JOURNAL OF INTERNATIONAL CRISIS AND RISK COMMUNICATION RESEARCH
ISSN: 2576-0017
2023, VOL 6, NO S3

Systematic Review of Psychological and Emotional Factors on Irritable Bowel Syndrome

Abdullah Ahmed Bawazir[1], khaled Ibraheem Alqurashe[2], Alaa Muhammad Alorabie[3], Abdullah Abdulghani Abdullah[4], Mohannad zuhair khayat[5], Abdullah Abdulaziz Alzaidi[6], Shatha Abdulaziz Alzaydi[7], Iyad Nizar A. Bnoonah[8], Jamal Hulyyle Alzaidi[9], Mohammad Abdoalrahman Almasoumi[10]

1. General physician Makkah health care cluster Saudi Arabia
2. Family Medicine Consultant Alnoor Hospital Makkah Saudi Arabia
3. General physician Ajiad Emergency Hospital Makkah Saudi Arabia
4. General physician PHCC Makkah Saudi Arabia
5. Preventive Medicine and Public Health Makkah Saudi Arabia
6. Medical Complex Alshemaisy Makkah Saudi Arabia
7. Pediatric Specialist Alzaher PHCC Makkah Saudi Arabia
8. Executive Administration of Crisis and Disaster Management Makkah health care cluster Saudi Arabia
9. General physician Heraa hospital Saudi Arabia
10. General physician Makkah health care cluster Saudi Arabia

ABSTRACT

Irritable bowel syndrome (IBS) has become a complex disorder that goes beyond visceral hyperalgesia, alterations in the sensitivity of the central and enteric nervous systems, alterations in the communication between the enteric nervous system and the central nervous system, alterations in the intestinal microflora, increased intestinal permeability and minimal enteric inflammation. It is known that psychological and social factors can influence the interaction between the central and enteric nervous systems and there is evidence that it is involved in the pathogenesis of IBS and influences the treatment and the outcome. It is suggested that abuse history and stressful life events may play a role in the development of functional gastrointestinal disorders. Genetic factors and social learning theory have been put forward in an attempt to explain the clustering of IBS in families The various psychological attributes including anxiety, depression, and co-morbid psychiatric disorders, as well as health beliefs play a critical role in the management of patients with IBS and are related to both symptoms and outcomes. This knowledge can be the basis for an improved and more comprehensive management of IBS with benefit to the patient in the form of a better quality of life.

KEYWORDS: Irritable Bowel Syndrome (IBS) , Psychological, Psychiatric Disorders.

1. Introduction

IBS is an example of chronic intermittent functional gastrointestinal disorder which presents with abdominal pain, distension and other intestinal disorders (Clark &

DeLegge, 2008). IBS has been classified by the Rome Committee for the Classification of Functional Gastointestinal Disorders as abdominal and bowel symptoms that are typical of suffers. In specific, the pain must be abdominal, for at least 3 days consecutively, for at least 3 consecutive months. The pain must have at least two of the below characteristics:The pain must have at least two of the below characteristics:

1) Relief by evacuation

2) Onset during or associated with a change in the frequency of the stools

3) Onset during or associated with a change in the form of the stools

According to studies 1/3 of the population has symptoms similar to those of IBS. The prevalence of IBS seems to be higher in low socio-economic groups and is influenced by environmental factors while it appears that there is a general decline in the incidence with increasing age (Rey & Talley, 2009). IBS divided in- IBS can be divided into two categories. There is constipation as the predominant symptom in patients in the first category of patients while diarrhea is the predominant symptom in patients of the second category(Dorn, Morris et al., 2009). The pathophysiology of IBS is complex and thus the cause of IBS is also complex.

IBS is now considered to be a disorder of the brain-gut axis, that is, the dysregulation of the intestinal, autonomic and central nervous system (Posserud, Ersryd et al., 2006).

This paper aims at identifying and describing the Irritable Bowel System as an illness that is not only physical in its nature and is caused by the brain gut axis dysfunction; it is also influenced by minute daily stressors, major life events and health perceptions. To this end, the pathophysiology of the IBS was reviewed first in order to gain insight into the function of the Irritable Bowel System and then to establish how the IBS was influenced by stressful factors and health beliefs.

2. Pathophysiology

Pathophysiological Mechanisms

Visceral Hyperactivity

The (Bueno last & information Fioramonti, that 2002). is The available afferent indicates neuron that terminals the mechanism that start abdominal pain is the visceral hyperactivity of enteric nervous system (ENS) which is located in submucosal tunica of gastrointestinal tract (Meissner plexus) and between smooth mus- cle fibers (Auerbach plexus) send signals to central nervous system (CNS) through parasympathetic the nervous sympathetic system and (SANS and PANS). SNS carries impulses which are perceived as abdominal pain while PANS carries impulses which initiate a number of reflex actions. The pain stimuli are carried to the thalamus where it reaches the cerebral cortex and thus enable one to recognize visceral pain. However, for the modulation of the visceral reflexes, the afferent stimuli through the hypothalamus engage efferent neural fibres which through PANS stimulate or inhibit the contraction of smooth muscle fibres and the secretion of enterocytes in the gastrointestinal tract thus affecting the motility and secretion of the gut (Bueno &

Fioramonti, 2002). It is believed that visceral sensitivity is modulated at a number of the different level nodes. of This mucosa control and is submucosa, also at very the much level regulated of at spinal cord, at the level of thalamus as well as at the level of cerebral cortex.

Visceral Sensitivity at the Level of Enteric Mucosa and Submucosa

When the enteric mucosa gets damaged in any way this can lead to the release of certain chemical mediators such as K+ ATP and bradykinin and the inflammatory mediators such as PGE2 (Bueno, Fioramonti et al., 1997). All this matter can directly stimulate the afferent neuron terminals but they can also have the capacity to release algogenic substances (serotonin (5HT), histamine, prostaglandins and nerve growth factor (NGF)). This deluge leads to enhancement of the stimulus that is associated with the visceral pain (Tracey & Walker, 1995).

The connection between afferent neuron terminals and mast cells has been found to be quite interesting. Substance P released from the neuron terminals induces histamine of and histamine NGF while release NGF from is mast thought cells. to Substance have P role is in released regulating in neuron higher terminal amounts plasticity with (Moss the help & Sanger, 1990). Recent findings suggest that increase in neural sensitivity to algogenic stimuli is associated with increased number of sodium channels on the afferent fiber (Moss & Sanger, 1990).

Some to of be the better inflammatory characterized. mediators Serotonin released (5HT), in is the thought enteric to mucosa activate and the submucosa cell appear primary bodies afferent of neurons. the Current research on pseudo-affective (cardiovascular) reflex to distention of the gut has implicated the 5HT3 receptor subtype coupled with a sodium channel located on primary afferent fibres. When a small dose of 5HT3 antagonists is given through the views, it enhance the visceral analgesia effect in various rat models of abdominal pain when subjected 1994). to distention It of is the also gut understood (Zemlan, that Murphy the et signaling al., of bradykinin produces a variety of effects on visceral sensitivity (Barthan & Proud, 1991). There are two types of bradykinin (BK) receptors, which have been identified. Some studies in suggest a that selective BK manner receptors during are the up processes regulated that follow some forms of intestinal tissue damage and inflammation. Using various stimuli endogenous NGF is released from most cells and enhances the sensitivity of primary afferent to BK by increasing the number of BK receptors. Experiments on animals have revealed that pharmacological agents that act as BK antagonists relieve abdominal pain which results from intraperitoneal administration of acetic acid and A gene urate number related crystals of peptide (Sharkey, mediators (CGRP) Coggins such and et as neuroki- al., adenosine, nins 1990). tachykinin, are calcitonin involved in a chain of events. Some C afferent fibers possess the so called ‘silent receptors’ for neurokinins, which can be activated during inflammation process in the peripheral tissues. In general, if nerve remodeling occurs during the course of inflammation, it results in hyperalgesia in the submucosa and other parts of the intestine (Millan, 1999). The aforementioned modification are composite, they depend on brasiliensis time is and associated are with affiliated an to increase the in kind nerve of tissue inflammation. content Intense by infection 2. with 5 Nippostrongylus fold, mainly due to ectatic axons. During the recovery period when mast cell proliferation is taken into consideration, the cross sectional area of the nerve

is reduced but the diameter of small fibres is increased.

3. Biopsychosocial Model of Irritable Bowel Syndrome

The 19th century saw the emergence of the concept that emotions may, in fact, influence the sensorimotor function of the gastrointestinal tract. Most of the research done at that time is still relevant today (Van Ouden- hove, Vandenberghe et al., 2010). This model incorporates all the potential causative factors that may be involved in the aetiology and clinical manifestation of IBS. In the light of the biopsychosocial model, symptoms can be modulated by the psychological and social factors (Drossman et al., 2006). The link between psychological aspects and the gastrointestinal function (sensory, motor and inflammatory) is through the brain-gut axis. This involves a mutual relationship system in between the gastrointestinal tract and the brain and these include neural, neuroimmune and neuroendocrine pathways (Jones, Dilley et al., 2006).

Psychosocial factors affect all the components of the biopsychosocial model. Genetic and environmental factors that are evident in early stages of one's life such as family influences, abuse, major losses can impact on a person's psychosocial development including psychological state and coping skills and the development of gut dysfunction. Dysfunction and dysregulation of the brain-gut axis perception, may illness lead behaviour to and IBS. thus Life day events to and day psychological functioning distress and may quality impact of on life the in digestive a functions, life symptom time (Drossman et al., 2006). On the other hand, visceral pain can alter central pain processing, mood and behaviour (Creed, Levy et al., 2006).

4. Psychosocial Stressors

Lazarus (1990) distinguished between stressors as events that happen in life and daily hassles. Life events are the significant events that occur in one's life for instance divorce, loss of a job or even death of a loved one. Daily hassles are the events which all individuals go through in their daily lives and rather frequently (Lazarus & Folkman, 1984). His assumption is that "hassles appear to be better predictors of health outcomes than life events". This theory is supported by the findings of a recent prospective study: there was a statistically meaningful increase in stress or score (daily hassles) just before the transition from IBS non-patient to IBS patient (Fujii & Nomura 2008). Most of the participants in this study were young college students and this may have limited the types of events that were rated as stressful life events.

The current data regarding the role of life events in the onset of IBS are the result of observations from the 80s. For example, Creed et al. (1988) showed that the most frequent events reported by patients with functional abdominal pain (FAP) (including IBS patients) during 38 wk prior to onset of symptoms, were a major disruption of close relationships, a marital separation, a family member leaving home, or break-up of a serious girl/boyfriend relationship. In addition, marked personal relationship difficulties such as severe marital problems or extreme family or household tensions, were much more frequently recorded among the FAP patients than in the organic GI diseases group (such as ulcer disease) or community subjects.

Recent data support the role of major life events in IBS. Childhood trauma was associated with an increased vulnerability for multiple somatic symptoms of which IBS is one subset (Videlock, Mayer et al., 2010). The items reported significantly more frequently in IBS than in healthy controls were: seeing someone being mur- dered, death or illness of a parent, failing to be understood by parents and having someone in the family with a psychiatric illness.

Holocaust survivors are another example of the impact of stressful life events on the development of IBS. The prevalence of IBS, duration of suffering, and frequency of GI symptoms were significantly higher in Holocaust survivors (Stermer, Bar et al., 1991) when compared to controls with the same demographic background, but who had not been exposed to extreme mental and physical hardships during the war. From our personal expe- rience (Dumitrascu & Baban, 1991) the stress developed by dramatic events presented live on television, during the uprising in Romania in 1989, led to an increased number of IBS symptoms within the first month.

Sometimes, what is considered to be a major life event is difficult to determine. For instance, a sudden cultur- al change (such as moving from a rural to an urban area) increased the prevalence of IBS in one study (Sperber & Friger, 2005).

The experience of stressful life events can also determine symptom exacerbation among adults with IBS and frequent health-care seeking (Creed, Levy et al., 2006; Palsson & Drossman, 2005). Thus, the severity of abdo- minal pain was higher in patients exposed to emotional stress (Devanarayana, Mettananda et al., 2011) and stress exacerbated abdominal distension in one third of IBS patients (Chang, Lee et al., 2001). In addition, recent data showed that environmental factors and psychosocial stressors (for example history of being psychologically abused, less than 6 h of sleep and irregular diet) influenced the progression from an IBS non-consulter to an IBS patient (Fujii & Nomura, 2008).

Based on these data we can say that psychosocial stressors, either during childhood or later in life are in- volved in the onset of IBS symptoms in susceptible individuals, and these factors influence the clinical course of IBS.

5. Health Beliefs and Coping with Stress

It is quite common for the patients with IBS to believe that the chronic gut symptoms which experience they point to a more severe disease or even cancer. In addition, IBS patients recognize that the symptoms of the disease interfere with their normal work, thinking, feeling and behavior. They also experience feelings of loss of freedom, directness and social contact along with feelings of anxiety, shame and self-consciousness. All these are able to alter one's behaviour for instance one may decide to avoid certain activities or make changes in his/her schedule in an attempt to control the situation (Drossman, Chang et al., 2009).

The most drastic form of focusing on a disease is hypochondriasis, which is one of the somatoform disorders. Hypochondriasis can be defined as fear of having a serious disease for which the patient has been examined and reassured by (Widiger doctors & Thomas, 1994). In a study conducted in the mid 1990s those patients who suffered from IBS were found to have more hypochondacal characteristics when compared

hypochondriacal with (Gomborone, beliefs patients Dewsnap and suffering et disease from al., phobia organic 1995). of healthy However, the GI there disease diseases. is were The no exceptionally bodily other high preoccupation, in the patients with IBS evidence available. Hypochondriacal behavior is not recommended for screening but in reality we encounter patients with extremely high levels of sickness related concern on a daily basis. The Ill-ness Attitudes Scales The (IAS) specific questionnaire questionnaire can was be developed used in to 1986 identify (Kellner, the 1986) presence but of is hypochondriacal attitudes. still relevant today (Sirri, Grandi et al., 2008). Having psychologically assessed IBS patients it is now known that there are dissimilarities about how people with IBS react to their condition. Strictly speaking, patients take up mixed kids of coping strategies in compari- son with patients who suffer from organic diseases or healthy controls. When we state "coping" we actually mean "steadily altering cognitive and behavioral attempts to deal with certain external and/or internal demands that are assessed as taxing or going beyond the resources of the individual" (Lazarus & Folkman, 1984). The authors have categorized coping strategies in two main groups: problem-orientated coping which focuses directly on the course of stress, like information seeking effective way of reducing/solving the problem and planning, and emotion-orientated coping which is used to deal with emotions stirred by this situation (such as running away from feeling, trying to flee from the problem or putting the blame on oneself.

Table 1. IBS in connection with health beliefs and coping with stress.

There can be irrational beliefs about health in IBS patients, leading to the hypochondriacal behaviors
Patients with Irritable Bowel Syndrome usually adopt incorrect coping strategies that are ineffective, such as catastrophizing
More severe pain referred by patients with a high degree of catastrophizing

There are a lot of questionnaires that evaluate coping strategies, for example Coping Strategies Questionnaire (CSQ) (Rosenstiel & Keefe, 1983), the Ways of Coping Questionnaire (WCQ) (Folkman & Lazarus, 1988) and Coping Inventory for Stressful Situation (CISS) (Endler & Parker, 1999). The CISS has shown up to now to possess very good psychometric qualities and was confirmed in a lot of languages (Schwarzer & Schwarzer, 1996). All of these contain the aforementioned coping strategies.

According to WCQ, Drossman et al. (2000) we know that patients suffering from IBS and other FGIDs, did not make use of revaluation as frequently as patients with organic disorders (such as IBD, acid peptic disease, pancreatico-biliary diseases). As reported in a Polish study, patients with IBS showed a high emotional-oriented coping style (Wrzesińska & Kocur, 2008).

The CSQ targets basically on coping as for as painful conditions are concered. The focal point in using the CSQ in IBS patients is associated with the sub scale measuring catastrophysing (for example "When I am in pain, I feel I cannot stand it anymore" or "it's awful and I feel it devours me"). Catastrophyzing is a maladjusted coping tactic described as "a negative mental procedure consisting of negative reflection and

concern" (Keogh & Asmundson, 2004). IBS sufferers are more inclined to catastrophize than those suffering from organic disord- ers (Drossman, Leserman et al., 2000). Furthemore, catastrophyzing plays the role of a mediator in the relationship between depression and pain severity. The subsequent observation suggest this relationship: IBS patients and a high level of catastrophyzing tend to report more intense pain; catastrophyzing and depression are linked (Lackner, Quigley et al., 2004); depression did not predict symptom intensity (Drossman, 1999). IBS patients who encounter greater degree of depression are occupied with more catastrophic ideas, and to certain extent this kind of thinking involves more severe pain and larger-scale limitations in activity because of the pain (Lackner, Quigley et al., 2004).

The CSQ assesses, as well, the total success of coping tactics (the amount of control over symptoms and self-considered capability to minimize symptoms). Patients with IBS showed less tendency to feel in control of symptoms and to feel capable of reducing symptoms than patients with organic disorders (Drossman, Leserman et al., 2000) indicating that coping tactics are not very effective in IBS patients.

A general conclusion is hard to be drawn when talking about coping styles in IBS patients. All the work pre- sented above made use of various questionnaires to evaluate coping strategies in IBS. The outcome is not con- flicting, but simultaneously did not indicate a certain coping strategy in IBS patients (see also the summary in Table 1). Additional research is vital to show the role of coping in symptom understanding and control, and clinical result in IBS suffers.

6. Conclusions

An important part for biopsychosocial model of IBS are the psychosocial and environmental aspects, because they are participate in deregulation of the brain-gut axis, resulting in the appearance of IBS, insistence of symp- toms or disease abnormal behavior. In human's life there is a vast range of environmental and psychosocial stressors, acting in different times; nevertheless IBS will be appeared only in susceptible individuals.

Other important factors, like personality traits and psychiatric disorders, it is likely the elements that make someone sensitive to the development of IBS; accordance with the biopsychosocial model.

References

Barthan, J. M., & Proud, D. (1991). Bradykinin Antagonists. Annual Review of Pharmacology and Toxicology, 31, 129-162. http://dx.doi.org/10.1146/annurev.pa.31.040191.001021

Bueno, L., & Fioramonti, J. (2002). Visceral Perception: Inflammatory and Non-Inflammatory Mediators. Gut, 51, i19-i23. http://dx.doi.org/10.1136/gut.51.suppl_1.i19

Bueno, L., Fioramonti, J., Delvaux, M. et al. (1997). Mediators and Pharmacology of Visceral Sensitivity: From Basic to Clinical Investigations. Gastroenterology, 112, 1714-1743. http://dx.doi.org/10.1016/S0016-5085(97)70056-8

Chang, L., Lee, O. Y., Naliboff, B., Schmulson, M., & Mayer, E. A. (2001). Sensation

of Bloating and Visible Abdominal Distension in Patients with Irritable Bowel Syndrome. The American Journal of Gastroenterology, 96, 3341-3347. http://dx.doi.org/10.1111/j.1572-0241.2001.05336.x

Clark, C., & DeLegge, M. (2008). Irritable Bowel Syndrome: A Practical Approach. Nutrition in Clinical Practice, 23, 263-267. http://dx.doi.org/10.1177/0884533608318107

Creed, F. H., Levy, R., Bradley, L., Drossman, D. A., Francisconi, C., Naliboff, B. D., & Olden, K. W. (2006). Psychosocial Aspects of Functional Gastrointestinal Disorders. In: D. A. Drossman, E. Corazziari, M. Delvaux, R. C. Spiller, N. J. Talley, W. G. Thompson, & W. E. Whitehead (Eds.), Rome III: The Functional Gastrointestinal Disorders (3rd ed., pp. 295-368). McLean, VA: Degnon Associates Inc.

Creed, F., Craig, T., & Farmer, R. (1988). Functional Abdominal Pain, Psychiatric Illness, and Life Events. Gut, 29, 235-242. http://dx.doi.org/10.1136/gut.29.2.235

Devanarayana, N. M., Mettananda, S., Liyanarachchi, C., Nanayakkara, N., Mendis, N., Perera, N., & Rajindrajith, S. (2011). Abdominal Pain-Predominant Functional Gastrointestinal Diseases in Children and Adolescents: Prevalence, Symptomatology, and Association with Emotional Stress. Journal of Pediatric Gastroenterology and Nutrition, 53, 659-665. http://dx.doi.org/10.1097/mpg.0b013e3182296033

Dorn, S. D., Morris, C. B., Hu, Y., Toner, B. B., Diamant, N., Whitehead, W. E., Bangdiwala, S. I., & Drossman, D. A. (2009). Irritable Bowel Syndrome Subtypes Defined by Rome II and Rome III Criteria Are Similar. Journal of Clinical Gastroenterology, 43, 214-220. http://dx.doi.org/10.1097/MCG.0b013e31815bd749

Drossman, D. A. (1999). Do Psychosocial Factors Define Symptom Severity and Patient Status in Irritable Bowel Syndrome? American Journal of Medicine, 107, 41S-50S.

Drossman, D. A. (2006). The Functional Gastrointestinal Disorders and the Rome III Process. In D. A. Drossman, E. Coraz- ziari, M. Delvaux, R. Spiller, N. J. Talley, W. G. Thompson, & W. E. Whitehead (Eds.), Rome III: The Functional Gastrointestinal Disorders (3rd ed., pp. 1-30). McLean, VA: Degnon Associates Inc.

Drossman, D. A., Chang, L., Schneck, S., Blackman, C., Norton, W. F., & Norton, N. J. (2009). A Focus Group Assessment of Patient Perspectives on Irritable Bowel Syndrome and Illness Severity. Digestive Diseases and Sciences, 54, 1532-1541. http://dx.doi.org/10.1007/s10620-009-0792-6

Drossman, D. A., Leserman, J., Li, Z., Keefe, F., Hu, Y. J., & Toomey, T. C. (2000). Effects of Coping on Health Outcome among Women with Gastrointestinal Disorders. Psychosomatic Medicine, 62, 309-317. http://dx.doi.org/10.1097/00006842-200005000-00004

Dumitrascu, D. L., & Baban, A. (1991). Irritable Bowel Syndrome Complaints Following the Uprising of December 1989 in Romania. Medicine and War, 7, 100-104. http://dx.doi.org/10.1080/07488009108408973

Endler, N. S., & Parker, J. D. A. (1999). Coping Inventory for Stressful Situations (CISS): Manual (2nd ed.). Toronto: Multi- Health Systems.

Folkman, S., & Lazarus, R. S. (1988). Ways of Coping Questionnaire Manual. Palo Alto: Consulting Psychologists Press. Fujii, Y., & Nomura, S. (2008). A Prospective Study of the Psycho-Behavioral Factors Responsible for a Change

from Non-
Patient Irritable Bowel Syndrome to IBS Patient Status. Biopsychosocial Medicine, 2, 16. http://dx.doi.org/10.1186/1751-0759-2-16

Gomborone, J., Dewsnap, P., Libby, G., & Farthing, M. (1995). Abnormal Illness Attitudes in Patients with Irritable Bowel Syndrome. Journal of Psychosomatic Research, 39, 227-230. http://dx.doi.org/10.1016/0022-3999(94)00126-P

Jones, M. P., Dilley, J. B., Drossman, D., & Crowell, M. D. (2006). Brain-Gut Connections in Functional GI Disorders: Anatomic and Physiologic Relationships. Journal of Neurogastroenterology and Motillity, 18, 91-103. http://dx.doi.org/10.1111/j.1365-2982.2005.00730.x

Kellner, R. (1986). Somatization and Hypochondriasis. New York: Praeger.

Keogh, E., & Asmundson, G. J. G. (2004). Negative Affectivity, Catastrophyzing and Anxiety Sensitivity. In G. J. G. As- mundson, J. W. S. Vlaeyen, & G. Crombez (Eds.), Understanding and Treating Fear of Pain (pp. 91-117). New York: Oxford University Press.

Lackner, J. M., Quigley, B. M., & Blanchard, E. B. (2004). Depression and Abdominal Pain in IBS Patients: The Mediating Role of Catastrophizing. Psychosomatic Medicine, 66, 435-441.

Lazarus, R. S. (1990). Theory-Based Stress Measurement. Psychological Inquiry, 1, 3-13. http://dx.doi.org/10.1207/s15327965pli0101_1

Lazarus, R. S., & Folkman, S. (1984). Stress, Appraisal and Coping (pp. 141-327). New York: Springer.

Millan, M. J. (1999). The Induction of Pain: An Integrative Review. Progress in Neurobiology, 57, 1-164.

Moss, H. E., & Sanger, G. J. (1990). The Effects of Granisetron, ICS 205-930 and Ondansetron on the Visceral Pain Reflex Induced by Duodenal Distension. British Journal of Pharmacology, 100, 497-501.

Palsson, O. S., & Drossman, D. A. (2005). Psychiatric and Psychological Dysfunction in Irritable Bowel Syndrome and the Role of Psychological Treatments. Gastroenterology Clinics of North America, 34, 281-303. http://dx.doi.org/10.1016/j.gtc.2005.02.004

Posserud, I., Ersryd, A., & Simren, M. (2006). Functional Findings in Irritable Bowel Syndrome. World Journal of Gastro- enterology, 12, 2830-2838.

Rey, E., & Talley, N. J. (2009). Irritable Bowel Syndrome: Novel Views on the Epidemiology and Potential Risk Factors. Digestive and Liver Disease, 41, 772-780.

Rosenstiel, A. K., & Keefe, F. J. (1983). The Use of Coping Strategies in Chronic Low Back Pain Patients: Relationship to Patient Characteristics and Current Adjustment. Pain, 17, 33-44. http://dx.doi.org/10.1016/0304-3959(83)90125-2

Schwarzer, R. & Schwarzer, C. (1996). A Critical Survey of Coping Instruments. In M. Zeidner, & N. S. Endler (Eds.),

Handbook of Coping: Theory, Research, Applications (pp. 107-133). New York: John Wiley and Sons.

Sharkey, K. A., Coggins, P. J., Tetzlaff, W., Zwiers, H., Bisby, M. A., & Davision, J. S. (1990). Distribution of Growth- Associated Protein, B-50 (GAP-43) in the Mammalian Enteric Nervous System. Neuroscience, 38, 13-20.

Sirri, L., Grandi, S., & Fava, G. A. (2008). The Illness Attitude Scales. A Clinimetric Index for Assessing Hypochondriacal Fears and Beliefs. Psychotherapy and

Psychosomatics, 77, 337-350. http://dx.doi.org/10.1159/000151387

Sperber, A. D., Friger, M., Shvartzman, P., Abu-Rabia, M., Abu-Rabia, R., Abu-Rashid, M., Albedour, K., Alkranawi, O., Eisenberg, A., Kazanoviz, A., Mazingar, L., & Fich, A. (2005). Rates of Functional Bowel Disorders among Israeli Bedouins in Rural Areas Compared with Those Who Moved to Permanent Towns. Clinical Gastroenterology and Hepatolo- gy, 3, 342-348. http://dx.doi.org/10.1016/S1542-3565(04)00553-1

Stermer, E., Bar, H., & Levy, N. (1991). Chronic Functional Gastrointestinal Symptoms in Holocaust Survivors. American Journal of Gastroenterology, 86, 417-422.

Tracey, D. J., & Walker, J. S. (1995). Pain Due to Nerve Damage: Are Inflammatory Mediators Involved? Inflammation Re- search, 44, 407-411.

Van Oudenhove, L., Vandenberghe, J., Demyttenaere, K., & Tack, J. (2010). Psychosocial Factors, Psychiatric Illness and Functional Gastrointestinal Disorders: A Historical Perspective. Digestion, 82, 201-210. http://dx.doi.org/10.1159/000269822

Videlock, E. J., Mayer, E. A., Naliboff, B. D., & Chang, L. (2010). The Effect of Childhood Trauma and Abuse on the De- velopment of Irritable Bowel Syndrome Is Mediated by Somatization. Gastroenterology, 138, S-144.

Widiger, T. A., & Thomas, A. (Eds.) (1994). Diagnosis and Statistical Manual of Mental Disorders (4th ed.). Washington DC: American Psychiatric Publishing.

Wrzesińska, M. A., & Kocur, J. (2008). The Assessment of Personality Traits and Coping Style Level among the Patients with Functional Dyspepsia and Irritable Bowel Syndrome. Psychiatria Polska, 42, 709-717.

Zemlan, F. P., Murphy, A. Z., & Behbehani, M. M. (1994). 5-HT1A Receptors Mediate the Effect of the Bulbospinal Sero- tonin System on Spinal Dorsal Horn Nociceptive Neurons. Pharmacology, 48, 1-10.