and to identify the practical difficulties and find ways of minimizing it.

Ethical Consideration:

- 1. Approval of Joint Program of Family and Community Medicine (JPFCM) at Makkah will be requested
- 2. Permission from the directorate of Health Affairs in Makkah
- 3. Permission from the PHCC directors
- 4. Permission from each participant
- 5. All collected data were confidential

Relevance and Expectations:

- 1. There may be a significantly high prevalence of IBS among physicians working in Primary Health Care Centers.
- 2. To know the risk factors associated with IBS among physicians as it may have a negative impact on the health workers' life and performance

Limitations:

1. Time limitations

Budget:

1. Self-funded

Chapter 4:

Results:-

Characteristics of the Study Population:

The study population is composed of 140 physicians. Table 1 shows a summary of the population's demographic information. Most of the participants are between the age of 26-45 years old or 76.4% of the study population. 19.3% are aged 15-25 years old and 4.3% are aged 45 years old and above. Moreover, for the social status, married physicians account for most (52.9%) of the participants, while the single and divorced populations are 44.3% and 2.9% respectively. Consequently, almost all (99.3%) of the participants work in a government hospital, and only a few (0.7%) work in private ones. Lastly, 94.6% of the participants are citizens Saudi Arabia, while 3.6% are non-Saudi Arabian citizens.

Demographics		Count	%
Total		140	100.0
Age	15-25	27	19.3
	26-45	107	76.4
	>45	6	4.3
Social status	Single	62	44.3
	Married	74	52.9
	Divorced	4	2.9
Work	Governmental	139	99.3
	Private	1	.7
Nationality	Saudi	135	96.4
	Non-Saudi	5	3.6

Table 1:- Characteristics of the participants of the study (n=140).

Symptoms of Irritable Bowel Syndrome:

The participants were asked to answer some questions about whether they feel symptoms of Irritable Bowel Syndrome. The tables and figures below show the summary of the result.

Table 2 shows the frequency of pain and discomfort they experience. For the past three months, a quarter (25%) of the study population have never felt pain or discomfort in any part of the abdomen, another quarter (26.4%) have felt pain or discomfort in the same area for 2-3 days a month, while a few have felt pain or discomfort every day, for one day, or less than a day in a month.

Among the 105 participants who have felt abdominal pain, most (61.9%) did not have persistent pain or discomfort in the abdomen for six months or more, while others (38.1%) had felt it. Consequently, for the last three months, half (51.4%) had a rigid or lump stool sometimes, almost a quarter (22.9%) have never had or rarely, while the remaining had it most of the time. In addition, for the last three months as well, half (50.5%) of them have had a liquid or soft stool for some time, 23.8% of those who feel abdominal pain and discomfort have never had a liquid or soft stool, while the remaining population has it most of the time.

40 participants who have felt pain and discomfort in the abdomen for the past six weeks were asked to answer another series of questions. Most (35%) of them sometimes had an increase in the number of defecations alongside pain and discomfort, while 20% had never or rarely, 25% mostly had it, and 20% had it most of the time. For the decrease in defecation, on the other hand, almost half (45%) never had it. Furthermore, 35% of them sometimes had a soft stool, 30% had a soft tool most of the time. Lastly, almost half (47%) have said that they never or rarely had a rigid tool, while 35% have agreed that sometimes they do.

Variables		Count	%
Total		140	100.0
During the past three months, have you felt pain or discomfort	Never	35	25.0
in any part of the abdomen?	Less than a day a month	17	12.1
	One day a month	15	10.7
	2-3 days a month	37	26.4
	One day a week	10	7.1
	More than a day per week	23	16.4
	Every day	3	2.1
		Count	%
Total		105	100.0
Is the pain or discomfort persistent for six months or more?	Yes	40	38.1
	No	65	61.9
In the past three months, has the stool been rigid or lumpy?	Never or rarely	24	22.9
	Sometimes (25%)	54	51.4
	Mostly (50%)	16	15.2
	Most of the time (75%)	11	10.5
In the past three months, was the stool soft or liquid?	Never or rarely	25	23.8
	Sometimes (25%)	53	50.5
	Mostly (50%)	22	21.0
	Most of the time (75%)	5	4.8
Is the pain or discomfort persistent for six months or more?	= Yes n=40	Count	%
When the pain or discomfort begins, does the number of	Never or rarely	8	20.0
defecations increase?	Sometimes (25%)	14	35.0
	Mostly (50%)	10	25.0
	Most of the time (75%)	8	20.0
When the pain or discomfort begins, does the number of	Never or rarely	18	45.0
defecations decrease?	Sometimes (25%)	18	45.0
	Mostly (50%)	2	5.0

Table 2:- Frequency of pain and discomfort among participants.

	Most of the time (75%)	1	2.5
	Always	1	2.5
When the pain or discomfort begins, does the stool become	Never or rarely	6	15.0
softer?	Sometimes (25%)	14	35.0
	Mostly (50%)	6	15.0
	Most of the time (75%)	12	30.0
	Always	2	5.0
When the pain or discomfort begins, does the stool become	Never or rarely	19	47.5
more rigid?	Sometimes (25%)	14	35.0
	Mostly (50%)	2	5.0
	Most of the time (75%)	4	10.0
	Always	1	2.5

Figure 1 show the medical and personal history of the 105 participants who have felt and pain discomfort for the last three months. Only 10% suffer from anorexia and also 10% had relatives who suffer from the digestive system tumor. Around 7% had a kind of pain and discomfort that wakes them up from sleep. Also, 4% suffered from weight loss for no reason. 3% had blood in their stool since the onset of symptoms, 2% had their symptoms of IBS to begin at the age of 50, and lastly, only 1% had claimed to use antibiotics to relieve the symptoms.



Figure 1:- Medical and personal history of participants.

Test for Irritable Bowel Syndrome:

Rome IV Criteria was used to identify the dependent variable. A simple additive method is used to total each of the criteria. After the criteria was computed, "Recurrent abdominal pain or discomfort" as the main criteria and associated with the remaining criteria with a score of ≥ 2 combined was suspected to have Irritable Bowel Syndrome. All 140 participants were asked a series of questions to determine whether they are positive with IBS. The variables considered are the recurrence of abdominal pain or discomfort, defecation, change in frequency of stool, and change in the appearance of stool. Almost (74.3%) all had felt pain or discomfort in the abdomen for the past three months, while 100 (71.4%) participants had felt pain or discomfort in the same area for the past six months. Moreover, 51.4% have said that the pain and discomfort was not improved after defecation, while the 48.6% have said that it was improved. Consequently, the number of defections of most of the participants did not increase or decrease when the pain or discomfort started to begin. For the appearance of the stool, only a few had stated that there stool are either soft or rigid, and most have answered that there stool did not change in form. Based on the following criteria, it was found out that 39 out of 140 participants are positive with Irritable Bowel Syndrome. The prevalence rate of IBS is 27.9%.

Table 3:- Test for Irritable Bowel Syndrome.

Variables			Count	%
Total			140	100
Recurrent abdominal pain or	During the past three months, have you felt	No	104	74.3
discomfort	pain or discomfort in any part of the	Yes	36	25.7
	abdomen?			
	Is the pain or discomfort persistent for six	No	100	71.4
	months or more?	Yes	40	28.6
Related to defecation	Does this pain or discomfort improve after	No	72	51.4
	defecation?	Yes	68	48.6
Associated with a change in	When the pain or discomfort begins, does the	No	104	74.3
frequency of stool	number of defecations increase?		36	25.7
	When the pain or discomfort begins, does the	No	134	95.7
	number of defecations increase?	Yes	6	4.3
Associated with a change form	When the pain or discomfort begins, does the	No	96	68.6
(appearance) of stool	stool become softer?	Yes	44	31.4
	When the pain or discomfort begins, does the	No	128	91.4
	stool become more rigid?	Yes	12	8.6
	In the past three months, has the stool been	No	113	80.7
	rigid or lumpy?	Yes	27	19.3
	In the past three months, was the stool soft or	No	111	79.3
	liquid?	Yes	29	20.7
Irritable bowel syndrome		No	101	72.1
-		Yes	39	27.9

Categorical Variables:

Table 4 shows the demographic information of the participants, the prevalence of IBS for each demographic, and the corresponding p-value using the Chi-square test. According to the result, the social status has a p-value of 0.004 which is greater than 0.05; therefore, this variable is significant. This means that the social status of an individual can be associated with having Irritable Bowel Syndrome.

Demographics		Total	Irritable bowel s	Irritable bowel syndrome		
			No	Yes		
Age	15-25	27	19(70.4%)	8(29.6%)	0.811	
	26-45	107	77(72.0%)	30(28.0%)		
	>45	6	5(83.3%)	1(16.7%)		
Social status	Single	62	44(71.0%)	18(29.0%)	0.004 ^a	
	Married	74	57(77.0%)	17(23.0%)		
	Divorced	4	0(0.0%)	4(100.0%)		
Nationality	Saudi	135	97(71.9%)	38(28.1%)	0.690	
	Non Saudi	5	4(80.0%)	1(20.0%)		
^a -significant using Cl	ni-Square test @<0.	.05 level.				

Table 4:- Chi-square test of the demographic variables.

The table below shows the relationship between having IBS and selected categorical variables. 25 of those with Irritable Bowel Syndrome said that this illness does not affect their daily life or their social relationship, while 14 people with IBS said that it affects their life and relationships. Moreover, 25(40.3%) of those who have first degree relatives that have IBS are also IBS positive, while only 14(17.9%) of those who do not have first degree relatives that have IBS are IBS positive. When it comes to increased nervousness and pressure at work or at home, 35(48.6%) of those who agreed have IBS, while only 4(5.9%) who disagreed yet positive with IBS. The resulting p-value for social relationships (p-value=0.001), first degree relatives with IBS (p-value=0.003), and increased nervousness and pressure (p-value<0.001) are less than 0.05 which means they are all significant; therefore, IBS may be related to having first degree relatives with IBS, increased nervousness and pressure at home or work, and having an effect in daily life and social relationships.

Variables		Total	Irritable bowe	l syndrome	ne p-value		
			No	Yes			
Does this problem affect your daily life	Yes	25	11(44.0%)	14(56.0%)	0.001 ^a		
and your social relationships?	No	115	90(78.3%)	25(21.7%)			
Do any of your first-degree relatives	Yes	62	37(59.7%)	25(40.3%)	0.003 ^a		
have Irritable Bowel Syndrome?	No	78	64(82.1%)	14(17.9%)			
Have you noticed an increase in your	Yes	72	37(51.4%)	35(48.6%)	< 0.001 ^a		
problem in case of nervousness or an	No	68	64(94.1%)	4(5.9%)			
extra pressure at work or at home?							
^a -significant using Chi-Square test @<0.0.	^a -significant using Chi-Square test @<0.05 level.						

Table 5:- Chi-square test of having first degree relatives with IBS, increased nervousness and pressure at home or work, and having an effect in daily life and social relationships.

Table 6 shows the response rate and associated p-value for the selected variables. Based on the result, 30(27.5%) of those who do not smoke have Irritable Bowel Syndrome, 7(43.8%) who smoke flavored shisha are positive with IBS, and only a few who smoke cigarettes and shisha have IBS. In addition, most of the individuals who have IBS have monthly family income more than 10,000 SR, in fact, most of the participants' monthly family income are in this range mainly because the respondents are physicians who have known to have fairly substantial monthly income. Furthermore, 21 of 51 (41.2%) participants who said that they have experienced a decrease in mood for the last two weeks were diagnosed with IBS, while 18 of 89 (20.2%) who do not experience a change in mood, were also diagnosed with IBS. Last among the selected variables is whether participants suffer from loss of interest in the things they used to love. 12 of 28 (42.9%) participants who have agreed, were positive with IBS, while 27 of 112 (24.1%) did not agree, but were also diagnosed with IBS. The resulting p-value computed for each variable showed that experiencing a decreased mood (p-value=0.008) and losing interest (p-value=0.048) for the last two weeks are both greater than 0.05; therefore, they are significant in the diagnosis of IBS. This means that these two variables may be related to and can be linked to the existence of IBS.

Variables		Total	Irritable bowe	l syndrome	P value
			No	Yes	
Are you a smoker?	I do not smoke	109	79(72.5%)	30(27.5%)	0.227
	Cigarette	12	11(91.7%)	1(8.3%)	
	Shisha	3	2(66.7%)	1(33.3%)	
	Flavored Shisha	16	9(56.3%)	7(43.8%)	
How much is the family's	Less than	2	2(100.0%)	0(0.0%)	0.288
monthly income?	10,000 SR				
	5000-10,000 SR	19	16(84.2%)	3(15.8%)	
	More than	119	83(69.7%)	36(30.3%)	
	10,000 SR				
During the past two weeks, have	Yes	51	30(58.8%)	21(41.2%)	0.008^{a}
you experienced a decreased	No	89	71(79.8%)	18(20.2%)	
mood?					
During the past two weeks, have	Yes	28	16(57.1%)	12(42.9%)	0.048^{a}
you suffered from a loss of	No	112	85(75.9%)	27(24.1%)	
interest in your loved things and					
works?					
^a -significant using Chi-Square test (a)<0.05 level.				

Table 6:- Chi-Square test result for smoking, family income, change in mood, and loss of interest

Dependent Study Variables:

A Binary Logistic Regression Model (BLRM), with Backward Conditional Elimination with Enter Criteria=0.05 and Elimination=0.10 was used to determine the statistical difference between having IBS and the dependent study variable with 95% confidence intervals. The dependent study variables include the social status, negative effect to daily life and social relationships, having first degree relatives with IBS, increase nervousness or pressure at work or at home, decrease in mood, and loss of interest in your loved things and works. Based on the result, the social status of an individual is not significant in the diagnosis of IBS (Odds ratio, 0). Meanwhile, experiencing an increase in

problem in case of nervousness or an extra pressure at work or at home also increases the chance of having Irritable Bowel Syndrome by 23 folds (Odds ratio, 23.485, 95% CI: 6.388-86.341) p<0.05.

Table 7:- Binary Logistic Reg	gression Model (BLRM),	with Backward (Conditional	Elimination an	nong Dependent
Study Variables.					

Variables	in the Equation	В	Exp(B)	95%	C.I.for	p-value
				EXP(B)		
				Lower	Upper	
Step 1 ^a	Social status					0.204
	Social status (Single)	-22.359	0.000	0.000		0.999
	Social status (Married)	-23.287	0.000	0.000		0.999
	Q34(Yes)	0.473	1.604	0.542	4.746	0.393
	Q35(Yes)	0.358	1.430	0.528	3.873	0.482
	Q36(Yes)	2.850	17.292	4.393	68.063	< 0.001 ^b
	Q40(Yes)	0.244	1.276	0.426	3.823	0.663
	Q41(Yes)	0.354	1.424	0.405	5.006	0.581
	Constant	19.348	252819371.739			0.999
Step 2 ^a	Social status					0.213
-	Social status (Single)	-22.344	0.000	0.000		0.999
	Social status (Married)	-23.254	0.000	0.000		0.999
	Q34(Yes)	0.518	1.678	0.577	4.879	0.342
	Q35(Yes)	0.350	1.420	0.524	3.848	0.491
	Q36(Yes)	2.871	17.654	4.500	69.262	< 0.001 ^b
	Q41(Yes)	0.492	1.636	0.546	4.897	0.379
	Constant	19.378	260380611.828			0.999
Step 3 ^a	Social status					0.258
-	Social status(Single)	-22.601	0.000	0.000		0.999
	Social status(Married)	-23.408	0.000	0.000		0.999
	Q34(Yes)	0.547	1.728	0.594	5.028	0.316
	Q36(Yes)	2.944	18.990	4.926	73.211	< 0.001 ^b
	Q41(Yes)	0.491	1.634	0.545	4.893	0.381
	Constant	19.709	362562787.844			0.999
Step 4 ^a	Social status					0.236
-	Social status(Single)	-22.538	0.000	0.000		0.999
	Social status(Married)	-23.365	0.000	0.000		0.999
	Q34(Yes)	0.673	1.961	0.701	5.483	0.199
	Q36(Yes)	2.929	18.713	4.890	71.613	< 0.001 ^b
	Constant	19.750	377904564.534			0.999
Step 5 ^a	Social status					0.146
_	Social status(Single)	-22.419	0.000	0.000		0.999
	Social status(Married)	-23.355	0.000	0.000		0.999
	Q36(Yes)	3.156	23.485	6.388	86.341	<0.001 ^b
	Constant	19.697	358449582.743			0.999
a						•

^a-Variable(s) entered on step 1: Social status,

Q34=Does this problem affect your daily life and your social relationships?

Q35=Does any of your first-degree relatives have Irritable Bowel Syndrome?

Q36=Have you noticed an increase in your problem in case of nervousness or an extra pressure at work or at home? Q40=During the past two weeks, have you experienced a decreased mood?

Q41=During the past two weeks, have you suffered from a loss of interest in your loved things and works?

^b-Significant using Binary Logistic Regression Model, with Backward Conditional Elimination with Enter Criteria=0.05, Elimination =0.10.

Q34=Does this problem affect your daily life and your social relationships?

Q35=Does any of your first-degree relatives have Irritable Bowel Syndrome?

Q36=Have you noticed an increase in your problem in case of nervousness or an extra pressure at work or at home?

Q40=During the past two weeks, have you experienced a decreased mood?

Q41=During the past two weeks, have you suffered from a loss of interest in your loved things and works?

b-Significant using Binary Logistic Regression Model, with Backward Conditional Elimination with Enter Criteria=0.05, Elimination =0.10.

Chapter 5:

Discussion:-

Irritable Bowel Syndrome is the most well-known gastrointestinal disease defined by bloating, abdominal pain, constipation, or diarrhea. Studies have shown that IBS tend to have a negative impact on the affected individual's quality of life (26).

Prevalence of Irritable Bowel Syndrome:

In this study, the prevalence of Irritable Bowel Syndrome among primary health care physicians in Makkah Al-Mukarramah, Saudi Arabia is 27.9%. The result was higher compared to the one that was reported by AlAmeel et al. which has an IBS prevalence of 16.3% among physicians and surgeons in Saudi Arabia. The difference in the prevalence rate among the two studies may be attributed to the scope of the study. The current study was more focused while the study done by AlAmeel et al. (10) was too broad for it focused on all doctors in Saudi Arabia. Also, the questionnaires in the study were answered digitally through a web-based survey, while the present study had a manual filling out of the questionnaire.

In addition, the current study has a higher IBS prevalence rate compared to Turkey (11.17%), United States of America (14.1%), Japan (13.1%), and India (12.27%). Although, it has a lower IBS prevalence rate compared to Egypt (31.7%) and the United Kingdom (30%).

The reason behind the high IBS prevalence rate (27.9%) of the current study is because the study population already focuses on the physicians. As discussed earlier, Irritable Bowel Syndrome is common among healthcare workers due to the nature of their work. They have a stressful working environment and long working hours. Aside from that, they are exposed to different diseases which make them more vulnerable.

Categorical Variables:

Based on the result of the Chi-square test done in the correlation between the demographic variables and the diagnosis of IBS, only the social status of the individual was found to be significant. Age and nationality don't have much correlation to being diagnosed with IBS, although this is only based on the result of the study. The results from this study agree with other related studies done. AlButaysh et al. (27) conducted a study regarding the prevalence of IBS and health-related quality of life among adults in Saudi Arabia. In the study, it was found out that there is a statistically significant association between IBS and marital status. In another study done by Mansouri et al. (28), a multivariable regression model revealed that marital status is a significant determinant of IBS. Despite a few studies showing the same result, most studies conducting research about factors of IBS stated that social status or marital status does not have significant association with IBS.

Irritable Bowel Syndrome affects not just the body but also the quality of life of the sufferer. Among the categorical variables used in the study are whether IBS affect the individual's daily life and social relationships, have a first degree relative with IBS, and increased nervousness and pressure at work. All of the mentioned variables are found to be significant in association with IBS. Irritable Bowel Syndrome can result in damaged relationships because of the increased possibility of: self-isolation, partner burden, and interpersonal conflict (29). Difficulties will arise in relation to IBS due to its embarrassing nature of symptoms and the society's lack of knowledge about the disease. Consequently, most participants with IBS also have first degree relatives with the same illness. According to Saito, IBS is a common disorder that can aggregate families (30). Relatives of an individual with Irritable Bowel Syndrome are two to three times more likely to have the same disorder, which can affect both genders. Moreover, increased nervousness and pressure at work can result in stress, and stress has been known to be a factor of Irritable Bowel Syndrome. Several studies have shown that psychological stress has an impact on sensitivity of the digestive tract. This finding can have a potential role in the pathogenesis of IBS.

Also included in the categorical variables tested are monthly family incomes, whether the participant smokes, experienced a decreased mood, and loss of interest. Based on the chi-square test, changing of mood and losing interest are statistically significant in association with IBS. According to Mudyanadzo et al. (31) IBS has always

been associated with mood and anxiety disorders. Anxiety and mood disorders were looked at as something that causes digestive problems, although, researchers are not ignoring the likelihood that troubled mood may be an effect of having Irritable Bowel Syndrome (32). Whatever the relationship between Irritable Bowel Syndrome and mood changes is, it is still unclear and requires more research in order to expound the association and to give appropriate treatment for both IBS and mood changes. Consequently, Irritable Bowel Syndrome has been characterized with low mood or loss of interest in activities that used to be pleasurable, and it usually comes with other symptoms like low self-esteem, sleep disturbances, loss of appetite, and lack of concentration (31). Another study has listed loss of interest as a factor IBS alongside change in appetite, insomnia, decreased libido and fatigue (33).

Dependent Study Variables:

A Binary Logistic Regression Model with Backward Conditional Elimination was used to identify the relevant predictors of the dependent study variables. These are the variables that were statistically significant using the Chisquare test. Based on the result of the binary outcome, only experiencing an increase in problem in case of nervousness or an extra pressure at work or at home has a significant association with Irritable Bowel Syndrome. The result is quite different with other similar studies. This may be due to fewer factors considered in the current study. In the demographic information alone, gender was not considered, and based on most studies done in determining factors of IBS, gender is statistically significant; in fact, IBS is said to be more prominent in females than males. Also, the working hours were not asked from the participants. Long working hours can result in occupational stress which means higher chance of digestive disturbance. This factor was also proven to be statistically significant in association with Irritable Bowel Syndrome.

Chapter 6:

Conclusion:-

Based on the result of the current study, the prevalence of Irritable Bowel Syndrome among Primary Health Care physicians in Makkah Al-Mukarramah, Saudi Arabia is significantly high with a rate of 27.9%. There are several factors associated with IBS which include age, social status, gender, occupation, psychological state, psychosocial state, stress level, and behavior. However, according to the tests done in the study, the strongest predictor of Irritable Bowel Syndrome is having an increase in problems in case of nervousness or extra pressure at work or at home. These findings will help researchers to determine the pathology if IBS, develop an improved assessment for the diagnosis of IBS, and establish appropriate treatment.

Chapter 7:

Recommendations:-

Based on the findings of the present study, there should be more awareness regarding Irritable Bowel Syndrome and what it does in the body. Most individuals diagnosed with IBS are not aware that they have one.

For the assessment being used in the diagnosis of Irritable Bowel Syndrome, such as the Rome III and Rome IV, previous studies suggest that criteria could use improvement. Adding variables that deemed to significant or strongly associated will help in the accuracy of the assessment.

In line with generating an improved and more reliable assessment tool for IBS, more studies should be done in order to unify or compile the significant predictors of IBS.

Since Irritable Bowel Syndrome are more common among health care workers due to the nature of their job, there should be a stress management program dedicated to them or at least lessen the working hours to avoid contracting stress-induced diseases.

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Appendix:-

Appendix A – Rome Iv Criteria:

Recurrent abdominal pain or discomfort:

- 1. During the past three months, have you felt pain or discomfort in any part of the abdomen?
- 2. Is the pain or discomfort persistent for six months or more?

Related to defecation:

1. Does this pain or discomfort improve after defecation?

Associated with a change in frequency of stool:

- 1. When the pain or discomfort begins, does the number of defecations increase?
- 2. When the pain or discomfort begins, does the number of defecations increase?

Associated with a change form (appearance) of stool:

- 1. When the pain or discomfort begins, does the stool become softer?
- 2. When the pain or discomfort begins, does the stool become more rigid?
- 3. In the past three months, has the stool been rigid or lumpy?
- 4. In the past three months, was the stool soft or liquid?

Appendix B – Additional Tables:

 Table 8:- Medical and personal history of participants.

Variables		Count	%
Total		105	100.0
Since the onset of symptoms, did you notice any blood in the stool?	Yes	3	2.9
	No	102	97.1
Does this pain or discomfort wake you up from sleep?	Yes	7	6.7
	No	98	93.3
Since the onset of symptoms, did you suffer from weight loss for no reason?		4	3.8
		101	96.2
Do you suffer from anorexia?	Yes	11	10.5
	No	94	89.5
If you are over fifty years of age, did your symptoms begin after you reach the age	Yes	2	1.9
of fifty?	No	103	98.1
Do any of your first-degree relatives suffer from digestive system tumors?	Yes	11	10.5
	No	94	89.5
Due to these symptoms, did you use antibiotics?	Yes	1	1.0
	No	104	99.0

Table 9:- Additional categorical variables.

Variables		Count	%	
Total		105	100.0	
For this problem, did you consult a doctor?	Yes	10	9.5	
	No	95	90.5	
For this problem, did you consult a doctor? =Yes n=10				
Have you been diagnosed with Irritable Bowel Syndrome?	Yes	9	90.0	
	No	1	10.0	
Have you been diagnosed with Irritable Bowel Syndrome? =No n=1				

What are the laboratory studies you have done already?	Blood tests	1	100.0		
Has the diagnosis changed after these analyses?	No	1	100.0		
Have you been diagnosed with Irritable Bowel Syndrome? =Yes n=9					
Were you convinced that you had Irritable Bowel Syndrome?	Convinced	9	100.0		

Table 9:- continuation.

Were you convinced that you had		0								G (0/
Irritable BowelSyndrome?		Co	unt	%						Count	% 0
Did you do relaxation	Sometimes	2		22.2	Did you :	feel	better?		Sometimes	2	50.0
exercises?	Yes	2		22.2					Yes	2	50.0
	No	5		55.6							
Have you been on a	Sometimes	2		22.2	Did you	feel	better?		Yes	6	100.0
diet?	Yes	4		44.4							
	No	3		33.3							
Are you using medical	Yes	6		66.7	Did you	feel	better?		Yes	6	100.0
treatment for this problem?	No	3	3								
Have you been absent	Yes	4		44.4	During	the	past thr	ee	1-2 days	3	75.0
from work due to this	No	5		55.6	months,	how	/ many da	ys	More than	1	25.0
problem?					have yo	ou 1	been abse	ent	4 days		
					from wor	rk?		~		<i></i>	
For this problem, did you	u consult a do	octor	$\frac{\text{ctor}}{1} = \frac{1}{100} \frac{1}{100$					70			
Are you convinced that y	you have Irrita	able	ible Convinced		1			40		42.1	
Bowel Syndrome?		Ina		ave dou	ibts			21		22.1	
				convine	ced		1 1 /	34		35.8	
Are you convinced that y	ou have Irrit	able.	Bow	el Sync	Irome? =	I ha	ve doubts	and	Unconvince	d n = 55	
what do you think you are	e suffering from	m?	Inf	ections	. 1 11			9		19.6	
			Psy	ycholog	sical proble	ems		12		26.1	
		Other		her				20		54.3	
What do you think you a	no auffanin a f		missing		9		9				
What do you think you a	ire suffering i	rom:	In-4	25 ligantia	n			1		4.0	
Other			DMS			1		4.0			
							1		4.0		
			Stress				5		20.0		
			Cramps				1		4.0		
			Fo	od poise	oning		1		4.0		
			I don't know			3		12.0			
			Due to some types of food		od	4		16.0			
			Gastroenteritis			1		4.0			
			Stomach ache			1		4.0			
			Gastritis			1		4.0			
			Nothing				5		20.0		

Table 9:- continuation.

Are you convinced that	t you have	Count	%			Count	%
Irritable Bowel	Syndrome?						
=Convinced n=40							
Did you do relaxation	Sometimes	6	15.0	Did you feel better?	Sometimes	3	20.0
exercises?	Yes	9	22.5		Yes	11	73.3
	No	25	62.5		No	1	6.7
Have you been on a diet?	Sometimes	1	2.5	Did you feel better?	Sometimes	1	4.7

	Yes	21	52.5		Yes	17	81.0
	No	18	45.0		No	3	14.3
					Missing	1	
Are you using medical	Yes	13	32.5	Did you feel better?	Yes	13	100.0
treatment for this	No	27	67.5				
problem?							
Have you been absent	Yes	10	25.0	During the past three	1-2 days	10	100.0
from work due to this				months, how many days			
problem?				have you been absent			
				from work?			

 Table 10:- Frequency count of categorical variables among all participants.

Variables		Count	%
Total		105	100.0
Does this problem affect your daily life and your social relationships?	Yes	25	23.8
	No	80	76.2
Do any of your first-degree relatives have Irritable Bowel Syndrome?	Yes	58	55.2
	No	47	44.8
Have you noticed increases in your problem in case of nervousness or an extra pressure at	Yes	71	67.6
work or at home?	No	34	32.4

Table 10:- continuation.

Variables		Count	%
Total		140	100.0
Are you a smoker?	I do not smoke	109	77.9
	Cigarette	12	8.6
	Shisha	3	2.1
	Flavored Shisha	16	11.4
How much is the family's monthly income?	Less than 10,000 SR	2	1.4
	5000-10,000 SR	19	13.6
	More than 10,000 SR	119	85.0
During the past two weeks, have you experienced a decreased mood?	Yes	51	36.4
	No	89	63.6
During the past two weeks, have you suffered from a loss of interest in	Yes	28	20.0
your loved things and works?	No	112	80.0
Are you suffering from any of the following: ^a	Diabetes	3	2.1
	High blood pressure	6	4.3
	High cholesterol	1	0.7
	Asthma	5	3.6
	Psychological problems	4	2.9
	None	125	89.3
^a don't add on the country and noncontagonal hearing it is the number of any	as within the 140 second		

^a-don't add up the counts and percentages, because it is the number of cases within the 140 cases.

Table 11. Rome IV criteria percentage					
Variables	Ν	Min	Max	Mean	SD
Criteria 1: Recurrent abdominal pain or discomfort	140	0	2	0.54	0.8
Criteria 2: Related to defecation	140	0	1	0.49	0.5
Criteria 3: Associated with a change in frequency of stool	140	0	2	0.30	0.5
Criteria 4: Associated with a change form(appearance) of stool	140	0	3	0.80	0.9
		Coun	t	%	
Total		140		100.0	
Criteria 1: Recurrent abdominal pain or discomfort	0	90		64.3	

	1	24	17.1
	2	26	18.6
Criteria 2: Related to defecation	0	72	51.4
	1	68	48.6
Criteria 3: Associated with a change in frequency of stool	0	99	70.7
	1	40	28.6
	2	1	.7
Criteria 4: Associated with a change form(appearance) of stool	0	73	52.1
	1	28	20.0
	2	33	23.6
	3	6	4.3



Appendix A – Additional Figures:

Figure 2:- Social status of participants



Figure 3:- Percentage of categorical variables of participants.



Figure 4:- Percentage of those who experienced a decreased mood and loss of interest for the last two weeks.