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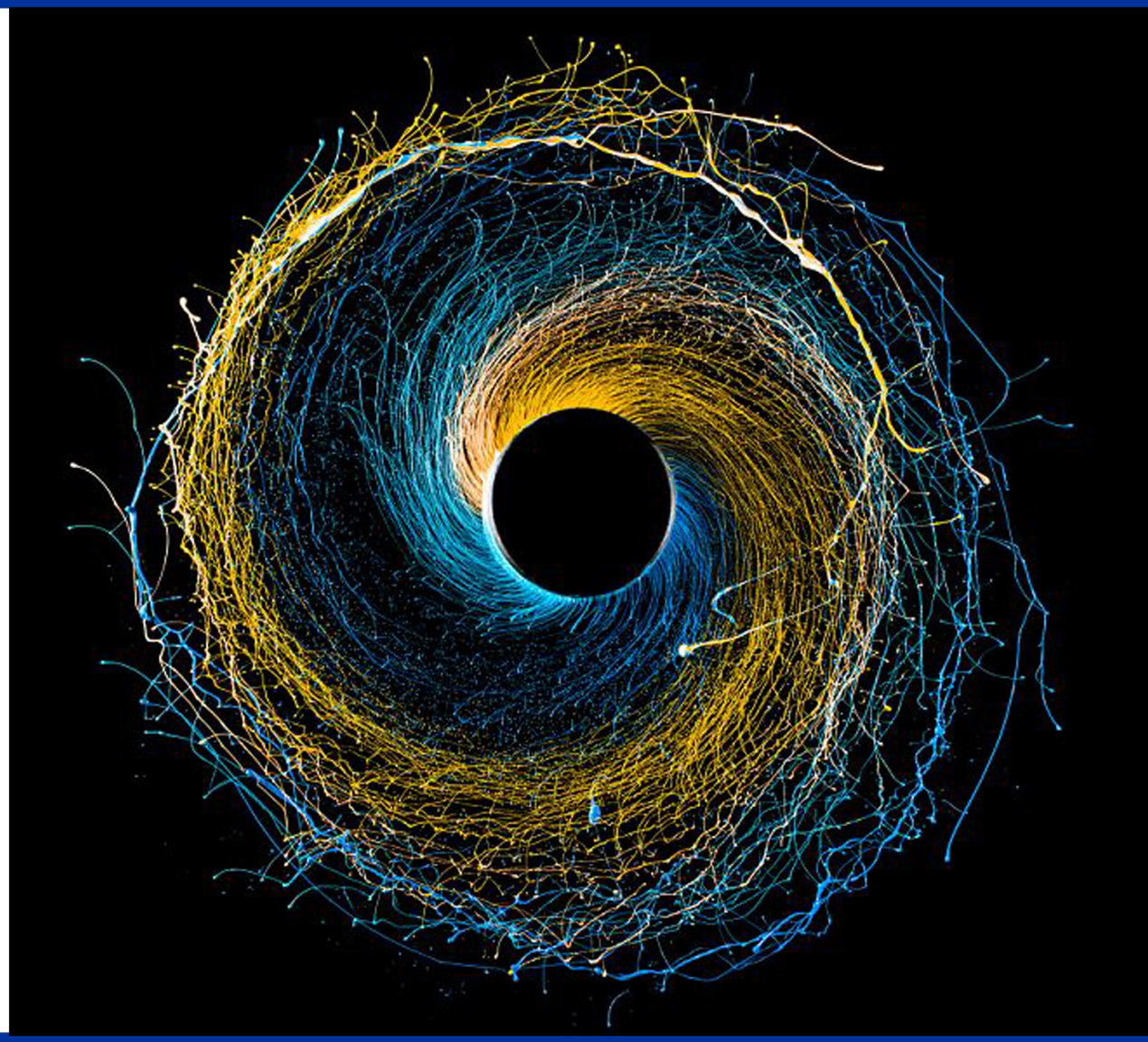

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Bioenergy Economy: A Biosemiotic Model of Care

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Editorial

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Today's trend of medicine promises going beyond traditional limits of reductionist explanation and pathological approach. It may be the time to integrate the knowledge and practice of heterogeneous specialties in health field. Our major resources to actualize health in all its aspects are a systemic and evolutionary clinical approach, a common language, and a feasible model to integrate body-mind, self-other, human-nature, and treatment-life.

To gain this purpose, health discourse firstly needs to take steps to the back -aligning with evolutionary vector of life- and then to take steps to the fore -to the phenomenological worlds of human kind-. In this way, human life is not narrowed to continuity of individuals along time rather is its evolutionary inclination to self, others, family, community, and the whole life itself. To actualize evolutionary role of medicine, we need something more than an idealistic icon of health and a list of diseases. To establish an individualized evolutionary medicine, we should realize one's specific responses to stressors and illnesses and how we can help a human system to find a new way of coping and healing. To have medical knowledge sensitive to one's conditions, it is insufficient to merely know one's structure, genome, and microbiome, rather there is a need to decode and find the way to one's lifeworld and epigenetic modulations. Studying one's nature, temperament, individual's belief network, metaphors, and determining lived experiences and one's expectancies from himself/life/treatment help us to understand and alter one's biopsycholosocial responses.

Function of medicine is something more than fighting with death or compensating for one's disabilities. It may be to release one's unique evolutionary desire which is prisoned inside him in his mind. Such evolution can happen in anybody's unique integrated context of body, narrative, relation, and intention. Authentic coherent responses which are formed in here and now can drive one to sustainable development of salutogenesis and even, newly emerged traits and functions. Through this function, domain of medicine transcends limits of treatment and causes elimination to salutogenesis and consciousness evolution; and caring for the lifetime transforms to midwifery the life.

Some biologists may disapprove such an attitude and state that evolution happens in a species, not in an individual. If we regard evolution happens not only genetically but epigenetically, systematic changes in one's

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experience and behavior may lead to changes in brain's performance and genes expression. These epigenetic moderations lead to emergence of new traits in an individual and, possibly, in family and society. These facts can be considered as individual or even sometimes intentional representations of evolution. This is the forgotten pedagogic aspect of biomedicine that training and mindfulness can change body responses. These epigenetic changes, of course, may directly or indirectly have a role in one's spouse selection, in the process of genes expression and dominating of one allele to another. Such processes are indeed confusing for a mind trained to believe in body-mind duality.

Now the question is: Does a common language exist which can explain the effect of such physical and symbolic factors on each other and their transformation to each other? My response to this question is yes!

Biosemiotics is a growing field of biology, semiotics, and a common language that links third-person (experimental) and first-person (phenomenological) experiences. This model can interweave generalizable medical science and ungeneralizable lived experiences, and create a clinical live knowledge. From this perspective, life is a recurrent flexible pattern which traps energy, maintains and expands its own order, and finds a kind of sustainability different from thermodynamics; namely dynamic-kinetic sustainability.

Human organism is indeed a pattern or a complex meaning system which continuously needs to receive and distribute energy economically for reproduction of its organization. So, its various intertwined subsystems can maintain their functional loop. To ensure economy of complicated difficult process of swimming against cosmic stream of entropy, we have to reach the more accessible resources to and the more coherent resources with our body, release their energy to the most optimal degree and distribute it in the whole system in a manner not to interfere with functions of parts by more or less cathexis.

To form such an order, it is essential that the signs which flow basically in material forms or vibrational pulsations be received and interpreted correctly by their related receptors. Any error in interpretation leads to a deviation in meaning and -to say it more specifically- a dis-order in function. As an instance, an electromagnetic wave in an intensity-frequency window specialized for osteoid cells (~7Hz) has the function/meaning of an increase in the rate of cell division. Or a "self" cell may be interpreted as "foreigner" by an immune cell. This chaotic meaning is quickly transferred to other cells through inflammatory molecules, or messengers the first cell has released. What happens is that misinterpretation of a cell and sequential interpretation of other cells simply creates an inconsistent meaning subsystem (disease) in the whole body meaning system and consequently illness is developed. Formation of a headstrong order which is incoherent with life order imprisons energy and uses it in the direction of non-life; that is, against the direction of evolution vector.

Now suppose that an immunosuppressant drug is given to a patient suffering from an immunological disease. That is, molecules that their meaning in system is the decrease and slowing down of inflammatory responses are entered into the system. It is obvious that the intensity of tissue destruction decreases but we cannot enter this function exclusively in the same incoherent meaning system. Therefore, this meaning is transferred to the whole immune system.

The story becomes more interesting when you find out that placebo has had the same effect in many cases. The matter is that human's complex nervous system has the ability to conceptualize and save energy in the form of symbols, arbitrary signs, and stimuli which are associated with neural functions. Symbols like material forms and vibrational pulsations can be interpreted and create meaning/function by the organism. In the case of placebo, the difference is that it is decoded and interpreted in brain not in cells. Due to

interactive context, attachment pattern, prior learning, healing expectancy, and drug as healing symbol, placebo creates a specific functional pattern in brain. By sequential recurrent translation of this meaning to electrical pulsations and molecular forms, it reaches the immune cells and organs and changes their functions.

In the moment of evolution, language has much extended and formed our body that it is impossible to unknit nodes of symbols from warps and woofs of matter and energy. It cannot be said sharply whether a certain change in function occurs because of a certain physical or chemical factor or that the interpretation of these factors in brain has caused a change in our illness.

In human condition, in which self-reflection has emerged, sometimes merely being aware of ourselves and the way of our being breaks the determined and conditioned energy-information chain and opens up a functional loop to the whole system organization. In these moments, healing response takes place. Therefore, upward-down organization makes incoherent subsystems coherent.

In the book "Biosemiotic Medicine: Healing in the World of Meaning", my expert colleagues and I explained in details the importance of this model for today's medicine. Therefore, here I narrow down the discussion and refer you to that book for further study.

Now we can say that body is a material-energetic-symbolic-reflective self-organizing meaning system. Matter is replaceable. Both matter and energy have dual role, mechanical and semantic. Energy has a structural role in this system and is used to overcome entropy. Furthermore, the intensity-frequency signs are interpreted in the system and create specific meaning/functions. Symbols are conditioned energy-information pathways but reflections work like some pauses or suspensions in this conditioned systems and make some new spatiotemporal self-organizing systems. To form a healing response, we can enter from each one of these gates: material, energetic, symbolic, and/or self-reflective.

In any case, meaning could be decoded and translated to other forms. A chemical, physical, cognitive, behavioral, or mindful intervention can change the whole organism response to a stress or illness.

Let me tell a short clinical case story to make the discussion more tangible. Sorraya, a 32-year-old woman suffering from pemphigus for five years, was referred to me for her depression and anxiety. Due to disease symptoms and high doses of corticosteroid and immunosuppressant drugs and their side effects like obesity, she had no participation in family and social interactions and was more or less bed rested for 3 years. Despite of intensive medication, she had been still developing blisters and ulcers in her vagina, mouth, and on her skin. She had three daughters of 9, 14, and 16 years old and her husband was a shepherd. Her dermatologist, having gone through the same process that almost every other physicians does in the same situation, followed her clinical and laboratory symptoms to diagnose her disease. Afterwards the treatment strategy was obvious, inhibiting autoimmune inflammatory processes.

Like any other skilled physician, her therapist knew psychological factors might be responsible for formation and aggravation of autoimmune diseases and decreases patient's life quality to a great extent. But as an unwritten tradition, only when physicians become desperate of treating patients suffering from chronic and incurable diseases refer them for psychosomatic care to be soothed or to receive some kind of priestly relief there. Due to biomedical presupposition, signs are followed to diagnose a disease in order to go beyond symptoms therapy. In the same way, to realize illness pattern, diagnosing disease is insufficient.

In an integrative practice, disease-oriented approach is comparable to symptom therapy for biomedical physician. Disease is an adaptive incoherent process in a complex biopsychosocial context. This context allows formation and reproduction of the disorder and determines the extent of patient's psychoneuroimmunological

response to disease and treatment and illness behavior. The physical, symbolic, and reflective resources that one potentially or actually has and his/her resilience and salutogenesis in response to the stressful conditions are in this healing context. Do not these functions act out of the body? Do not they change process of the disease? Are not they medical issues?

Anyway, I investigated her healing context and from the very onset, I found out that although the woman of our story was from a distant village and completely illiterate, she was very clever and had strong imagination and deep affections. She was the first daughter and the third offspring of a poor village family with 11 kids. Due to her life condition that she was to take care of her younger sister and brother, she could not to go to school. She married when she was 13 and gave birth to her first child in 15. The time I visited her, she talked a lot about her childhood, watching stars, her family's garden, and her willingness to learn as she was a little girl. She talked about her many attempts to provide a condition in which her children become educated. Although she was regretful of her early marriage; but knew having a very kind and diligent husband, as the most important chance of her life.

Her lost childhood, suppressed creativity, and tiredness due to years of hard work on the one hand and her high energy and creative mind on the other hand had caused severe conflicts for her in years. When she could calm down and integrate her body in the process of mind-body coordination, she lifted up and began to do some light activities in home. She found her lost fantasy world in self-hypnosis exercises, she remembered bodily memory of health, found that she can always have this inner secret place which gave her the sense of freedom and safety. Having practiced guided visualization technique and the imaginary bathe in healing spring, her bodily responses changed. All the blisters disappeared. She lost weight and as her husband said, "Finally her sleeping mattress from the middle of the home was folded after three years". When she found beautiful meanings for tragic difficulties of her life, she felt sense of coherence in herself. She loved the metaphor of being a "little angel" had come to the earth to take care of children. She was still full of maternal energy. She only needed to include herself in her own circle of care.

She found a more intimate dynamic relationship with her husband and children because she could find no contradiction between caring of herself and that of themselves and she knew saying no to them is not against loving them. After four months from the treatment onset, she used no medication, much of her overweight was lost (35 kg), and she returned to her normal life.

I should apologize for such a fable-like happy end of the story; but at least in this case and in this life span of hers –of course in three years after the treatment, I had news from her–, she had no disease relapse and she was very content of her life than before.

Information, rapport, altered states of consciousness, and metaphors were medications which rendered a more specific and more sustainable change in meaning, caused absorption of Sorraya's wandering self-destructive bioenergy to be employed for reaching her goals and guiding her body orientation toward life.

My approach in her treatment was based on bioenergy economy. That is, how to make one's body, narrative, relation, and intention coherent. First of all, energy expenditure in her body became more economic. Then, she got rid of the force of repetition and self-destruction. Afterwards, she could find tangible images of health which formed in her somatic memory. She learnt how to align interests of hers with those of others. Her sense of loneliness and rejection transformed to a union deeper than ever with the whole, universe, and the god. Before logotherapy, she was angry from god since like a cruel father had sold him to slavery; but simultaneously, she could not have any hatred to him. All of these changes embedded in the context of the link between treatment and life.

It is worth noting that, although one's clinical state and performance are not so interfered, sometimes it is more intricate problem-organizing systems have been formed which need more time and energy consumption for salutogenesis to open up these system's loops unto the whole body in order to prevent further disease.

Bioenergy economy (BEE) is an integrative, evolutionary, body-centered approach to care. Releasing blockages, reprocessing energy-information flows, resonating biofield and opening the whole body to being are the main strategies of this metadiagnostic approach. The main goal of the BEE is sustainable development of happiness. This care system tries to integrate matter-energy-information-consciousness process through four levels; body economy, narrative economy, relation economy, and intention economy. BEE works on the embodied aspect of experience among intrapersonal (physical, and energetic), intercorporal, and transpersonal bodies. For this purpose, bodywork, energy work, mindful and psychodynamic techniques are employed in an integrative manner. Body economy, the first level, focuses on mindful recathexis of physical body and harmonization of tones of tactile, proprioceptive, vestibular, and visceral perceptions. Body economy leads to development of grounding and "tensegrity" state. Development of body awareness promotes self-awareness and security. The sense of tensegrity is not only our state of mechanistic tuning but a reference point which can be returned to when any chaos occurs in thinking and emotions. By re-establishing tensegrity and whole-body experience, without dealing with mind content, we can regulate our emotions. Having the body tuned, when we come back to the same thoughts and feelings, we often find out there exists no such problem to be solved, the problem changes, or becomes clearer with sharp confines and illustrations.

The second level is narrative economy. Through deepening our understanding of physical body, we can percept subtler body sensations; energetic body. Our touchstone of being in this level is being in our "fluent-centered state"; that is, the feeling of being fluent while concentrated in the center of gravity of the body. In the last few decades, instruments to measure electromagnetic fields and streams in body have been developed and diagnostic and therapeutic methods based on them are employed to a great extent. Electromagnetic streams not only spread all over the body through veins and nerves, but also through the more extensive connective tissue system called the living matrix. Physical and emotional traumas and chronic stressors can cause blockages in this network leading to biological and psychological dysfunctions.

Today, talking about bioenergy is less metaphorical than when Freud and Jung talked about psychodynamics in terms of the concept of energy. Energy-information flow in body is explainable and measurable both empirically and phenomenologically. From this perspective, affects are patterns of energy distribution in body and a kind of intentional preparation for one's behavior. These patterns are named, interpreted, and valued by symbolic mind. Symbolic locus of awareness is in our head as if we experienced, narrated, and intervened in the world and, to say it briefly, ride the chariot of our body from there. In our heads, we seldom notice first-order bodily experiences and changes in state and traits of bioenergy distribution in body. Our attention is focused on objects, mainly on objects of desire and objects of fear. Therefore, consciousness usually floats in cognitions and metacognitions and symbolic brain is busy with mostly inefficient interpretations and associations while matter-energy-information-consciousness streams through the whole body and is altered in the horoscope of present moment.

Body awareness opens up the body field (phenomenal field) to the now and here. Focusing awareness in the center of the body increases the sense of balance and self-control. On the other hand, biofield attunement and hands-on exercises not only lead to higher bioenergy resonance, but more homogeneous distribution. Free flow of

bioenergy in body and optimal cathexis equal to cognitive and behavioral flexibility and bioenergy centering equals to cognitive and behavioral autonomy. Whole-body attunement and bioenergy centering in embodied mind are equivalents of coherence in narrative and sense of self in symbolic mind. To deconstruct efficiently our more incoherent narratives of life, we need to change our body tune, to release energy blockages and rigidities, and of course to distance "self" from its problems. This is more accessible through doing bioenergetic exercises and distancing consciousness from mind content.

The relation economy, the third level, is based on integrating interpersonal cathexis. From energy economy perspective, relationship is symbolic and/or spatiotemporal extensions of the body and interaction of our phenomenal field with other fields. Through sharing its resources and boundaries, our biofield can reach higher dynamic-kinetic sustainability. Relationship is not mere interaction but is participation in more complex systems. For more sustainable connection between self and other, we have to go beyond imaginary and rigid limits of mental self and understand self not as an object with a name but as a reflective communicative action in space-time.

In this level, consciousness transcends familiar boundaries of the skin to the communicative proxemics of ours and our body becomes a mindful biofield. Whether we are aware of current communicative bodies or not, our body parts participate in larger intercorporal systems; although we conceptualize all those complex multidimensional experiences simply in the frame of egoistic narratives.

The forth level, intention economy, is related to nonlocal body and transpersonal experiences. Consciousness emerged from matter but it is non-local in nature. Although consciousness can simply be identified with anywhere and anything, it cannot be known where in place it really is located.

The organism which is aware of its own existence or, in Heidegger's words, Dasein, cares for being and makes "beings" express "the being". Body extends not only in domains of intrapersonal and interpersonal relationships, but into the domain of transpersonal relationships. Transpersonal realm includes relationship of body with the whole. Conscious body simultaneously is in relation with self, other, and the whole although in any time inclines to concentrate on one of these dimensions. Transpersonal experience is to derive security of boundarylessness and, in Ungaretti words, *m'illumino d'immenso*. This is not a regressive metamorphosis which wipes out individuality; but is the experience of *unos-ambo* or dual unity. It is the individuality which is rooted in the existence, not out of it. The individuality beyond the origin of paranoiac ego is not a mental experience, but body awareness.

As we have seen, fostering a secure attachment and integrating the streams of material, energetic, symbolic, and reflective signs can be actualized by developing tensegrity in physical body, fluent-centeredness in energetic body, being in-field in communicative body, and non-locality in transpersonal body. As mentioned before, this coherence development in all aspects of body mostly happens through application of known body-centered, bioenergetic, mindful, behavioral, cognitive, psychodynamic, and systemic methods in bioenergy economy.

Many facts and reasons indicate thoughts and emotions are not authentic phenomena to a great extent, but rather are epiphenomena. It is the main reason that in BEE, we try to establish more direct relationship between consciousness and body states towards sustainable/evolutionary cathexis. To effectively open up the loop of problem-organizing systems, the most effective way is to enter from all the paths of body. To prompt healing response, we need to employ all physical signs (e.g. food, medication, bodywork, and surgery), energetic (e.g. bioenergy, alteration of and movement in electromagnetic environment), symbolic (e.g. social behaviors, beliefs, schemata, images, and metaphors) and reflective signs (e.g. mindful exercises); so that

there would be less chance for an incoherent subsystem to rearrange itself.

Development of symbolic world and consciousness caused beliefs and proactive responses, as well as embodied self-organizing mind or -as humanistic psychologists say- organismic sense effect on economic function of body.

In the process of evolution, having belief and being proactive are newly emerged qualities; so that their being in harmony with ancient wisdom of organismic sense faced with many challenges. Prophets, philosophers, scientists, and therapists all tried to find out how to arrange language and self-reflection and how to organize behaviors; so that they become aligned with human nature from the one hand and were able to develop the ability to satisfy the desire on the other. This is the way to expand happiness in space and time.

Happiness is a spectrum of emotional states from tranquil contentment to vibrant joy, from transient pleasure to bliss which is the state of being self-containedness. Anyway, happiness is meant feelings of well-being and comfort in the whole body, either transient or persistent.

Happiness includes state of harmonious flow of bioenergy in the whole body and the balance between will, desire, and resources. Obviously human kind always attempted to extend this state in mind-time-space to reconstruct a sustainable happiness.

Impulsive and unrestrained behaviors or compulsive and ascetic behaviors are various approaches to happiness. All the people, either those who believe or do not believe in authenticity of happiness or those who do not believe in happiness in this world and think it belongs to the other world, are in pursuit of happiness -more immediate (impulsive stage), cumulative (conditioned stage), sustainable (proactive stage), or global (agapistic stage) joy-.

The more we rely on economic patterns which are in more harmony with life, the more we reach higher health or -to say- more development of happiness in all inter/intra/transpersonal fields of communication. More coherent biopsychosocial meaning systems lead to more evolutionary and more harmonious matter-energy-information-reflection.

Bioenergy economy as a contextual body-centered approach tries to make our happiness, salutogenesis, and evolution more unconditional and self-organizing through mindful telenomic cathexis.

Emerging discipline of biosemiotics is able to cast a new light on the meaning and life and properly translate the mind-matter and treatment-life interactions. This evolutionary semiotic development shifts the focus of medicine from treatment to salutogenesis and healing. From this viewpoint, healing procedures are indeed integrated reorganizing responses. BEE program is a care model which can bring about such upward-down processing leading to that "the whole heals the whole".

In this issue, in addition to an interview with professor Peter Whorewell and other worthy articles on different psychosomatic subjects, a clinical trial -"The effect of a bioenergy economy program on pain control, depression, and anxiety in patients with migraine headaches"- and a case study in editorial –titled "Bioenergy economy: A biosemiotic model of care" as instances of clinical effectiveness of BEE approach – are presented.

International Journal of Body, Mind & Culture
Cross-Cultural, Interdisciplinary Health Studies

A Bridge between Mind and Gut: An Interview with Professor Peter Whorwell

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Interview

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Professor Peter Whorwell studied medicine at Guy's Hospital in London. He has the experience of working as a hospital doctor in London, Cambridge, and Southampton, and he also worked for a year in the USA. Since 1981, he has been Consultant Physician and Gastroenterologist at the University Hospital of South Manchester and his main area of interest is functional gastrointestinal (GI) disorders, and he is the director of South Manchester Functional Bowel Service. He is also medical advisor to international foundation for functional GI disorders and member of the European expert panel for functional GI disorders. He is the pioneer of research on use of hypnotherapy for the treatment of irritable bowel syndrome (IBS) and related conditions. He has published over 300 papers or chapters, has written articles for popular magazines and newspapers, and appeared in several radio and television programs on functional GI problems. In this short interview, he has shared some of his ideas about practice and education in medicine.

• Could you please introduce yourself and tell us how you became interested in functional GI problems?

My name is Peter Whorwell and I am a professor of medicine at the University Hospital of South Manchester. When I started as a gastroenterologist, I, obviously, studied all aspects of gastrointestinal diseases including liver diseases, but found that the most challenging to treat was a group of conditions called the functional gastrointestinal disorders. Moreover, the patients were not being taken seriously by the doctors; therefore, I gradually became more and more interested in the challenge of treating functional gastrointestinal disorders. As I got older, the unit was virtually devoted to the management of these conditions and research into these disorders. As most people know, functional gastrointestinal disorders, including irritable bowel syndrome (IBS), are particularly difficult to treat and most doctors only advise patients with IBS to take more fiber and assure them that they will learn to live with this disorder. This is clearly not good advice, since the condition completely overwhelming their life, and therefore, they really must do something more.

• How did you become interested in studying hypnotherapy?

In the face of not having very good conventional treatment to offer these patients, I thought that hypnotherapy might be worth a try. The reason I tried hypnotherapy was that back in the early 1980s IBS was thought to be a motility disorder.

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This means that the problem is only abnormal contractions in the muscles of the gut that cause spasms, and that is why the disorder used to be called "spastic bowel syndrome". Because of this and because I knew that hypnosis relaxes muscles (I had watched a television program on hypnosis), I thought perhaps it can be used to relax the muscles of these patients. Thus, the reason I tried hypnotherapy was almost on a wrong hypothesis because we now know that the cause of IBS is much more complicated than muscle contraction. Even though it was based on a wrong hypothesis, it worked, and therefore, I thought it worth pursuing. The other interesting aspect was that, as a physician rather than a psychologist or psychiatrist, I felt that if I want to perform hypnotherapy it would have to be in a more medical way rather than a psychological way. Fortunately, in those days, patients were not quite stressed as they are today and applying hypnosis in a medical way, "gut focused hypnosis" as we call it, seemed to work. However, evidently, you try to give the patient advice during hypnosis about stress management and those sorts of things. Since then, we have shown that hypnotherapy does seem to help or improve various physiological abnormalities we now know occur in IBS. IBS, in addition to being a motility disorder, includes hypersensitivity and various other abnormalities of pain control mechanisms and those also seem to be amenable to modulation by hypnosis.

• Today, management of chronic conditions is one of the main problems of healthcare systems, and in these conditions, many psychosocial factors are important and the doctor cannot change the majority of them. What do you think a doctor can do in this regard?

I think one of the problems with IBS is that it is what is called a chronic condition and I think healthcare systems are faced with great problems in the management of these conditions. In the modern medical model, everything seems to be acute and you put acute things right, and then, you get rid of the patient (for want of a better word) and the job is done. However, chronic conditions are lifelong conditions and we are not good at addressing these for two reasons. One is that many doctors are, I think, almost frightened by chronic conditions, because they feel incompetent because they are not helping the patient. Therefore, they start blaming the patient rather than telling the patient that he/she has a chronic condition and they are helping him/her manage it rather than curing it, because we cannot cure these conditions. The second reason is that healthcare systems do not support doctors in their role of helping patients manage these problems. In hospitals, they are given 10-15-minute appointments, and in general practice, 10-minute appointments and you cannot manage a chronic condition in 5 or 10 minutes. Thus, healthcare systems should allow doctors who are interested- as not everybody is interested- to spend more time with these patients. We have also found, over and over again, that the time spent with the patient is a good investment, because that patient will last longer on that advice than if you never get to the core of the problem. You need to get to the core of the problem. Patient education is absolutely vital. They need to understand the condition; they need to understand what you can do and more importantly what they can do. They have got to engage in their treatment. If they expect you as the doctor to put them right, it will never happen. Therefore, it is a case of partnership between you and the patient working towards an improvement rather than a cure and setting realistic goals, and doing that, it is amazing how many patients you can help. There are always some that you cannot help, but even though you cannot help them, you should not discharge them. You can still look after them and give them a point of contact with the medical profession. Because it seems grossly unfair that patients with chronic illnesses are caused to drift with no realistic and meaningful point of contact with the medical system.

Professor Peter Whorwell

• What are your views about the current status of medical training in your country and in the world and what do you think needs to change?

I am not sure I would very much enjoy the medical training as it is today, but what you have not had, you do not miss, so probably I would still enjoy it. I fear that it is getting worse, because medical students are trained in this very physical and medical model in which you do a test, you find the cause of the problem, and you put it right. This is fine for the things for which this model applies, but in chronic illnesses, which quite often have very negative tests and vague symptoms, this is not going to work because you cannot necessarily find a concrete diagnosis. Even IBS is not a diagnosis. It is a collection of symptoms. Therefore, the management of these patients is challenging for medical systems and medical students are not being taught how to manage them. They are being taught how to treat acute problems, but not chronic problems. This needs to change, but I am not sure that it is going to change in the near future. I only now remembered a relevant example in our IBS clinic. We had two patients referred to the emergency team because they were in such severe pain, and the emergency team attended to the first patient. I went in there and they ignored me, so I thought I will leave them to it. They had a drip up and monitor on them and all sorts of things, and then, a stretcher was brought in and the patient was taken off in an ambulance. Then, in the afternoon, the same thing happened, and I could not believe that the emergency team were summoned again. I was not going to be silent this time and I asked to take over. She was having pseudo-epilepsy. We managed to find some Buscopan injection and it was all resolved, and so, she was not put on a stretcher.

I think, once the more challenging conditions, like cancer, ischemic heart disease, and diabetes, are managed better, which is inevitable, we will be left with these so called functional conditions. Then, we will have to learn how to manage them. Managing these patients reasonably well is incredibly rewarding, probably, in my experience, more rewarding than treating somebody with thyroxin for their thyroid disease or insulin for their diabetes. Since you are making a difference to these patients, where no difference was made before.

• Do you have any suggestions about the way in which this situation can be changed?

Regarding the possibility to change the situation, I think the point is that there is an obsession with tests. How do you change that? How do you make doctors talk to their patients? It is very difficult. What can you do to stop this obsession with investigation? I suppose it would be helpful if we had more doctors like me. Doctors who have sat in my clinic with me have said it has been useful to learn how to speak to these patients. They receive trainings with so called mock patients, the actors being the patients, and they go through all these role model training sessions, but it is not challenging in anyway and it is just ticking the

boxes. For example, there is a module about breaking bad news, but there is no module about how to deal with a chronically ill patient. The other point is that, in the UK education system, in order to get into medical school you have to have three A levels (the exams at the end of school) and you have to have them at a star level. I am not sure that you have to be super intelligent to be a doctor. I think you should have a good memory, but I am not sure you have to be super intelligent. Therefore, they select a group of people who may have very high intelligence, but not very high empathy. The other problem in this country now, I think, is that being a doctor comes with one of the best salaries of any occupation. Therefore, you attract people because of the financial rewards, and hence, they are not empathic to the patients. I think the other thing that still attracts people is that being a doctor carries a certain degree of kudos although not as much as before. Thus, people study medicine for the money, kudos, and because they are intelligent and I do not think these are necessarily the right qualities for the job.

- **If you were not a doctor, what would you do?**

If I was not privileged enough to be a doctor, I am not sure what I would do. I thought about becoming a doctor from the moment I could speak. Thus, I do not think I would have ever been any good at anything else. The only other thing that crossed my mind was being a pilot. However, I am not very keen on wars, and most of the training is done by the forces. I would have preferred to be a commercial pilot, but in those days you had to go through the forces to learn to be a pilot. Thus, I learned to be a pilot anyway, but in a private way. Therefore, I do not think anything would have suited me really, so I would be lost if I was not a doctor.

- **Who is your role model?**

With regard to role models, when I was a medical student, consultants in the United Kingdom were very arrogant despots. They were a very arrogant group of people who strutted around expecting students and young doctors to follow them around obediently. When they did speak to them, it was usually in a rude way. I did actually reverse model myself on people, so I thought I am not going to be like them. There was one doctor who was a surgeon actually, which was rather unusual. He did what I do today; he talked to patients, was very gentle to them, and chatted with them in a nice, non-threatening, and easy-to-talk-to manner. Therefore, he was actually my role model. Fortunately, he worked in the hospital where I was trained and I chose him as my role model.

- **Thank you very much for devoting your time to this interview.**

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Psychological Profile in a General Population in Central Iran

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Quantitative Study

Abstract

Background: The description of demographic features and associated risk factors provides a perspective for the development of health and prevention policies for psychological screening or referrals. Thus, updated data on epidemiologic profile of depression and anxiety in the society are necessary. This study aims to describe the psychological profile of a general population in central Iran.

Methods: This community-based, cross-sectional survey was performed as part of the SEPAHAN project (Study on the Epidemiology of Psychological-Alimentary Health and Nutrition). The participants were selected from among the 20,000 non-academic employees of Isfahan University of Medical Sciences working in 50 different centers across Isfahan Province, Iran. The data on 4628 adults who had completed demographic questionnaires and psychological questionnaires for depression and anxiety, coping styles, and stressful life events were included in the analysis. The data collection tools were the Demographic information questionnaire, Hospital Anxiety and Depression Scale (HADS), Coping Strategies Scale (Cope), and Stressful Life Event (SLE) questionnaire.

Results: The frequency and intensity of all considered stressors were found to be significantly associated with both depression and anxiety. Adaptive coping strategies were found to function as protective factors against both depression and anxiety. However, avoidance, as a maladaptive coping strategy, was found to be a risk factor.

Conclusion: The present survey reveals that the prevalence of depression and anxiety was 28% and 14%, respectively. Scholastic education plays a protective role against both depression and anxiety. All coping strategies, except avoidance, function to protect against depression and anxiety.

Keywords: Depression, Anxiety, Stressor, Coping, Hospital Anxiety and Depression Scale, Stressful life event

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Introduction

Depression and anxiety are the most prevalent psychological morbidities (Sansone & Sansone, 2010; Ferrari et al., 2013; Pietrzak et al., 2013; Baxter, Scott, Vos, & Whiteford, 2013). Depression was the leading cause of disability as measured by Years Lived with Disability (YLDs) and the fourth leading contributor to the global burden of disease according to Disability Adjusted Life Years (DALYs) in 2000 (World Health Organization, 2016). By the year 2020, depression is predicted to reach the second place in the ranking of DALYs calculated for all ages in both sexes (Sansone & Sansone, 2010; WHO, 2016). The prevalence of anxiety is difficult to determine as nuance in diagnostic criteria, tools, and methodology can affect results; yet, it is very common (Sansone & Sansone, 2010; Baxter et al., 2013). Moreover, anxiety can be very disabling, cause high individual and social burden, and tends to follow a chronic course (Sansone & Sansone, 2010; Baxter et al., 2013; Smit et al., 2006; Kathol et al., 2005). Compared with other psychological issues, people with anxiety place a remarkable strain on health care systems (Smit et al., 2006; Kathol et al., 2005). The burden for both depression and anxiety can be viewed in terms of treatment costs, short-term and long-term disability, days of absence from work, reduced productivity, unemployment, and interpersonal and family problems (Sansone & Sansone, 2010; Baxter et al., 2013; Smit et al., 2006; Kathol et al., 2005). Studies in different populations have reported the various profiles of these states. A study in the US showed that lifetime major depressive disorder (MDD) prevalence estimates were as high as 10.4% to 17.9% (Williams et al., 2007). On the other hand, anxiety disorders afflict about 18% of the US population (Sansone & Sansone, 2010; Williams et al., 2007). In the Middle East, the frequency of depressive symptoms was estimated as 16.1% among men and 58.4% among women, and that of anxiety symptoms as 21.9% among men and 78.2% among women (Al-Gelban, Al-Amri, & Mostafa, 2009; Muhammad Gadit & Mugford, 2007; Ventevogel, 2005). In Iran, epidemiologic studies on depression and anxiety have reported conflicting results (Noorbala, Bagheri Yazdi, Yasamy, & Mohammad, 2004; Mohammadi et al., 2005; Farhoodian et al., 2007; Sadeghirad et al., 2010; Noorbala, Bagheri Yazdi, Hafezi, 2012). The prevalence of depression and anxiety in central Iran was 32% and 15.4% in 1994 (Ghassemi, Asadollahi, Ahmadzadeh, Najmi, & Palahang, 2000), 8.9% and 4.6% in 1996 (Attari, Naghdi, Farzaneh, Ris-Manchian, & Jaberi, 1998), and 7.01% and 17.15% in 2001, respectively, (Mohammadi et al., 2004). Studies on factors associated with depression and anxiety have led to conflicting results (Kessler & Bromet, 2013; Alvi, Assad, Ramzan, & Khan, 2010; Alexander, David, & Grills, 2013).

Although in some studies, female gender, low education, unemployment, socioeconomic problems, poor coping mechanisms, and stressful events were considered as risks for depressive symptoms as well as anxiety (Ferrari et al., 2013; Pietrzak et al., 2013; Williams et al., 2007), others demonstrate rather contrary results (Baxter et al., 2013; Al-Gelban et al., 2009; Muhammad Gadit & Mugford, 2007; Chou & Cheung, 2013) .

The description of demographic features and associated risk factors provides a perspective for the development of control programs and planning of primary care provision policies for psychological screening or referrals (Sansone & Sansone, 2010; Noorbala, 2011). Thus, updated data are necessary on the epidemiologic profile of depression and anxiety in the society. This study aims to describe the psychological profile of a general population in central Iran.

Methods

Study design and participants

The present cross-sectional study was performed as part of the SEPAHAN project (Study on the Epidemiology of Psychological-Alimentary Health and Nutrition), which was a community-based epidemiologic study focusing on functional

gastrointestinal disorders (FGIDs) in Iran in 2011. It also addressed the role of different lifestyle, nutritional, and psychological factors in symptoms of FGIDs and their severity. Details of this project have been published recently (Adibi et al., 2012). This work was supported by the Psychosomatic Research Center of Isfahan University of Medical Sciences in Isfahan Province, Iran. The statistical population consisted of all the non-academic staff of Isfahan University of Medical Sciences, working in hospitals, university campus, and health centers affiliated with Isfahan University of Medical Sciences. The academic staff and the personnel of teaching hospitals and research centers were excluded. The participants were selected through cluster random sampling from among 20,000 non-academic employees working in 50 different centers across Isfahan Province.

The data were collected in two separate phases to increase the accuracy of data collection and the response rate; self-reported questionnaires for psychological assessment were applied in the second phase. The data on 4628 adults who had completed demographic questionnaires and psychological questionnaires for depression and anxiety, coping styles, and stressful life events were included in the analysis. The protocol of the study was approved by the Ethics Committee of Isfahan University of Medical Sciences. Individuals were assured of the confidentiality of their information. The study process was clarified for all the participants, and written informed consents were obtained from all participants.

Variable assessment

Demographic Features: Demographic information included age (< 40 or ≥ 40), sex, marital status [married or unmarried (including single, widow, or divorced)], and educational level [undergraduate (0-12 years of education), or graduate (> 12 years of education)].

Hospital Anxiety and Depression Scale: Anxiety and depression were assessed using the Persian validated Hospital Anxiety and Depression Scale (HADS). The questionnaire consists of 14 items that can be divided into two scales of anxiety (α = 0.82), and depression (α = 0.84). Each scale consists of seven items, with a total score ranging from 0 to 21. Higher scores reflect higher levels of anxiety and depression. Clinical levels of anxiety and depression were considered for scores equal to or higher than 11 (Adibi et al., 2012; Kaviani, Seifourian, Sharifi, & Ebrahimkhani, 2009). Coping Strategies Scale (Cope questionnaire): Coping with stressors was assessed using the Persian validated Coping Strategies Scale (Cope questionnaire), a multi-component, self-administered questionnaire. The reliability of the scale was determined using Cronbach's alpha (α = 0.84). It consists of 23 items in the five scales of positive re-interpretation and growth, problem engagement, acceptance, seeking support, and avoidance. Each item is scored on a three-point scale (never = 0, sometimes = 1, and often = 2). Separate scores are reported for each scale (Adibi et al., 2012)

Stressful Life Event: Stressors were assessed by means of the Persian validated Stressful Life Event (SLE) questionnaire which is a 44-item questionnaire in 11 domains. Its domains consist of home life, personal conflicts, education concerns, sexual life problems, social relation, occupational conflicts, occupational security, loss and separation, daily life, health concerns, and financial problems. The presence of each stressor is indicated through yes/no questions, and the intensity of the stressor is determined on a four-point scale (1 = low, 2 = medium, 3 = high, and 4 = very high). The standardized Cronbach's alpha was 92% (Adibi et al., 2012).

Statistical analysis

Data were analyzed in SPSS software (version 15.0, SPSS Inc, Chicago, IL, USA). A significance level of 0.05 was considered for all P values.

Continuous variables were expressed as mean ± SD and t-test was used to compare the means between the two groups. Qualitative variables were expressed as frequency, and chi-square test was used to compare frequencies

between the groups. Odds ratios (ORs) were reported with the corresponding 95% confidence intervals (95% CI).

Results

A total of 4657 participants were studied. The mean age of the participants was 36.51 ± 7.91 years. Women constituted 2612 (56.1%) of the studied population. Moreover, 3689 (79.2%) and 2601 (55.8%) of the population were married and graduated, respectively. In addition, the overall number of individuals with depression and anxiety was 1338 (28%) and 654 (14%), respectively.

Results of univariate analysis are displayed in tables 1 and 2. Based on demographic variables, women and undergraduates were at a remarkably higher risk of depression and anxiety. Age was also a considerable risk factor for anxiety (OR = 1.37; 95% CI: 1.12-1.68), but not for depression.

Considering stressful life events, the frequency and intensity of all considered stressors were found to be significantly associated with both depression and anxiety. As to the frequency of stressors, personal conflict (depression: OR = 4.57; 95% CI: 3.91-5.35, anxiety: OR = 5.00; 95% CI: 3.97-6.30), social relation (depression: OR = 3.55; 95% CI: 2.94-4.28, anxiety: OR = 6.34; 95% CI: 4.51-8.90), and health concern (depression: OR = 3.08; 95% CI: 2.70-3.51, anxiety: OR = 4.05; 95% CI: 3.40-4.83) are indicated as risk factors for depression and anxiety. Moreover, occupational security (OR = 4.06; 95% CI: 2.99-5.51) and daily life stress (OR = 3.45; 95% CI: 2.87-4.13) are remarkable risks for anxiety. Considering the intensity of stressors, health concern is significantly associated with depression (OR = 1.41; 95% CI: 1.30-1.53) and anxiety (OR = 1.47; 95% CI: 1.35-1.59), and daily life stress is also a considerable risk for anxiety (OR = 1.41; 95) (Tables 1 and 2).

As shown in tables 1 and 2, adaptive coping strategies were found to function as protective factors against both depression and anxiety. However, avoidance, as a maladaptive coping strategy, was found to be a risk factor (depression: OR = 1.10; 95% CI: 1.06-1.14, anxiety: OR = 1.09; 95% CI: 1.03-1.14)

The results of multivariate analysis, similar to those of univariate, indicated significant findings (Table 3). However, educational concerns and financial problems were found to be non-significant stressors in both depression and anxiety. Furthermore, among coping styles, acceptance was indicated as a non-significant coping style for depression.

Discussion

The present survey revealed that the prevalence of depression and anxiety was 28% and 14%, respectively. This corroborates with previous studies in the Iranian population (Noorbala et al., 2004; Ahmadvand, Sepehrmanesh, Ghoreishi, & Afshinmajd, 2012) as well as surveys in the Middle East (Al-Gelban et al., 2009; Muhammad Gadit & Mugford, 2007; Ventevogel, 2005), and central Africa (Lasebikan, Ejidokun, Coker, 2012). However, it seems to be higher than the reported prevalence in the Far East (Chong, Vaingankar, Abdin, & Subramaniam, 2012; Chang et al., 2013; Radford, 2004) and European/American populations (Sansone & Sansone, 2010; Pietrzak et al., 2013; Baxter et al., 2013; Williams et al., 2007; Radford, 2004). This difference could be explained through diversities in culture, socioeconomic stressors, symptom presentation styles, as well as dissimilarities in methodologies and diagnostic practices (Lasebikan et al., 2012; Radford, 2004). According to our current findings, the prevalence of depression and anxiety is higher among women. This is compatible with previous studies in Iran and other countries (Noorbala et al., 2004; Farhoodian et al., 2007; Radford, 2004), and is explained by biological vulnerabilities, gender roles, and social inconveniences (Ferrari et al., 2013; Muhammad Gadit & Mugford, 2007; Noorbala et al., 2004; Radford, 2044) Moreover, consistent with earlier surveys, scholastic education plays a protective role against both depression and anxiety.

Table 1. Depression and demography, frequency, and intensity of stressors and coping strategies

Variable		Depression	No depression	P-value	OR (95% CI)
Demographic variable		**n (%)**	**n (%)**		
Age group	< 40 years	338 (28.9)	878 (30.4)	0.328	Ref
	≥ 40 years	832 (71.1)	2006 (69.6)		1.08 (0.934, 1.25)
Sex	Male	454 (33.9)	1590 (48.0)	< 0.001	Ref
	Female	884 (66.1)	1725 (52.0)		1.79(1.57, 2.04)
Educational level	Graduate	648 (49.9)	1950 (60.3)	< 0.001	Ref
	Undergraduate	650 (50.1)	1283 (39.7)		1.52 (1.33, 1.74)
Marital status	Married	1030 (78.8)	2656 (82.0)	0.012	Ref
	Unmarried	277 (21.2)	582 (18.0)		1.22 (1.04, 1.44)
Home life	No	563 (42.1)	2305 (69.5)	< 0.001	Ref
	Yes	775 (57.9)	1010 (30.5)		3.14 (2.75, 3.58)
Personal conflict	No	234 (17.5)	1632 (49.2)	< 0.001	Ref
	Yes	1104 (82.5)	1683 (50.8)		4.57 (3.91, 5.35)
Education concerns	No	657 (49.1)	1897 (57.2)	< 0.001	Ref
	Yes	681 (50.9)	1418 (42.8)		1.38 (1.22, 1.57)
Sexual life	No	898 (67.1)	2717 (82.0)	< 0.001	Ref
	Yes	440 (32.9)	598 (18.0)		2.22 (1.92, 2.57)
Social relation	No	144 (10.8)	994 (30.0)	< 0.001	Ref
	Yes	1194 (89.2)	2321 (70.0)		3.55 (2.94,4.28)
Occupational conflict	No	166 (12.4)	767 (23.1)	< 0.001	Ref
	Yes	1172 (87.6)	2548 (76.9)		2.12 (1.77, 2.54)
Occupational security	No	157 (11.7)	848 (25.6)	< 0.001	Ref
	Yes	1181 (88.3)	2467 (74.4)		2.58 (2.15, 3.10)
Loss and separation	No	670 (50.1)	2093 (63.1)	< 0.001	Ref
	Yes	668 (49.9)	1222 (36.9)		1.70 (1.50, 1.94)
Daily life	No	499 (37.3)	2008 (60.6)	< 0.001	Ref
	Yes	839 (62.7)	1307 (39.4)		2.58 (2.26, 2.94)
Health concerns	No	567 (42.4)	2300 (69.4)	< 0.001	Ref
	Yes	771 (57.6)	1015 (30.6)		3.08 (2.70, 3.51)
Financial problems	No	114 (8.5)	521 (15.7)	< 0.001	Ref
	Yes	1224 (91.5)	2794 (84.3)		2.00 (1.61, 2.47)
Intensity of stressors		**Mean (SD)**	**Mean (SD)**		
Home life		4.70 (3.59)	2.98 (2.64)	< 0.001	1.20 (1.16, 1.25)
Personal conflict		5.60 (3.78)	3.29 (2.53)	< 0.001	1.25 (1.22, 1.29)
Education concerns		4.50 (2.94)	3.33 (2.41)	< 0.001	1.17 (1.13, 1.21)
Sexual life		3.03 (1.64)	2.69 (1.68)	< 0.001	1.09 (1.00, 1.18)
Social relation		6.48 (3.45)	4.24 (2.79)	< 0.001	1.24 (1.21, 1.27)
Occupational conflict		5.79 (3.52)	4.07 (2.86)	< 0.001	1.17 (1.14, 1.20)
Occupational security		6.52 (3.67)	4.44 (3.00)	< 0.001	1.19 (1.16, 1.22)
Loss and separation		3.46 (2.19)	2.54 (1.68)	< 0.001	1.30 (1.23, 1.38)
Daily life		2.98 (1.59)	2.30 (1.30)	< 0.001	1.30 (1.22, 1.39)
Health concerns		2.56 (1.59)	1.89 (1.20)	< 0.001	1.41 (1.30, 1.53)
Financial problems		10.42 (5.52)	7.50 (4.90)	< 0.001	1.10 (1.09, 1.12)
Coping Strategies		**Mean (SD)**	**Mean (SD)**		
Problem engagement		8.90 (2.36)	9.95 (1.93)	< 0.001	0.80 (0.77, 0.82)
Support seeking		9.16 (3.36)	10.24 (2.97)	< 0.001	0.89 (0.87, 0.91)
Positive re-interpretation and growth		5.85 (1.66)	6.68 (1.35)	< 0.001	0.69 (0.66, 0.72)
Avoidance		3.62 (1.78)	3.32 (1.75)	< 0.001	1.10 (1.06, 1.14)
Acceptance		2.81 (1.05)	3.09 (0.95)	< 0.001	0.75 (0.70, 0.80)

OR: Odds ratio; SD: Standard deviation

Table 2. Anxiety and demography, frequency, and intensity of stressors and coping strategies

Variable		Anxiety	No anxiety	P-value	OR (95% CI)
Demographic variable		**n (%)**	**n (%)**		
Age group	< 40 years	140 (24.6)	1078 (30.9)	0.002	Ref
	≥ 40 years	429 (75.4)	2411 (69.1)		1.37 (1.12, 1.68)
Sex	Male	204 (31.2)	1841 (46.0)	< 0.001	Ref
	Female	450 (68.8)	2162 (54.0)		1.87 (1.57, 2.24)
Educational level	Graduate	288 (45.4)	2313 (59.3)	< 0.001	Ref
	Undergraduate	347 (54.6)	1587 (40.7)		1.76 (1.48,2.08)
Marital status	Married	521 (81.8)	3168 (81.0)	0.629	Ref
	Unmarried	116 (18.2)	744 (19.0)		0.94 (0.76, 1.17)
Home life	No	215 (32.9)	2658 (66.4)	< 0.001	Ref
	Yes	439 (67.1)	1345 (33.6)		4.03 (3.38, 4.81)
Personal conflict	No	90 (13.8)	1778 (44.4)	< 0.001	Ref
	Yes	564 (86.2)	2225 (55.6)		5.00 (3.97, 6.30)
Education concerns	No	296 (45.3)	2258 (56.4)	< 0.001	Ref
	Yes	358 (54.7)	1745 (43.6)		1.56 (1.32, 1.84)
Sexual life	No	387 (59.2)	3231 (80.7)	< 0.001	Ref
	Yes	267 (40.8)	772 (19.3)		2.88 (2.42, 3.43)
Social relation	No	37 (5.7)	1103 (27.6)	< 0.001	Ref
	Yes	617 (94.3)	2900 (72.4)		6.34 (4.51, 8.90)
Occupational conflict	No	62 (9.5)	872 (21.8)	< 0.001	Ref
	Yes	592 (90.5)	3131 (78.2)		2.65 (2.02, 3.49)
Occupational security	No	47 (7.2)	958 (23.9)	< 0.001	Ref
	Yes	607 (92.8)	3045 (76.1)		4.06 (2.99, 5.51)
Loss and separation	No	295 (45.1)	2468 (61.7)	< 0.001	Ref
	Yes	359 (54.9)	1535 (38.3)		1.95 (1.65, 2.31)
Daily life	No	187 (28.6)	2322 (58.0)	< 0.001	Ref
	Yes	467 (71.4)	1681 (42.0)		3.45 (2.87, 4.13)
Health concerns	No	214 (32.7)	2656 (66.4)	< 0.001	Ref
	Yes	440 (67.3)	1347 (33.6)		4.05 (3.40, 4.83)
Financial problems	No	47 (7.2)	588 (14.7)	< 0.001	Ref
	Yes	607 (92.8)	3415 (85.3)		2.22 (1.63, 3.03)
Intensity of stressors		**Mean (SD)**	**Mean (SD)**		
Home life		5.44 (3.92)	3.16 (2.71)	< 0.001	1.22 (1.18, 1.27)
Personal conflict		6.52 (4.10)	3.62 (2.75)	< 0.001	1.25 (1.21, 1.29)
Education concerns		4.79 (3.03)	3.50 (2.52)	< 0.001	1.17 (1.12, 1.22)
Sexual life		3.14 (1.60)	2.72 (1.68)	< 0.001	1.14 (1.04, 1.25)
Social relation		7.17 (3.57)	4.54 (2.93)	< 0.001	1.25 (1.22, 1.29)
Occupational conflict		6.72 (3.82)	4.21 (2.88)	< 0.001	1.24 (1.20, 1.27)
Occupational security		7.40 (3.82)	4.66 (3.09)	< 0.001	1.23 (1.20, 1.27)
Loss and separation		3.83 (2.41)	2.65 (1.72)	< 0.001	1.32 (1.24, 1.40)
Daily life		3.22 (1.66)	2.38 (1.34)	< 0.001	1.39 (1.29, 1.50)
Health concerns		2.77 (1.62)	1.98 (1.29)	< 0.001	1.47 (1.35, 1.59)
Financial problems		11.70 (5.56)	7.80 (5.00)	< 0.001	1.14 (1.12, 1.16)
Coping Strategies		**Mean (SD)**	**Mean (SD)**		
Problem engagement		8.75 (2.42)	9.79 (2.03)	< 0.001	0.81 (0.78, 0.84)
Support seeking		9.09 (3.33)	10.06 (3.07)	< 0.001	0.91 (0.88, 0.93)
Positive re-interpretation and growth		5.79 (1.72)	6.55 (1.42)	< 0.001	0.73 (0.70, 0.77)
Avoidance		3.64 (1.77)	3.37 (1.76)	< 0.001	1.09 (1.03, 1.14)
Acceptance		2.68 (1.12)	3.07 (0.96)	< 0.001	0.69 (0.64, 0.75)

OR: Odds ratio; SD: Standard deviation

Table 3. Multivariate Analysis of demographic variables, stressors, and coping strategies

Variables	Depression [OR (95% CI)]	Anxiety [OR (95% CI)]
Age group (≥ 40 years)	1.04 (0.89, 1.23)	0.77 (0.62, 0.95)
Sex (female)	2.12 (1.81, 2.48)	2.30 (1.86, 2.83)
Educational level (Undergraduate)	1.83 (1.57, 2.12)	2.09 (1.72, 2.52)
Marital status (Unmarried)	1.14 (0.95, 1.36)	0.84 (0.66, 1.07)
Frequency of stressors		
Home life	1.73 (1.47, 2.04)	2.01 (1.61, 2.49)
Personal conflict	2.67 (2.21, 3.24)	2.19 (1.66, 2.87)
Education concerns	0.83 (0.70, 1.09)	0.87 (0.70, 1.08)
Sexual life	1.42 (1.18, 1.70)	1.64 (1.31, 2.05)
Social relation	1.75 (1.37, 2.24)	2.77 (1.82, 4.21)
Occupational conflict	1.15 (0.905, 1.46)	1.11 (0.787, 1.57)
Occupational security	1.20 (0.940, 1.53)	1.77 (1.21, 2.60)
Loss and separation	1.21 (1.03, 1.42)	1.37 (1.12, 1.69)
Daily life	1.58 (1.34, 1.87)	1.87 (1.49, 2.33)
Health concerns	1.99 (1.69, 2.34)	2.10 (1.70, 2.60)
Financial problems	0.94 (0.72, 1.25)	0.67 (0.46, 1.08)
Intensity of stressors		
Home life	1.19 (1.15, 1.24)	1.22 (1.17, 1.26)
Personal conflict	1.25 (1.22, 1.29)	1.26 (1.22, 1.30)
Education concerns	1.16 (1.12, 1.21)	1.18 (1.13, 1.23)
Sexual life	1.11 (1.02, 1.21)	1.14 (1.03, 1.25)
Social relation	1.25 (1.22, 1.29)	1.28 (1.24, 1.32)
Occupational conflict	1.17 (1.14, 1.20)	1.23 (1.19, 1.26)
Occupational security	1.20 (1.17, 1.23)	1.24 (1.20, 1.27)
Loss and separation	1.28 (1.21, 1.37)	1.31 (1.22, 1.40)
Daily life	1.31 (1.22, 1.40)	1.42 (1.31, 1.53)
Health concerns	1.41 (1.29, 1.53)	1.47 (1.35, 1.60)
Financial problems	1.12 (1.10, 1.13)	1.16 (1.13, 1.18)
Coping strategies		
Problem engagement	0.89 (0.86, 0.93)	0.92 (0.87, 0.97)
Support seeking	0.95 (0.93, 0.98)	0.97 (0.93, 1.00)
Positive re-interpretation and growth	0.74 (0.69, 0.79)	0.83 (0.75, 0.89)
Avoidance	1.22 (1.16, 1.28)	1.19 (1.12, 1.27)
Acceptance	0.94 (0.86, 1.03)	0.82 (0.74, 0.92)

OR: Odds ratio

Low education may interfere with managing stressors as it limits adaptive coping strategies (Noorbala et al., 2004). Unlike many previous studies, age was found to increase the risk of anxiety, but not depression (Ferrari et al., 2013; Baxter et al., 2013; Noorbala et al., 2012; Ahmadvand et al., 2012) However, in a study conducted in China, the age group of above 65 years had the lowest risk for depression (Chong et al., 2012). In addition, in a study in South Korea, younger age was significantly associated with depression (Chang et al., 2013). Our findings are consistent with the results of earlier surveys, in that, generally all life events and stressors amplify the risk of depression and anxiety. Notably, the frequency of personal conflicts, social relation problems, and health concern increases the risk of both conditions; however, occupational security problems and daily life stress are

found to be associated with anxiety. These findings are to some degree in agreement with studies that focus on the role of workplace issues in intensification of anxiety (Jarczok et al., 2013). Furthermore, the severity of health concern increases the risk for both depression and anxiety, and the intensity of daily life stress can augment anxiety. In terms of coping strategies, our findings correspond to most previous studies. All coping strategies, except avoidance, function to protect against depression and anxiety. In fact, coping strategies can restrict or regulate the maladaptive influence of depression and anxiety (Radford, 2004; Keeler, Siegel, & Alvaro, 2014; Knowles, Cook, & Tribbick, 2013; Gourounti, Anagnostopoulos, & Lykeridou, 2013). Moreover, in individuals with less exposure to social relations and poor social training, coping strategies seem to be limited and the risk for depression and anxiety appears to be higher (Noorbala et al., 2004; Noorbala et al., 2012; Keeler et al., 2014).

We believe that the current findings provide a basis for developing policies and plans for mental health improvement and prevention strategies. Prevention should be targeted at those at risk. Social skills training, coping strategy improvement, academic education, and workplace stress reduction are among the measures that can be taken within the society.

Limitation: In this study, data were gathered only through self-administered questionnaires and not clinical interviews. The subjects were recruited from among university staff and not from a wider society where many are unemployed. The sample did not include children, adolescents, or the elderly.

Conflict of Interests

Authors have no conflict of interests.

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The Association of Psychological Comorbidity with the Number of Functional Gastrointestinal Disorders

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Quantitative Study

Abstract

Background: The overlap of functional gastrointestinal disorders (FGIDs) has been reported in literature. Hence, this study aimed to examine psychological comorbidity with the number of FGIDs.

Methods: A total of 4763 individuals in 20 cities across Isfahan Province, Iran, were selected through cluster random sampling. The Rome III questionnaire in its complete form was used to investigate gastrointestinal symptoms. The other data collection tools consisted of the Stressful Life Events (SLE) Questionnaire, and Hospital Anxiety and Depression Scale (HADS). To analyze the data, t-test, chi-square test, and logistic regression analyses were used.

Results: The results of logistic regression analysis showed that the number of functional gastrointestinal disorders was the risk factor for stress level, anxiety, and depression and increased the odds ratio (OR) of these disturbances.

Conclusion: Increase in the number of functional gastrointestinal disorders was associated with more psychological comorbidity. Therefore, overlap of functional gastrointestinal disorders functional gastrointestinal disorders to be carefully considered and physicians should pay more attention to psychological factors when FGIDs overlap.

Keywords: Functional gastrointestinal disorders (FGIDs), Psychological disturbances, Rome III

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Introduction

Functional gastrointestinal disorders (FGIDs) are common conditions (Jones, Crowell, Olden, & Creed, 2007), which are observed in patients with both upper and lower gastrointestinal tract symptoms (Dobrek & Thor, 2009). Population-based studies in western countries consistently report prevalence rates of 10-20 percent (Drossman et al., 1993). The epidemiological data show that the frequency of occurrence of FGIDs is similar in Western and Central European

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countries and in the USA with lower incidence in the Asiatic Region. The highest ages of clinical manifestation of FGIDs are 40-50 years (Dobrek & Thor, 2009).

These disorders are characterized by the occurrence of various dyspeptic, dysmotility, and pain symptoms (Dobrek & Thor, 2009). A new classification of FGIDs based on consensus in expert committees (Rome III Diagnostic Criteria for FGIDs) is available (Van Oudenhove, Vandenberghe, Demyttenaere, & Tack, 2010). FGIDs are classified into 6 major domains of esophageal, gastroduodenal, bowel, functional abdominal pain, biliary, and anorectal disorders for adults (Drossman et al., 2006). It is common for FGIDs to coexist, and the criteria permit the coexistence of more than one FGID (Drossman et al., 2006). The overlap of pairs of FGIDs has been widely reported in the literature (Choung et al., 2011; Park et al., 2011; Suzuki & Hibi, 2011). It has been estimated that more than one-third of the general population have one or more FGIDs (Koloski, Talley, & Boyce, 2002).

Although these digestive disorders comprise a major portion of the clinical practice of both gastroenterologists and primary-care physicians, they are often regarded as challenging and frustrating. Much of this difficulty stems from the fact that the pathophysiology of FGID is not completely understood (Jones et al., 2007). However, it is accepted that these common disorders result from a complex reciprocal interaction between biological, psychological, and social factors that can be predisposing, precipitating, and/or perpetuating (Van Oudenhove et al., 2010).

Concomitant psychological disorders, notably anxiety and depressive disorders, are strongly associated with FGIDs and these psychological comorbidities correlate with severity of FGID symptoms (Wu, 2012). Anxiety and depression are frequently present in patients with different types of FGIDs, and seem to play a major part in both the perception of symptoms and the outcome of treatment (Bouchoucha et al., 2013). The onset of the psychiatric illness often predates or coincides with the onset of bowel disorder (Walker et al., 1990). The investigation of the influence of stress has revealed that it is the factor aggravating the course of FGIDs (Dobrek & Thor, 2009). The interrelationship between digestive function and hypersensitivity with stress forms the basis of the biopsychosocial model. In this model, various stressors can transiently or permanently alter physiological stress responses (Jones et al., 2007).

Considering the correlations between psychological comorbidities and severity of FGID symptoms, it is hypothesized that these comorbidities can be likely correlated with the number of FGIDs diagnosed in a patient. Therefore, the present research studied whether the higher number of FGIDs was more associated with psychological comorbidities. Hence, the aim of the present study was to determine the association of psychological comorbidities with the number of FGIDs in a large group of community individuals with FGIDs.

Methods

Study design and participants

The current study was part of the "Study on the Epidemiology of Psychological, Alimentary Health and Nutrition" (SEPAHAN) (Adibi et al., 2012). In the SEPAHAN study, data were collected in two separate phases to increase accuracy as well as response rate. In the first phase, all participants were asked to complete a self-administered questionnaire on demographic and lifestyle factors including nutritional habits and dietary intakes. In the second phase, further information on GI functions and different aspects of psychological variables were collected using a number of other self-administered questionnaires (response rate: 86.16%). In the current analysis, we used data on 4,763 adults who had completed the questionnaires on demographic data, symptoms of FGIDs, life events, and psychological disturbances such

as depression and anxiety. The protocol of the study was approved by the Ethics Committee of Isfahan University of Medical Sciences (Isfahan, Iran) and was clarified for all the participants, and a written informed consent was obtained from all participants.

Measures

Demographic factors: In the current study, demographic information included age, sex, marital status consisting of married and unmarried (single, divorced, or widowed) and educational level consisting of graduate and undergraduate.

FGID Symptom Checklist: To assess the presence or absence of different symptoms of FGIDs including dyspepsia, irritable bowel syndrome (IBS), abdominal pain, functional constipation, and functional diarrhea, Rome III questionnaire was used. The diagnosis of FGIDs was based on this self-administered questionnaire (Attanasio, Andrasik, Blanchard, & Arena, 1984).

Stressful Life Events Questionnaire: The Stressful Life Events (SLE) questionnaire measures the frequency and the perceived intensity of different stressors of daily life. In addition, the values of stressors on individuals' health that determine risk of stress-related illness are assessed by this questionnaire. It is comprised of 46 items in 11 domains, including home life, financial problems, social relations, personal conflict, occupational conflict, educational concerns, occupational security, loss and separation, sexual life, daily life, and health concerns. In order to assess the effect of stressors and whether or not stress contributes to illness, participants were asked to determine whether they had experienced any of a series of 46 life events in the last year. Each stressful life event had a different "weight" for the participants who experienced them.

The more events the individuals had experienced, the higher the score they obtained. With increase in total score and the weight of each event, the likelihood of individuals becoming ill also increased. A cut-off point of 100 was considered as risk of stress-related illness (high stress) (Roohafza et al., 2011; Sali et al., 2013).

Hospital Anxiety and Depression Scale (HADS): The Hospital Anxiety and Depression Scale (HADS) consists of 14 items that can be divided into two scales; anxiety ($\alpha = 0.82$) and depression ($\alpha = 0.84$). Each scale consists of 7 items, with a total score ranging from 0 to 21. Higher scores reflect more anxiety and more depression. Threshold points for clinical levels of anxiety and depression were set at a score ≥ 11 (Snaith, 2003).

Statistical analysis

Data were analyzed using SPSS software (version 15.0, SPSS Inc., Chicago, IL, USA). All P-values < 0.05 were considered significant. Continuous variables were expressed as mean ± SD and differences between groups were analyzed using t-test. Qualitative variables were expressed as frequency and chi-squared test was used to compare frequencies between groups.

Binary logistic regression analyses were used to find the associations between the number of FGIDs and psychological disturbances (stress level, anxiety, and depression). The dependent variables were levels of stress (low/high), and presence of anxiety (yes/no) and depression (yes/no), and the independent variables were the number of FGIDs. Odds ratios (OR) were reported with the corresponding 95% confidence intervals.

Results

A total of 4763 respondents with mean ± SD age of 36.58 ± 8.09 years (men: 38.59 ± 8.61; women: 35.16 ± 7.38) were included in the study. The study population consisted of 2657 (55.8%) women, 3776 (79.3%) married individuals, and 2650 (55.6%) graduates. The scores of demographic and psychological characteristics (scores of stress, depression, and anxiety) according to the number of FGDIs are presented in table 1. The occurrence of 0-7 FGIDs was observed in 847 (17.5%), 1019 (21.4%), 1056 (22.2%), 844 (17.7%), 540 (11.3%), 306 (6.4%), 119 (2.5%), and 32 (0.7%) participants, respectively.

Table 1. Demographic and psychological characteristics according to the number of functional gastrointestinal disorders

Variables		Number of functional gastrointestinal disorders								P-value
		0	1	2	3	4	5	6	7	
Demographic characteristics										
Age (Mean ± SD)		36.98 ± 8.67	36.65 ± 8.23	36.09 ± 7.65	36.99 ± 8.04	36.12 ± 7.90	36.42 ± 7.87	35.84 ± 6.93	40.96 ± 11.05	0.020
Sex	Male	416 (49.1)	511 (50.1)	468 (44.3)	356 (42.2)	212 (39.3)	92 (30.1)	33 (27.7)	18 (56.3)	< 0.001
Number (%)	Female	431 (50.9)	508 (49.9)	588 (55.7)	488 (57.8)	328 (60.7)	214 (69.9)	86 (72.3)	14 (43.8)	
Educational level	Undergraduate	370 (44.9)	410 (41.5)	388 (37.7)	360 (43.8)	228 (42.8)	145 (49.0)	64 (56.6)	21 (70.0)	< 0.001
Number (%)	Graduate	454 (55.1)	579 (58.5)	642 (62.3)	461 (56.2)	305 (57.2)	151 (51.0)	49 (43.4)	9 (30.0)	
Marital Status	Married	652 (79.2)	792 (79.7)	839 (81.3)	681 (82.4)	448 (84.8)	239 (79.7)	99 (85.3)	26 (83.9)	0.139
Number (%)	Unmarried	171 (20.8)	202 (20.3)	193 (18.7)	145 (17.6)	80 (15.2)	61 (20.3)	17 (14.7)	5 (16.1)	
Psychological characteristics										
Depression score (Mean ± SD)		4.65 ± 2.90	5.24 ± 2.92	5.87 ± 2.96	6.62 ± 3.32	7.55 ± 3.39	8.71 ± 3.68	9.30 ± 3.60	9.46 ± 3.67	< 0.001
Anxiety score (Mean ± SD)		1.58 ± 2.42	2.36 ± 2.84	3.03 ± 3.06	4.27 ± 3.67	5.57 ± 4.05	7.00 ± 4.29	7.50 ± 4.61	8.00 ± 4.21	< 0.001
Stress score (Mean ± SD)		106.89 ± 81.32	140.05 ± 84.81	156.51 ± 82.03	180.50 ± 91.41	197.29 ± 95.91	221.35 ± 101.11	231.60 ± 99.09	266.59 ± 111.61	< 0.001

Psychological variables scores according to the number of FGIDs are shown in figures 1-3. As is seen, with increase in the number of FGIDs, the scores of these variables also increase.

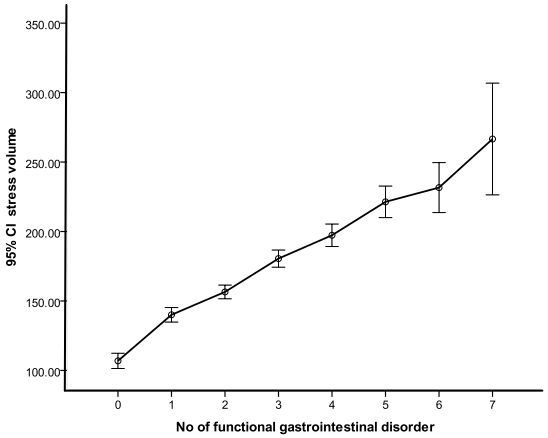

Figure 1. Stress score according to the number of functional gastrointestinal disorders

As shown in figure 2, for comparison of the number of FGIDs according to psychological status, the percentage of stress, anxiety, and depression levels are recorded in two categories. About 3338 (70.1%) respondents had high level of stress. Moreover, about 1338 (28.1%) and 654 (13.7%) of the individuals had depression and anxiety symptoms, respectively. These percentages increased with increase in the number of FGIDs, as individuals with 7 FGIDs had higher stress (at risk of disease), depression, and especially anxiety.

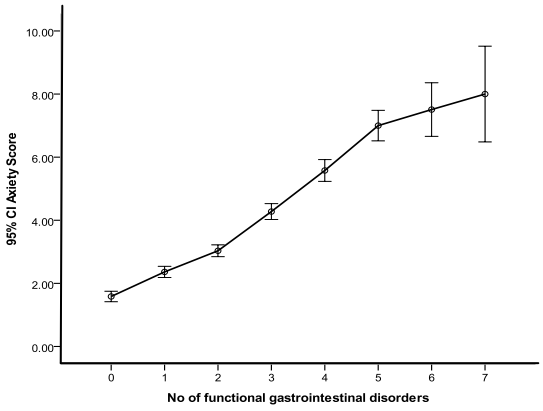

Figure 2. Anxiety score according to the number of functional gastrointestinal disorders

Furthermore, the frequency of psychological variables according to the number of FGIDs is depicted in figure 4. The frequency of these variables increased with increase in the number of FGIDs. Individuals with higher number of FGIDs had higher stress, depression, and especially anxiety.

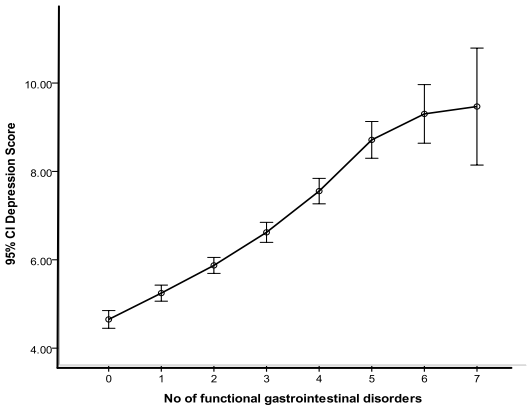

Figure 3. Depression score according to the number of functional gastrointestinal disorders

To examine the associations between number of FGIDs and psychological status, binary logistic regression analyses were conducted. The results are provided in table 2. The overlap of FGIDs was the risk factor for stress level, anxiety, and depression. However, the overlap of FGIDs was more important in the occurrence of anxiety.

Discussion

In accordance with the main aim of the study, the results showed that higher number of FGIDs was associated with increased stress, depression, and anxiety levels. In other words, increased number of FGIDs increases the OR to psychological disturbances. This is consistent with findings of a limited number of previous studies, most of which have studied the information on relationships between the assessed variables (Bouchoucha et al., 2013; Bennett et al., 1998; Park et al., 2013; Lee et al., 2010).

In fact, our results support the association of the overlap of FGIDs with high levels of psychological comorbidity. Bennett et al. reported significant relationships between the number of FGIDs and severity of emotional distress (state anxiety, depression, anger, and goal frustration).

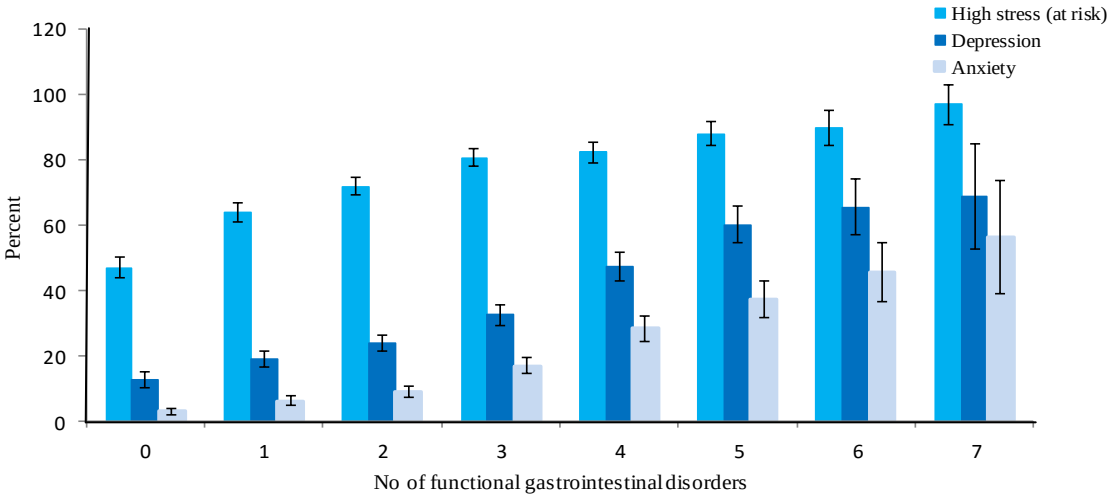

Figure 4. Frequency of psychological variables according to the number of functional gastrointestinal disorders

Psychosocial disturbance was strongly related to the overall severity and extent of functional gut disturbance (the number of coexistent FGID subgroups). The study by Bouchoucha et al. (2013) showed that levels of depression and state and trait anxiety are higher in patients with several sites of complaint. In addition, Park et al. (2013) found that the load of symptoms consistent with FGID in each patient (i.e., the number of FGID symptom clusters per patient) correlated with psychological comorbidity (higher rates of depression and anxiety). As previously mentioned, functional dyspepsia (FD) and IBS are the most common FGIDs and most studies are conducted on them. For example, Lee et al. (2010) reported that depressive mood was significantly related to FD and FD-IBS overlap, but not to IBS alone. Patients with FD-IBS overlap had a lower quality of life (QOL) than patients with FD alone or IBS alone (Wang et al., 2008). Overlaps between FD and IBS significantly worsen health-related QOL (HRQOL) in most domains (Kaji et al., 2010).

Our results were inconsistent with the findings of Mikocka-Walus, Turnbull, Andrews, Moulding, and Holtmann (2008). In their study, participants with no FGID had a significantly better physical QOL than those with more than two FGIDs. However, there was no relationship between the number of FGIDs, mental QOL, anxiety, or depression (Mikocka-Walus, Turnbull, Andrews, Moulding, & Holtmann, 2008). This is probably due to the fact that their study was performed in IBD patients. In contrast to IBS, psychological disorders in IBD patients are more a reaction to the disease itself than a cause for it and associate with poorer QOL(Mikocka-Walus et al., 2008). Furthermore, the lack of association may be because of their study's smaller sample size (n = 61).

Table 2. Crude and adjusted odds ratios of number of functional gastrointestinal disorders and psychological variables (adjusted based on age and sex)

Number of functional gastrointestinal disorders	Stress level	Anxiety	Depression
	Reference	Reference	Reference
1	1.54 (1.13, 2.11)	1.90 (1.15, 3.15)	1.55 (1.17, 2.05)
2	1.96 (1.45, 2.65)	2.67 (1.66, 4.31)	2.05 (1.56, 2.69)
3	3.53 (2.63, 4.76)	5.81 (3.67, 9.20)	3.04 (2.32, 3.99)
4	5.08 (3.72, 6.94)	10.91 (6.87, 17.31)	5.76 (4.33, 7.66)
5	7.67 (5.42, 10.87)	15.81 (9.72, 25.72)	8.99 (6.45, 12.52)
6	10.47 (6.52, 16.82)	22.49 (12.58, 40.20)	11.64 (7.21, 18.78)
7	19.03 (7.82, 46.30)	37.48 (15.04, 93.40)	13.21 (5.44, 32.07)

One reason for this finding may be that development in a number of FGIDs can be in the sense of involving more parts of the GI tract, and consequently, growth of numbers of FGIDs and intensification of severity of symptoms. Another reason may be that the brain-gut axis is conceptualized as the bidirectional connection system between the GI tract and the brain (Van Oudenhove et al., 2010). As the brain affects the gut, similarly, activity in the gut can affect mood and behavior in the brain (Dalton, 2016). Thus, it follows that a rise in the number of FGIDs can influence the emotional system more and cause more severe psychological comorbidities. In this regard, investigators have showed that among individuals who did not have high levels of anxiety and depression at baseline, those with a FGID at baseline had significantly higher levels of anxiety and depression at follow-up (Koloski et al., 2012). Moreover, Suzuki and Hibi (2011) indicated that overlap of FGIDs is associated with more severe symptoms than any FGIDs alone. Furthermore, psychiatric comorbidity is strongly correlated with the severity of digestive symptoms and degree of impairment (Haug, Mykletun, & Dahl, 2002; Van Oudenhove et al., 2008).

The strength of this study was utilizing a large sample to reliably assess the effect of the number of FGIDs on psychological disturbances. The limitations of this study were reliance on self-report data which may be biased regarding the occurrence of symptoms, and also existence a problem regarding whether GI symptoms were functional or organic; nevertheless, using a validated questionnaire for the Rome III criteria. In addition, FGIDs were not separated.

In summary, overlap of FGIDs occurs in the general population and there are relationships between the overlap of FGIDs and psychological disturbances, namely increase in the number of disorders was associated with more psychological comorbidity. Overlap of FGIDs strengthens the importance of a complete assessment of other FGIDs when a patient is diagnosed with a functional disorder. Thus, it needs to be carefully considered and physicians should pay more attention to psychological factors when FGIDs overlap.

Conflict of Interests

Authors have no conflict of interests.

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The Effect of a Bioenergy Economy Program on Pain Control, Depression, and Anxiety in Patients with Migraine Headache

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Quantitative Study

Abstract

Background: Psychological problems such as depression and anxiety are very common in patients with chronic headaches and give rise to the repetition and continuity of the headaches. This study aimed to assess the effect of a bioenergy economy program and particularly the biofield attunement on the improvement of the pain control, depression, and anxiety in patients suffering from migraine, a common psychosomatic disorder.

Methods: To collect data, a quasi-experimental method was adopted including pretest, posttest, and follow-up phase. Thirty patients with migraine were selected based on convenience sampling method and put into two experimental and control groups. Data collection tools included Beck Depression Inventory-II (BDI-II), Beck Anxiety Inventory, and Headache Impact Test (HIT-6^{TM}). The data were analyzed using repeated-measures analysis of variance (ANOVA) and covariance (ANCOVA) tests. Both experimental and control groups participated in the entire program to assess the effect of bioenergy economy program on mentioned variables. To assess the effect of biofield attunement, a non-expert person performed the attunement of participants in the control group while an expert bioenergy healer and channel performed attunement procedures for the participants in the experimental group.

Results: The mean scores of pain, anxiety, and depression of 30 participants in pretest differed significantly with those in posttest and follow-up phases; but such a difference was not observed between the scores of posttest and follow-up in control group. Moreover, the participants' mean scores in posttest and follow-up phases differed significantly between the two groups.

Conclusion: Bioenergy economy program caused a significant decrease in anxiety, depression, and intensity and frequency of pain in patients with migraine. The decrease on mentioned variables were consistent in a two-month interval. These therapeutic effects were even more in experimental group who had received real biofield attunement. As bioenergy economy program and biofield attunement is a non-pharmaceutical and harmless care system, it is recommended as an effective method for the reduction of depression, anxiety, and pain in patients with migraine.

Keywords: Migraine, Headache, Bioenergy economy, Biofield, Attunement, Pain, Depression, Anxiety

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Introduction

Migraine, usually unilateral and often pulsating in nature, is the most prevalent headache globally (Aminoff, Greenberg, & Simon, 2009). Among 20 incapacitating conditions, migraine is one of the most disabling ones. Its occurrence in the world is more than 10 percent of the population and 1.7 to 4 percent of adult population suffer from migraine more than 15 days in a month (World Health Organization, 2011). International Headache Society (IHS) classifies migraine into two types, migraine with aura (classic migraine) and migraine without aura. Aura is a reversible neurological disorder which may occur with numbness and tingling of the scalp or a change in senses of sight, smell, hearing, or transient aphasia (Ducros, 2006). The pain usually lasts 4 to 72 hours in adults. The frequency of attacks varies from a few in a lifetime to several times a week, with an average frequency of once a month. The pain is frequently accompanied by nausea, vomiting, sonophobia, photophobia, and lethargy. More than half of sufferers show the symptoms which affect their mood, appetite, or cognition (Bradley, Daroff, Fenichel, & Jankovic, 2008).

Migraine is a neurovascular disorder known to be caused by depression of cortical spreading, neurogenic inflammation, dysfunction of cranial vascular contractile and decreased inhibition of central pain transmission. In migraine, abnormalities are observed in inflammatory markers, such as C-reactive protein (CRP), levels of patients' blood circulation (Yilmaz-Avci, Lakadamyali, Arikan, Benli, & Kilinc, 2015). Although no significant association between the CRP level and migraine is reported in some studies (Fava et al., 2013; Gudmundsson et al., 2009; Guldiken et al., 2008), many studies report the correlation between the elevation of CRP level and an increased risk for psychological distress, depression, anxiety, acute and chronic stress in the general population (Lippi, Mattiuzzi, & Cervellin, 2014; Wium-Andersen, Orsted, Nielsen, & Nordestgaard, 2013; Nijm, Kristenson, Olsson, & Jonasson, 2007; Coussons-Read, Okun, & Nettles, 2007; Ranjit et al., 2007; Hamer, Gibson, Vuononvirta, Williams, & Steptoe, 2006; Miller, Rohleder, Stetler, & Kirschbaum, 2005). As a result, elevation of CRP level may cause migraine headaches.

Studies indicate unfavorable effects of migraine on patients' quality of life and developing negative mood states. Continuous negative mood states lead to chronic headaches which cause mood and anxiety disorders as comorbidity disorders (Holroyd, 2002).

A recent research, using biopsychosocial framework and development of latest views on factors causing headaches, considers the role of psychological factors in occurrence and outcomes of headache (Nicholson, Houle, Rhudy, & Norton, 2007). Anxiety can be a risk factor which triggers headache attacks in an individual who has prior (genetic or learned) vulnerability (Breslau, Chilcoat, & Andreski, 1996). Certain personality traits can make the individual prone to headache. Besides, stressful emotional experiences work as a factor to increase attacks. Onset of migraine headaches is often related to frustration, psychological tensions, depression, suppressed anger, and other emotional factors. Besides, psychological traits show a pattern of excess self/other blaming/criticism in migraine sufferers (Nicholson et al., 2007; Drummond, & Passchier, 2006; Olesen, & Goadsby, 2006; Spierings, Ranke, & Honkoop, 2001; Rasmussen, 1993; Levor, Cohen, Naliboff, McArthur, & Heuser, 1986; Popper, & Eccles, 1977).

The most common correlation between emotion and pain is the correlation between depression and pain (Tshccannen, Duchro, & Wilson, 2000). The researches indicate that people who suffer from pain are likely to have depression which is a major predictor of headache and disability (Materazzo, Cathcart, & Pritchart, 2000; Marcus, 2000; Duckro, Chibnall, & Tomazic, 1995).

Moreover, migraine sufferers' perceptions of life requirements as threats and fear of pain can increase stress response which leads to troublesome behaviors (like poor sleep patterns, excess use of caffeine and medication, and evading from social behaviors reinforcement) (Nicholson et al., 2007; Biga, & Lipton, 2006). Anxiety and fear of pain may cause sufferers' use of pain killers prior to headache attacks. As such, using medication to prevent pain is reinforced and the cycle of recurrent use of pain killers is shaped. This cycle misses one's chance to learn pain prevention strategies or regulation of headache triggering factors which consequently causes an increase in headache disorder, attack aggravation, and perceived disability to control headache and its related factors which in turn leads to unfavorable outcomes in one's performance and quality of life. Therefore, an increase in stress experience hinders the use of psychological and social resources (Nash, & Thebarge, 2006). Studies on pain control indicate that chronic pain is caused by pain and stress interpretation which correlates with poor coping and performance (Holroyd, & Lipchik, 1999; Martin, 1985). The perception that factors related to headaches are out of individual's control (external locus of control) and perceived disability to control these factors (low self-efficacy) explain this correlation. High anxiety and fear related to pain is correlated with one's inability to control headaches (Nash, & Thebarge, 2006). On the other hand, based on the gate control theory (GCT) of pain, interaction between peripheral stimuli and cortical variables such as mood and anxiety has an effect on enhancing or moderating the pain perception (Drummond, & Passchier, 2006). In some longitudinal studies, the association between mood disorders and migraine is reported to be bidirectional (Olesen, & Goadsby, 2006; Rasmussen, 1993). All sorts of emotional states, like being anxious, worried, and depressed, can make the gates of pain more open. Having a lot of tension in body is a common way of opening the pain gates (Melzack, & Katz, 2013; Melzack, & Wall, 1965). Repeated migraines, like chronic repeated stress, may lead to allostatic dysfunction and consequently structural and functional damages are manifested (Borsook, Maleki, & Becerra, 2012; McEwen, & Seeman, 1999). The mentioned negative changes may influence pain processing, increase central sensitivity, and affect the pain experience in patients with migraine (Radat, 2013; Borsook et al., 2012). Functional MRI (fMRI) findings show that in response to painful heat stimuli, the perigenual cortex of the patients with migraine become more activated than that of patients without migraine. Perigenual cortex is the brain area responsible for allostatic dysfunction in rats (Tessitore, Russo, & Esposito, 2011). Besides, the overuse of analgesic and headache symptomatic medications might affect allostasis too (Minen et al., 2015).

Control methods of common headaches are divided into two major classifications. Medication treatments applied with the aim of affecting the pathology of the migraine including antidepressant, beta blockers, and pain relievers (Aminoff et al., 2009). The second classification is non-drug alternative and/or complementary treatments which conceptualizes headache as a psychosomatic disorder. Such treatments focus on physiologic responses related to headache (relaxation training, biofeedback …), behaviors, emotions, and cognition (cognitive-behavioral therapy including stress management, mindfulness, acceptance and commitment therapy …) (Brown, Newman, Noad, & Weatherby, 2012; Nicholson, Buse, Andrasik, & Lipton, 2011). Cognitive-behavioral therapies focus on creating effective confronting and coping responses, hinder negative emotions to reinforce patients' self-efficacy, and decrease their disability through changing inefficient interpretation, modifying thought patterns and inefficient cognition. Such treatments are suggested in accompany with biological

treatments for headache management. Besides, combinations of psychophysical treatments, complementary and alternative medicine which are known as body-mind approaches (like hypnosis, meditation, reiki, yoga, and energy-based approaches) are applied (Clark, & Beck, 2010; Penzien et al., 2005). Most of energy-based treatments as complementary treatments are included in energy medicine and/or mind-body interventions (Goli, 2010).

"Bioenergy economy" is an integrative health program. Many evidences show effectiveness of the therapeutic elements of bioenergy economy such as relaxation (Murphy, & Donovan, 1997; Benson, 1976), body awareness (Geggus, 2004; Stein, 2000; Baginski, & Sharamon, 1997; Wilber, 1977), bioenergy/body psychotherapy (Levin, & Mead, 2008; Staunton, 2002; Hurwitz, 2001; Oschman, 2000; Watson, 1999; Lubeck, 1991; Reich, 1974), and bioenergy healing (Lee, Pittler, & Ernst, 2008; Herron-Marx, Price-Knol, Burden, & Hicks, 2008; Hodge, 2007; Vitale, & O'Connor, 2006; Bell, Lewis, Brooks, Lewis, & Schwartz, 2003; Tiller, 2002; Gallo, 2002; O'Mathuna, 2000; Winstead-Fry, & Kijek, 1999). But there were not any evidence-based study on the clinical effectiveness of the whole package.

Research findings suggest that bioenergetic approaches have positive results in treating psychological and physical problems such as addiction, post-traumatic stress disorders, allergies, stress, anxiety and pain, and cardiac dysrhythmia. The findings also reported improved mood, increased speed of healing, increased feeling of being healthy, and improved quality of life (Marcus, Blazek-O'Neill, & Kopar, 2013; Crawford, Leaver, & Mahoney, 2006; Wardell, & Engebretson, 2006; Zafarnia, Abbaszadeh, Borhani, Miri, & Soleimanian, 2006; Zolfaghari, & Hazrati, 2001; Weymouth, & Sandberg-Lewis, 2000; Astin, 2000).

The main goals of bioenergy economy intervention are to increase the coherence of energy-information flow and self-organization of body via development of body awareness, increasing mind-body coordination, and modification of lifestyle. The aim of current study is to assess the effect of bioenergy economy program and particularly the biofield attunement on depression, anxiety, pain intensity and pain frequency of patients with migraine.

Methods

Research design: As for research method, a quasiexperimental design including pre-test, post-test, and follow-up stage was adopted.

Participants: Statistical population of the current research was all the people with migraine headaches who referred to the psychosomatic clinic and offices of neurologists in Isfahan city, Iran, in the year 2013. To select participants involved in the study, convenience sampling was used; that was, patients suspected to have migraine were interviewed, examined and assessed clinically in accordance with diagnostic criteria of the IHS by a neurologist or a psychiatrist and those who were diagnosed to have migraine, were included in the study. The participants were randomly divided into two groups. All names were written on a list and numbered. Even numbers and odd numbers were assigned in control and experimental groups, respectively. Study method was single blind; that was, although all the participants in control group and experiment group participated in the entire program and used sedatives as medication but the participants were unaware that the members of the latter group was under sham attunement of a non-expert person while control group members received their attunements from a channeled bioenergy healer.

Participant's inclusion criteria: All participants had to be at least 15 and at most 65 years old. They had to have headaches in the past 6 months for which they had consulted to a specialist, had gone under medication, and had at least experienced two migraine attacks in the past month. Moreover, the absence of psychotic disorders and brain

disorders (such as brain tumors) had to be diagnosed by the psychiatrist and neurologist.

Exclusion criteria: The continuous absence of participants in weekly training meetings and practicing other confusion assessment method (CAM) during study conduct weeks were conditions under which participants were excluded from the study.

Procedures of bioenergy economy: The experimental group received bioenergy economy with real "biofield attunement" while the control group received bioenergy intervention with sham "energy attunement". Therapeutic and training principles of bio-energy economy intervention were in the framework of "bioenergy economy" package based on operational and educational protocols of the Energy Medicine University, California, United States (Energy Medicine University, 2012) established by Goli (Goli, 2010). During 10 clinical training sessions of 90 minutes, one training session per week, this project focused on training conscious release of tension in muscular, cognitive, and energy levels and teaching conscious guide of will, body awareness, and stress-release relaxation techniques. Participants were supposed to perform exercises they were taught in weekly sessions daily. Meetings sessions were as follows:

First session: Familiarity with the entire program and group members; pre-test; the role of stress in health; muscular economy, body-emotion-thought cycle; practicing progressive relaxation training (PRT) technique; participants' feedbacks; presenting the homework.

Second session: Familiarity with bioenergy economy program; cathexis and satisfaction development; release only (RO) technique; happiness that I created (team work); draw attention to happiness and values in life; participants' feedbacks; presenting the homework.

Third session: Week experiences review; sustainable happiness (team work); sustainable happiness rehearsal; cue controlled relaxation; participants' feedback; presenting the week program.

Forth session: Week experiences review; sustaining happiness and processing levels of cathexis; impulsive, reactive, active levels of energy processing; energy investment forms and their results (team work); conditioning key technique; participants' feedbacks; presenting the week program.

Fifth session: Week experiences review; body awareness and happiness obstacles in body; free flow of energy in body; vibrational exercises and grounding; participants' feedbacks; presenting the week program.

Sixth session: Week experiences review; emphasis on "awareness" of bioenergy flow in body; happiness is reinforced by gratitude; gratitude reframing; "obstacles in gratitude toward self/other/universe" (team work); familiarity with attunement and the role of energetic system in mind-body coordination, biofield attunement vibrational exercises, grounding and hands-on energy emission techniques.

Seventh, eighth, ninth session: week experiences review, exercise correction (team work), answering to questions, practicing the current exercises.

Tenth session: Review of the experiences during past three months, team work, answering to questions, encouraging to follow the exercises, first post-test.

Instruments:

A) Beck Depression Inventory-II (BDI-II). The questionnaire consists of 21 items. Each item received a score from zero to three. Studies indicated the reliability and validity of this questionnaire for diagnosing depression (Marnie, 2005). In Iran, in a study to evaluate the reliability and validity of BDI-II, the results indicated Cronbach's alpha of 0.78 and the reliability in test-retest with an interval of two weeks was 0.73 (Gharraee, 2003). In this study, Cronbach's alpha level obtained from BDI-II was equal to 0.88.

B) Beck Anxiety Inventory (BAI). The questionnaire is designed to measure anxiety levels and consists of 21 items. Each item on a scale of four-point Likert questionnaire (not

at all, mild, moderate, and severe) should be marked based on the severity of symptoms one has experienced in the past week. Five types of content, concurrent, construct, diagnostic, and agent validity for this test is measured that all indicated the effectiveness of this instrument in measuring the intensity of anxiety (Beck, Epstein, Brown, & Steer, 1988). Persian version of this questionnaire is suitable for clinical evaluation and research in the Iranian population as it had validity of 0.72 and reliability of 0.83 and internal consistency of 0.92 in study conducted by Kaviani and Mousavi (2008). In this study, the Cronbach's alpha was equal to 0.79 For BAI.

c) The Headache Impact Test (HIT-6TM). This test was used to collect data concerning the intensity and frequency of pain suffered by participants, as well as their social behavior. Scoring and its interpretation are based on an English version of The Standard Criterion for Quality published by the Glasgow/Smith/Cline Group (2001) which is made up of six questions designed to measure the intensity of migraine and the extent to which it has impact on patients' temperament, mentality, and daily activities.

The questionnaire is based on six axes: (1) pain frequency, (2) social behavior, (3) individual behavior, (4) fatigue and vital energy, (5) cognitive behavior, (6) psychological behavior, all of them were examined in the current study as subscales. Total score of the test ranges from 36 to 78, a situation in which higher scores indicate the greater impact on headaches. These scores can be interpreted in terms of four distinct factors: (1) intensity of headaches, (2) frequency of the occurrence of headaches, (3) levels of headache-induced inability, and (4) quality of the patient's life and his social behavior. Besides, this questionnaire has a permanence score of 0.80, an internal score of 0.89, a validity score of 0.82, and an alpha quotient of 0.95 (Kosinski et al., 2003). Headache Impact Test has been standardized in Iran (Ghorbani, & Chitsaz, 2011), as a result of which, its permanence and validity scores (0.83 and 0.80, respectively) have been determined by means of a testing-retesting procedure. In addition, the Cronbach's alpha used in this research to test the impact of headache has been 0.73.

Research method: Having explained the purpose of the study to participants, their written consent was obtained to meet research ethical requirements, it was announced that whenever they tended not to continue attending the meetings, they can opt out. Then participants were divided randomly into two experimental and control groups. Having taken pre-test from both groups, bioenergy economy training program were taught to them in ten ninety-minute sessions by a bioenergy economy trainer and channel. Participants practiced weekly taught exercises. Besides, a printed summary and voice recordings of taught exercises on CD were given to participants at the end of each session. Two days after each session, researchers called each participant to get their feedback and see if they had any problem in execution of exercises. In the sixth training session, as part of the bioenergy economy program, energy "attunement" was executed for the participants of the experimental group by a bioenergy channel, while those in control group just received sham energy "attunement" by a non-expert in a single blind manner; that was, participants in the control group were unaware who attuned them.

At the end of the tenth session, post-test was taken from both groups and two months after outset of intervention and the post-test, both groups were evaluated in terms of follow-up phase to examine the effect of the time interval on the effects caused by the program. Due to ethical principles of beneficence, process of real biofield attunement was done for the participants in control group. Research lasted four months and a half from. Data were analyzed using software SPSS (version 20, SPSS Inc., Chicago, Il, United States). There was a within groups variable (pre-test, post-test,

Table 1. Results of repeated-measures ANOVA with repeated measure to examine bioenergy-based therapy intervention on psychological symptoms of depression and anxiety

Variable	Source of changes	Sum of squares	Degree of freedom	The mean of squares	F	Level of significance	The eta quotient (extent of impact)
Depression	Total	3178.689	2	1589.344	60.514	< 0.001	0.676
	Error	1523.311	58	26.264			
Cognitive depression	Total	104.289	2	52.144	10.439	< 0.001	0.265
	Error	289.711	58	4.995			
Physical depression	Total	1796.289	2	898.144	57.305	< 0.001	0.664
	Error	909.044	58	15.673			
Anxiety	Total	2986.822	2	1493.411	52.353	< 0.001	0.644
	Error	1654.511	58	28.526			

follow-up) and a between groups variable (control and experimental groups). Therefore, variance with repeated-measures (ANOVA) and covariant (ANCOVA) were used to find both intragroup and intergroup significant differences, respectively.

Results

First of all, all participants were measured in three phases of pre-test, post-test, and follow-up and were compared using repeated-measures ANOVA to detect the significant difference caused by the bioenergy economy training intervention in general (with sham and real biofield attunement). The results of the analysis are given in tables 1 and 2.

The results of repeated-measures ANOVA with repeated measure given in table 1, indicate that there exists a significant difference between the mean scores of depression, cognitive depression, physical depression, and anxiety in pre-test and post-test ($P < 0.05$); that is, these variables mean score decreased significantly in the post-test compared to pre-test. Besides, these variables mean scores had decreased significantly in follow-up phase compared to pre-test but the post-test and follow-up phase results were not significantly different ($P < 0.05$).

The results of ANOVA with repeated measure given in table 2 show that there exists a significant difference between the mean scores of migraine components in pre-test, post-test, and follow-up phase ($P < 0.05$). These variables decreased significantly in post-test and follow-up phase compared to pre-test but they did not differed significantly in post-test and follow-up stage (Figures 1, 2, and 3).

Table 2. The results of repeated-measures ANOVA with repeated measure to examine bioenergy-based therapy intervention on migraine

Variable	Source of changes	Sum of squares	Degree of freedom	The mean of squares	F	Level of significance	The eta quotient (extent of impact)
Migraine	Total	3226.956	2	1613.478	44.330	< 0.001	0.605
	Error	2111.044	58	36.397			
Pain frequency	Total	90.822	2	45.411	41.254	< 0.001	0.587
	Error	63.844	58	1.101			
Social performance	Total	64.089	2	32.044	19.791	< 0.001	0.406
	Error	93.911	58	1.619			
Individual performance	Total	107.489	2	53.744	20.896	< 0.001	0.419
	Error	149.178	58	2.572			
Vitality	Total	57.867	2	28.933	17.218	< 0.001	0.373
	Error	97.467	58	1.680			
Cognitive performance	Total	127.489	2	63.744	31.022	< 0.001	0.517
	Error	119.178	58	2.055			
Psychological distress	Total	105.622	2	52.811	26.471	< 0.001	0.477
	Error	115.711	58	1.995			

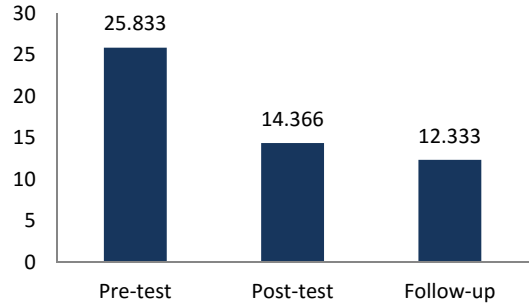

Figure 1. A comparison of depression scores during pre-, post-, and follow-up tests

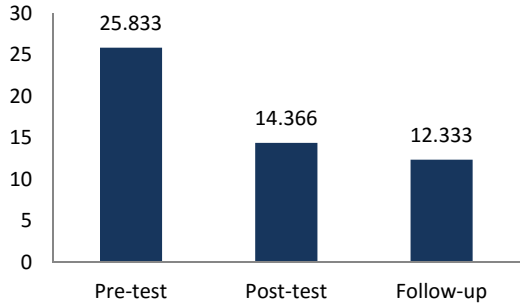

Figure 2. A comparison of anxiety scores during pre-, post-, follow-up tests

As to examine the effectiveness of biofield attunement on mentioned variables, the analysis with covariance was conducted (Table 3). To examine the equality of variances, Levine test was used and, to test normal distribution of data as a prerequisite analysis of covariance, Kolmogorov-Smirnov test was used.

Regarding depression, physical depression, cognitive depression, and anxiety variables, the results given in table 3 reveal that, the level of significance for the experimental groups was less than 0.05. It follows that biofield attunement has had a significant impact on reduction of

Table 3. Results of covariance analysis designed to investigate impacts of biofield attunement on the psychological symptoms of depression and anxiety

Variable	Source of changes	Sum of squares	Degree of freedom	The mean of squares	F	Level of significance	The eta quotient (extent of impact)
	Pretest group	0.211	1	0.211	0.007	0.934	0.000
Depression	Posttest group	449.817	1	449.817	14.970	0.001	0.365
	Experimental group	189.065	1	189.065	6.292	0.019	0.195
	Error	781.238	26	30.048			
	Total	2504.667	29				
Cognitive depression	Pretest group	5.261	1	5.261	1.012	0.324	0.037
	Posttest group	62.225	1	62.225	11.973	0.002	0.315
	Experimental groups	26.042	1	26.042	5.011	0.034	0.162
	Error	135.122	26	5.197			
	Total	397.200	29				
Physical depression	Pretest group	12.893	1	12.893	.609	0.442	0.023
	Posttest group	74.357	1	74.357	3.513	0.072	0.119
	Experimental group	183.735	1	183.735	8.681	0.007	0.250
	Error	550.318	26	21.166			
	Total	1258.967	29				
Anxiety	Pretest group	100.249	1	100.249	3.927	0.058	0.131
	Posttest group	890.144	1	890.144	34.873	< 0.001	0.573
	Experimental group	251.044	1	251.044	9.835	0.004	0.274
	Error	663.665	26	25.526			
	Total	3435.867	29				

depression, cognitive depression, physical depression, and anxiety in migraine patients (Figures 4, 5, and 6).

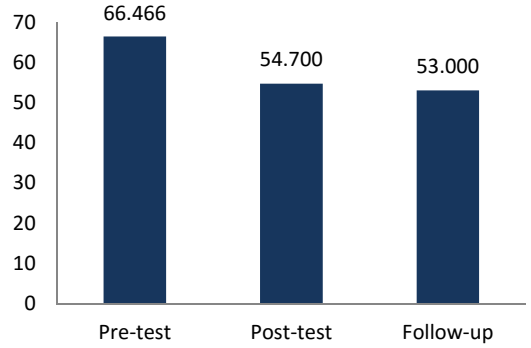

Figure 3. A comparison of migraine during pre-, post-, follow-up tests

The extent of impact of bioenergy economy on anxiety (27.4%), depression (19.5%), Cognitive depression (16.2%), and physical depression (25.0%) can be seen.

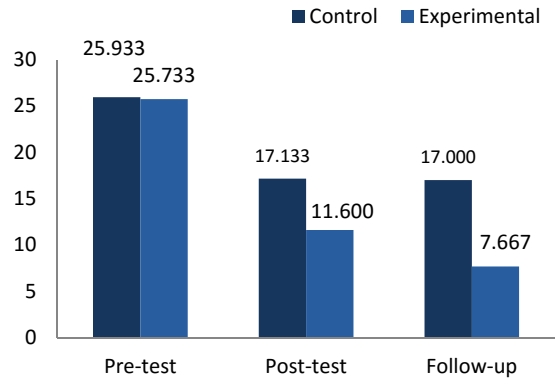

Figure 4. A comparison of depression scores obtained by the control and experimental groups during pre-, post-, and follow-up tests.

The results shown in the table 4 reveal that, with reference to migraine, pain frequency, individual and the social behavior, vitality of the subjects, cognitive performance, and psychological distress as variables, the level of significance associated with the experimental groups is less than 0.05. Therefore, a therapy based on bio-energy economy has had a significant impact on the variables in question.

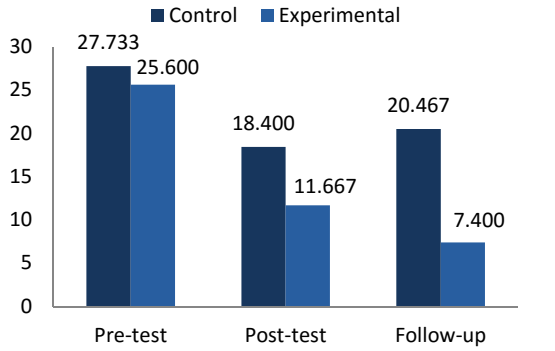

Figure 5. A comparison of anxiety scores obtained by the control and experimental groups during pre-, post-, follow-up tests

Discussion

In line with the reported findings, the aim of this study was to investigate the effectiveness of bio-energy economy program in general and biofield attunement in particular on improving depression and reduction of anxiety, pain intensity, and pain frequency in patients with migraine.

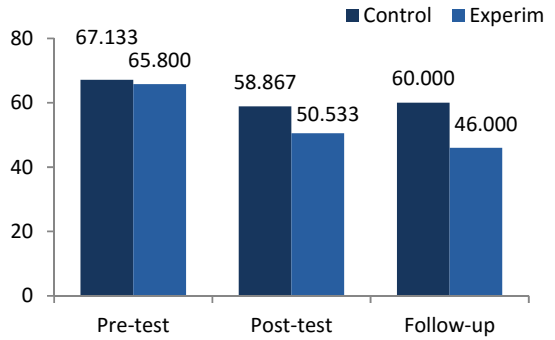

Figure 6. A comparison of migraine scores obtained by the control and experimental groups during pre-, post-, follow-up tests

The results comparing the pre-test and post-test of all 30 participants have shown that there exists a significant difference in the scores of the post-test. That is, the bioenergy economy program (both with real and sham attunement) has been effective on depression improvement and reduction of anxiety, pain intensity, and pain frequency in patients with migraine and this effect was consistent in a two-month interval; that is, participants' state were stable over time.

Table 4. Results of Covariance Analysis Designed to investigate the effect of biofield attunement on Migraine Signals

Variable	Source of changes	Sum of squares	Degree of freedom	The mean of sqaurers	F	Level of significance	The eta quotient (extent of impact)
Migraine	Pretest group	11.491	1	11.491	0.576	0.455	0.022
	Posttest group	951.494	1	951.494	47.726	< 0.001	0.647
	Experimental group	399.717	1	399.717	20.049	< 0.001	0.435
	Error	518.356	26	19.937			
	Total	3174.000	29				
Pain Frequency	Pretest group	0.002	1	0.002	0.002	0.962	0.000
	Posttest group	40.275	1	40.275	48.787	< 0.001	0.652
	Experimental group	20.463	1	20.463	24.788	< 0.001	0.488
	Error	21.464	26	0.826			
	Total	105.367	29				
Social Performance	Pretest group	0.967	1	0.967	0.789	0.382	0.029
	Posttest group	24.035	1	24.035	19.631	< 0.001	0.430
	Experimental group	8.241	1	8.241	6.731	0.015	0.206
	Error	31.832	26	1.224			
	Total	111.867	29				
Individual Performance	Pretest group	0.656	1	0.656	0.344	0.563	0.013
	Posttest group	20.236	1	20.236	10.612	0.003	0.290
	Experimental group	38.670	1	38.670	20.280	< 0.001	0.438
	Error	49.577	26	1.907			
	Total	150.700	29				
vitality	Pretest group	2.262	1	2.262	1.724	0.201	0.062
	Posttest group	31.820	1	31.820	24.247	< 0.001	0.483
	Experimental group	5.555	1	5.555	4.233	0.044	0.140
	Error	34.121	26	1.312			
	Total	118.800	29				
Cognitive Performance	Pretest group	1.803	1	1.803	1.393	0.249	0.051
	Posttest group	49.534	1	49.534	38.267	< 0.001	0.595
	Experimental group	8.386	1	8.386	6.478	0.017	0.199
	Error	33.655	26	1.294			
	Total	112.167	29				
Psychological Distress	Pretest group	1.402	1	1.402	1.085	0.307	0.040
	Posttest group	18.045	1	18.045	13.963	0.001	0.349
	Experimental group	19.639	1	19.639	15.196	0.001	0.369
	Error	33.601	26	1.292			
	Total	101.467	29				

Besides, to examine the effectiveness of biofield attunement, post-tests scores analysis of the two groups using covariance revealed a significant difference; that is, although both sham and real attunements were effective to gain desired results and caused significant difference between the pre-test and post-test of all 30 participants, but the program was more beneficial for the experimental group and this further improvement observed was significant compared to the control group. It can be concluded that real attunement has significant impact on improving depression and reduction of anxiety, pain intensity, and

pain frequency in patients with migraine. The effects in control group can be explained in terms of placebo effects and expectancies participants have from the program.

Moreover, although no significant difference was observed in scores of post-test and follow-up of all participants and their state were stable, the results of participants' follow-up mean scores in experimental group was significantly more than to those in control group. That is, the effect of the program was more stable for former group in long-term than participants in the latter group.

Current study findings are in line with those studies examined the impact of bioenergy economy intervention on anxiety (Marcus et al., 2013; Bowden, Goddard, & Gruzelier, 2011; Birocco et al., 2011; Jain, & Mills, 2010; Zafarnia et al., 2006; Vitale, & O'Connor, 2006; Crawford, Leaver, & Mahoney, 2006; Wardell, & Engebretson, 2006; Shore, 2004; Olson, Hanson, & Michaud, 2003; Zolfaghari, & Hazrati, 2001; Weymouth, & Sandberg-Lewis, 2000), depression, mood improvement (Marcus et al., 2013; Bowden, Goddard, & Gruzelier, 2011; Shore, 2004), and pain intervention (Marcus et al., 2013; Birocco et al., 2011; Jain, & Mills, 2010; Vitale, & O'Connor, 2006; Olson et al., 2003). Considering that in the present study, it was shown that all participants in a 2-month follow-up had a reduction in symptoms of anxiety compared to the control group, the findings are consonant with other research follow-up findings about bio-energy intervention in the long-term effects on anxiety (Wardell, & Engebretson, 2006; Weymouth, & Sandberg-Lewis, 2000).

Many studies explored the association between CRP values and migraine (Lippi et al., 2014). Waeber and Moskowitz (2005) conceptualized and postulated the neurogenic inflammation to include inflammatory mechanisms involved in migraine. In this theory, anti-inflammatory drugs are considered to stop migraine attacks. Furthermore, as inflammation is an important factor which leads to atherogenesis and atherothrombosis, it can be known as the cause of migraine occurrence, especially migraines with aura. Stress may also lead to inflammation (Gudmundsson et al., 2009).

Sympathetic nervous system and the hypothalamic-pituitary adrenocortical axis are activated by psychological stress that leads to release of stress hormones. Stress hormones releases, and cytokine release caused by stress, create the response to trigger inflammation (Wium-Andersen et al., 2013). Thus, reducing distress by psychosomatic interventions like bioenergy economy can reduce inflammation and subsequently migraine intensity.

In addition, gate control theory explains the cognitive aspect of pain by central control mechanism hypothesis which affects and is under the influence of sensory incomes. Moreover, psychological factors such as anxiety, depression, and uneasiness, which had been regarded as responses to pain, are known to have an important role in processing of pain-related information (Melzack, & Katz, 2013). Pain control gates open or close due to many factors. Positive mood, distraction, and deep relaxed breathing may cause the gates to be completely or partially closed while strong emotions like fear, anxiety, and expecting the worst can open the gates (Katz, & Rosenbloom, 2015). Relationship between stress and pain gate control after inflammation and migraines can represent the environmental effectiveness of the bioenergy economy program.

As mentioned before, it seems that in the state of deep relaxation and inactive concentration which occurs in relaxation, meditation, and attunement, alpha waves develop. The resulted healing is due to the fact that the system has enough time for energetic self-organization. When a person is under the influence of electromagnetic field emission of a therapist specialized in bioenergy, attunement would have deeper impact (Goli, 2008). In this approach,

"attunement" is a healer presence in which a bio-field pattern will be transferred to another person as a harmonious and healthy blueprint, and attunes his/her biofield, too. During this process, the individual acquires the ability to receive and guide bioenergy (Astin, 2000). Attunement restructures free movement of energy and makes possible redirection of energy from areas with surplus energy to the ones with deficiency. This leads to energy cleansing and releasing of trapped energy, and energy blockings in old patterns. The base of energy-based treatments is transferring information to cells and tissues. These methods act through bio-field, energy centers, and energy pathways. Due to development of bio-energy balance, inner healing process (nereupsychoimmunological change) is activated and the energy patterning connection coordination is increased (Oschman, 2000). Besides, attunement causes an increase in biofield integration and coordination leading to system's sustainability, grounding, coherence, and inner peace; a decline in allostasis; system's resilience returning to its homeostasis. Consequently, system's resonance and immunity increase which in turn leads to more sense of grounding. Although these claims are reported by people's experience, further research needed to support them.

Considering the findings of this study, it can be concluded that as stress and anxiety play a prominent role in headache occurrence and this have implications for the assessment of anxiety and stress and the use of anxiety reduction strategies at different stages of headache attacks and its development, and also, due to high rates of comorbid psychiatric disorders in patients with headaches, it is recommended that all the patients with headache be at least screened for having depression and anxiety. Since most migraine treatment includes medication therapy, the necessity and importance of non-pharmacological methods of treatment in the form of CAM therapy along with medication is evident more than before. Bioenergy economy program is a holistic approach based on coordinated use of cognitive, behavioral, mindful, body-centered interventions and energy development and active participation of patients in their health promotion. It increases the individual's adaptation with the environment. Treatment is secondary outcome of this procedure. The results of this study show that bioenergy economy program (both with real and sham attunement) may help many patients with migraine to decrease their anxiety, depression and pain intensity and frequency of their headaches.

Further research is recommended to be conducted in larger groups and with double blind study designs.

Conflict of Interests

Authors have no conflict of interests.

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International Journal of Body, Mind & Culture
Cross-Cultural, Interdisciplinary Health Studies

Comparison of Stress Profiles among Individuals with and without Functional Dyspepsia

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Quantitative Study

Abstract

Background: Functional dyspepsia (FD) is defined as the presence of dyspeptic symptoms in the absence of an organic cause that readily explains them. Life stressors, individuals' perceptions, their coping responses, and social supports are linked and can affect the well-being of individuals. The aim of the current study was to assess the relationship between FD and life stressors, coping strategies, and social support.

Methods: In a cross-sectional study conducted in Isfahan Province, Iran, in 2013, the employees of Isfahan University of Medical Sciences, Isfahan, were evaluated. Symptoms of FD were measured using the modified ROME III questionnaire. The Stressful Life Event (SLE) Questionnaire, modified COPE scale, and Multidimensional Scale of Perceived Social Support (MSPSS) were used for assessing life stressors, coping strategies, and social support. Logistic regression analysis was applied to assess the crude and adjusted effects of each variable on FD.

Results: About 55.8% of participants were women and 79.3% were married. In total, 723 (15.2%) participants had FD, 457 (63.2%) of whom were women. The mean scores of perceived intensity and frequencies of all life stressors were significantly higher in patients with FD ($P < 0.05$). In addition, the mean score of social support in patients with FD was significantly lower ($P < 0.05$). Logistic regression analyses demonstrated that the frequency of stressors and perceived intensity of stressors were significantly associated with FD (OR = 1.08 and 1.025, respectively). Moreover, the acceptance coping strategy had a significant relationship with FD (OR = 0.85, 95% CI, 0.75-0.95). Among the socio-demographic factors, sex (OR = 1.65, 95% CI, 1.3-2.1) and education (OR = 0.6, 95% CI, 0.5-0.8) demonstrated significant relationships with FD.

Conclusion: FD was more common in those individuals who had a higher rate of stressors and lower social support.

Keywords: Functional dyspepsia, Life stressors, Coping strategies, Social support

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Introduction

One of the most common gastrointestinal (GI) disorders is functional dyspepsia (FD) (Chang, 2004) The main symptoms of FD include those of the upper GI tract such as early satiety, bothersome postprandial fullness, and epigastric pain or burning which had started within the previous 6 months and lasted for 12 or more weeks (Drossman, & Dumitrascu, 2006; Drossman et al., 2010; Drossman, 2006). There is no evidence of structural disease (including in upper endoscopy) that is likely to explain the symptoms in FD. The prevalence of FD in different studies has ranged between 3% and 40% (Vege, Locke, Weaver, Farmer, Melton, & Talley, 2004; Park, 2011; Li, Nie, Sha, & Su, 2002; Perez, & Youssef, 2007; Amini, Keshteli, Jazi, Jahangiri, & Adibi, 2012). Various studies have been conducted in this field to understand the behavior and pathophysiology of this disease. Their findings have shown that psychological factors may influence the development of FD (Koloski, Jones, Kalantar, Weltman, Zaguirre, & Talley, 2012; Pajala, Heikkinen, & Hintikka, 2012; De la Roca-Chiapas, Solis-Ortiz, Fajardo-Araujo, Sosa, Cordova-Fraga, & Rosa-Zarate, 2010). Therefore, A comprehensive understanding of life stressors, coping strategies, and social support leads to the determination of the severity of such a psychosomatic disease (Haug, 2002).

Different domains of life stressors in patients with FD have been studied. For instance, FD is more prevalent among patients with self-reported sleep disturbance (Vege et al., 2004). Moreover, the relationships of the prevalence and intensity of life stressors with FD have been investigated. The prevalence of stressors was higher in patients with FD compared with healthy volunteers (Pajala et al., 2012, Haug, 2002). Coping and life stressors are correlated. Given the relationship between coping responses and well-being, many diseases may be treated through appropriate adjustment, coping reactions, and flexibility (Wrzesinska, & Kocur, 2008; Cheng, Hui, & Lam, 1999). Moreover, the lower the frequency of stressors is, the higher the use of action-oriented coping strategies in controllable conditions and passive coping strategies in uncontrollable circumstances are (Wrzesinska, & Kocur, 2008; Cheng et al., 1999). Since the coping response of FD patients may be different from that of the healthy population, their stress levels might also be different (Cheng et al., 1999; Cheng et al., 2002; Grzyb, Wrzesiniska, Harasiuk, Chojnacki, & Kocur, 2007; Wrzesinska & Kocur, 2008). For example, patients with FD perceived stressors as less controllable, and thus, used less emotion-focused action and more direct action and/or avoidance-oriented coping strategies when handling stressful situations (Cheng, Hui, & Lam, 2002; Wrzesinska, & Kocur, 2008; Cheng et al., 1999).

On the other hand, social support determines the amount of assistance an individual receives from others. The relationships of individuals with their family, friends, and society largely affect their health perceptions. Individuals with stronger social support, received more assistance and had lower symptoms severity, and consequently, better health status (Alemi, Stephens, Llorens, Schaefer, Nemes, & Arendt, 2003; Grassi, Rasconi, Pedriali, Corridoni, & Bevilacqua, 2000; Hefner, & Eisenberg, 2009; Karukivi et al., 2011; Rabinovitch, Cassidy, Schmitz, Joober, & Malla, 2013). It has been demonstrated that patients with FD use fewer social supports when dealing with life stressors (Cheng et al., 1999) Thus, life stressors, social supports, the individual's perceptions, and his/her coping responses are interrelated and together could substantially shape the psychological and somatic well-being of the individual (De la Roca-Chiapas et al., 2010). This study aimed to compare these important interrelated psychosocial variables among individuals with and

without FD in a university based community.

Methods

The current investigation was a cross-sectional study carried out in Isfahan Province, Iran, in 2013. The methodology of the study has been explained in details in the Study on the Epidemiology of Psychological, Alimentary Health, and Nutrition (SEPAHAN) (Adibi, Hassanzadeh Keshteli, Esmaillzadeh, Afshar, Roohafza, & Bagherian-Sararoudi, 2012). In brief, information on the goals of the research and the study design were provided for the employees of 50 centers of Isfahan University of Medical Sciences across Isfahan Province. The participants were selected from among about 10500 non-academic healthy personnel. In total, 4763 of the 6239 participants who received the questioner returned it. Subjects who were aged 18 years or older and able to comply with the protocol of the study were selected. The exclusion criterion was the presence of any medical or psychiatric condition that required long-term drug use. Different phases of the study were continuously monitored by the principal investigator. The detailed information of this study have been previously published (Adibi et al., 2012).

This study was approved by the Medical Research Ethics Committee (project number 189069, 189082, and 189086). All participants signed written consent forms.

Presence or absence of different symptoms of FD including early satiety, bothersome postprandial fullness, and epigastric pain or burning were evaluated using ROME III questionnaire and its scoring system (Drossman, 2006; Song et al., 2013). Furthermore, ROME III criteria were used to define the disorders (Drossman, & Dumitrascu, 2006). FD was diagnosed based on the questionnaire which was completed individually.

The frequency and perceived intensity of different stressors of daily life were assessed using the Stressful Life Event (SLE) Questionnaire. The SLE Questionnaire consists of 44 items in the 11 stress domains of home life, financial problems, social relations, personal conflicts, occupational conflicts, educational concerns, occupational security, loss and separation, sexual life, daily life, and health concerns. Each item was scored on a 5-point Likert scale (never = 0, mild = 1, moderate = 2, severe = 3, and very severe = 4). Total intensity score indicated the total perceived intensity of stressors; the higher the score, the higher the perception of stress intensity. Moreover, the frequency of each stressor and the total stress frequency were calculated (Roohafza, Ramezani, Sadeghi, Shahnam, Zolfagari, & Sarafzadegan, 2011; Sali, Roohafza, Sadeghi, Andalib, Shavandi, & Sarrafzadegan, 2013). The questionnaire's reliability was verified using Cronbach's alpha coefficient ($\alpha = 0.81$).

Coping strategies applied to cope with stressful life events were evaluated using the modified COPE Scale, a multi-component self-administered coping strategies questionnaire (Carver, Scheier, & Weintraub, 1989). The modified COPE Scale is composed of 23 items classified into the 5 subscales of positive reinterpretation and growth, problem engagement, acceptance, seeking support, and avoidance. The questionnaire's reliability was verified using Cronbach's alpha coefficient ($\alpha = 0.84$). Its items were scored using 3-point Likert scales (never = 0, sometimes = 1, and often = 2). Higher scores obtained on this scale indicate more frequent use of the related coping strategies (Roohafza et al. 2014).

Various perceived social supports were assessed using the Multidimensional Scale of Perceived Social Support (MSPSS). Its reliability was assessed using Cronbach's alpha coefficient ($\alpha = 0.88$). The scale includes 12 items scored on 3-point Likert scales (never = 0, sometimes = 1, and often = 2). It assesses the sufficiency of social support received from the 3 sources of family, friends, and significant others. Each source is evaluated through 4 items. Higher scores on the MSPSS indicate higher rates of received social support (Zimet, Powell, Farley, Werkman, & Berkoff,

1990; Bagherian-Sararoudi, Hajian, Ehsan, Sarafraz, & Zimet, 2013).

Data analyses were carried out in SPSS software (version 15, SPSS Inc., Chicago, IL, USA). Two-tailed P values of less than 0.05 were considered significant. Continuous variables were presented as mean ± standard deviation (SD). Student t-test was applied to analyze continuous variables. The prevalence of FD according to sex, age, education, marital status, life stressors, coping strategies, and social supports were calculated and are presented in this paper. Associations of FD with different variables, such as age, sex, education, marital status, life stressors, coping strategies, and social supports, were studied. Univariate logistic regression analysis was applied to assess the crude effects of each variable on outcome (FD). Total frequency of life stressors and mean scores of perceived intensity of life stressors were used as the indices of life stressors. Total score of social support was employed as an index of all types of social supports. Different types of coping strategies were studied separately. Multivariate regression analyses were applied to evaluate the relative contributions of stressors, social support, coping strategies, age, sex, marital status, and educational level in the development of FD. In model 1, total frequency of life stressors, total score of social support, different types of coping strategies, and age, sex, marital status, and education were entered. In model 2, a similar process was repeated by replacing the total frequency of life stressors with the mean score of perceived intensity of life stressors. The odds ratios (OR) and the 95% confidence intervals (CI) were calculated in the logistic regression analysis. Odds ratios (95% CI) of higher than 1 indicate that the individual with the corresponding variable(s) is more likely to suffer from FD. Odds ratios (95% CI) of less than 1 indicate that the individual with the corresponding variable(s) is less likely to suffer from FD. The 10% significance level was considered for exclusion from the model.

Results

Of all the participants, 2106 (44.2%) subjects were men and 3776 (79.3%) were married. About 2874 (69.3%) individuals were over 40 years old and 2650 (55.6%) had graduate degrees. Furthermore, 723 participants (15.2%) were diagnosed with FD. Among the FD group, 266 individuals (36.8%) were men, 578 employees (80%) were married, 449 (62.1%) were aged 40 years and older, and 365 subjects (50.5%) had graduate degrees.

The frequency and perceived intensity of life stressors were calculated and their relationships with FD were evaluated (Table 1). Of the 11 evaluated stress domains in the SLE Questionnaire, 10 revealed significantly higher mean scores in patients with FD ($P < 0.05$). The mean ± SD of the perceived intensity score of all stressors was 29 ± 20. The frequencies of stressors among patients with FD in all items of the SLE Questionnaire were significantly higher than among patients without FD ($P < 0.05$). The mean ± SD frequency of all stressors in the SLE Questionnaire was 12.5 ± 7.0.

The relationships of the total scores of stressors, coping strategies, and social supports with FD were evaluated (Table 2). The only coping strategy that had no significant relationship with FD status in either sex was avoidance. The mean scores of all kinds of social supports in all subjects with FD both in men and women were significantly lower than in individuals without FD ($P < 0.001$).

The results of univariate and multivariate logistic regression analyses in the total study population are summarized in table 3. Univariate analyses showed the significant association of all independent factors with FD, except avoidance coping strategy. In addition, model 1 and model 2 demonstrated that only frequency of stressors (OR = 1.08, 95%CI, 1.06-1.095) and perceived intensity of stressors (OR = 1.025, 95%CI, 1.02-1.03) had significant associations with FD, respectively. Among the socio-demographic factors, the only variables that revealed significant relationships with FD in models 1 and 2 were

Table 1. Differences in the frequency and perceived intensity of life stressors between patients with functional dyspepsia (n = 723) and those without functional dyspepsia (n = 4097) using t-test and chi-square test

Life stressors (number of items)	Functional dyspepsia	Perceived intensity of stressors (Mean ± SD)	P-value	Frequency of stressors (Mean ± SD)	P-value
Home life (7 items)	No	3.5 ± 3.0	0.03*	0.6 ± 0.9	0.03*
	Yes	4.7 ± 3.8		1.0 ± 1.3	
Financial problems (5 items)	No	8.1 ± 5.2	0.03*	2.8 ± 1.8	0.02*
	Yes	9.9 ± 5.4		3.3 ± 1.6	
Social relations (4 items)	No	4.8 ± 3.1	0.01*	1.7 ± 1.3	0.04*
	Yes	6.0 ± 3.5		2.1 ± 1.3	
Personal conflicts (5 items)	No	4.0 ± 3.1	0.03*	1.1 ± 1.2	0.03*
	Yes	5.1 ± 3.7		1.5 ± 1.4	
Occupational conflicts (4 items)	No	4.3 ± 3.0	0.03*	0.7 ± 1.0	0.03*
	Yes	5.8 ± 3.5		0.95 ± 1.1	
Educational concerns (4 items)	No	3.6 ± 2.5	0.03*	1.6 ± 1.2	0.02*
	Yes	4.4 ± 3.0		2.1 ± 1.2	
Occupational security (5 items)	No	4.9 ± 3.3	0.02*	1.5 ± 1.2	0.02*
	Yes	6.1 ± 3.6		1.9 ± 1.2	
Loss and separation (4 Items)	No	2.8 ± 1.8	0.03*	0.5 ± 0.7	0.04*
	Yes	3.3 ± 2.2		0.7 ± 0.8	
Sexual life (4 items)	No	2.8 ± 1.7	0.75	0.2 ± 0.5	0.38
	Yes	2.8 ± 1.6		0.4 ± 0.6	
Daily life (2 items)	No	2.4 ± 1.4	0.04*	0.5 ± 0.7	0.02*
	Yes	3.1 ± 1.6		0.9 ± 0.7	
Health concerns (2 items)	No	2.0 ± 1.3	0.04*	0.4 ± 0.5	0.02*
	Yes	2.6 ± 1.7		0.7 ± 0.6	

*P < 0.05

sex (OR = 1.65, 95%CI, 1.3-2.1) and education (OR = 0.6, 95%CI, 0.5-0.8), respectively.

Logistic regression analyses demonstrated the crude and adjusted effects of evaluated variables on FD (Table 3). Model 1 included frequency of life stressors, social support, and coping strategies, whereas model 2 involved perceived intensity of life stressors, social support, and coping strategies. Both models were adjusted based on socio-demographic factors (age, sex, marital status, and education).

Table 2. The relationships of total picture of stressors, coping strategies, and social supports with Functional dyspepsia using t-test

Variables	Functional dyspepsia (n = 723)	No Functional dyspepsia (n = 4097)	P-value
Perceived intensity of all life stressors	39.4 ± 23.2	26.8 ± 18.5	< 0.001
Frequency of all life stressors	15.7 ± 7.2	11.8 ± 6.6	< 0.001
Total social supports	6.8 ± 3.8	7.8 ± 3.6	< 0.001
Coping strategies			
Problem engagement	9.4 ± 2.2	9.7 ± 2.1	< 0.001
Social support coping	9.6 ± 3.1	10.0 ± 3.1	< 0.001
Positive reinterpretation and growth	6.2 ± 1.6	6.5 ± 1.5	< 0.001
Avoidance	3.5 ± 1.8	3.4 ± 1.7	0.100
Acceptance	2.9 ± 1.0	3.0 ± 1.0	< 0.001

Table 3. Logistic regression analyses of the crude and adjusted effects of evaluated variables on functional dyspepsia

Variables	Crude effect	Multivariate analysis	
		Model 1	Model 2
Frequency of stressors	1.09 (1.07-1.1)	1.08 (1.06-1.095)	
Perceived intensity of stressors	1.029 (1.025-1.032)		1.025 (1.02-1.03)
Social support	0.93 (0.91-0.95)	0.99 (0.96-1.02)	0.99 (0.96-1.025)
Coping strategies			
Problem engagement	0.935 (0.9-0.97)	0.99 (0.94-1.05)	0.99 (0.94-1.05)
Support seeking	0.965 (0.94-0.99)	1.003 (0.96-1.04)	0.99 (0.96-1.04)
Positive reinterpretation and growth	0.875 (0.83-0.92)	0.96 (0.89-1.04)	0.97 (0.89-1.05)
Avoidance	1.03 (0.99-1.08)	1.05 (0.985-1.1)	1.05 (0.985-1.1)
Acceptance	0.835 (0.77-0.9)	0.9 (0.8-1.006)	0.9 (0.8-1.004)

Model 1 included frequency of life stressors, social support, and coping strategies, whereas model 2 involved perceived intensity of life stressors, social support, and coping strategies. Both models were adjusted based on age, sex, marital status, and education.

Discussion

Stress is experienced when real or perceived demands exceed the resources and imposing the organism's homeostasis imbalance (Richter, 1991). Mean scores of perceived intensity of 10 stressors in subjects with FD were significantly higher than the corresponding scores in subjects without FD. On the other hand, mean scores of social supports in subjects with FD were significantly lower than in subjects without FD. In other words, employees with FD had higher stress levels and lower social supports. Social support acts as a stress buffering process. Moreover, 5 different mechanisms have been proposed in the improvement of patient outcomes through social support. They included improvement in quality of life (QOL), higher rates of access to health care, better immune system function, increased compliance with medications, and decreased depressive affect (Alemi et al., 2003; Grassi et al., 2000; Hefner & Eisenberg, 2009; Karukivi et al., 2011; Rabinovitch et al.,2013). Mean scores of the 3 coping strategies of problem engagement, acceptance, and positive reinterpretation and growth in employees with FD were significantly lower than the corresponding mean scores in employees without FD. It has been shown that patients with FD, besides controllability of stressors, may adopt action-oriented coping strategy that may provoke anxiety when applied consistently for all stressors (Cheng et al., 1999; Folkman, Lazarus, Gruen, & DeLongis, 1986; Miller, Brody, & Summerton, 1988; Polman, Borkoles, & Nicholls, 2010). Both strategies of acceptance, and positive reinterpretation and growth are among the emotion-focused coping strategies. This means the stressor must be tolerated and cannot be resolved or eliminated through direct action. The abovementioned findings regarding higher stress, lower social support, and immature coping strategies were consistent with other studies showing the imbalance between stressors, social support, and coping strategies in patients with FD (De la Roca-Chiapas et al., 2010; Cheng et al., 1999; Cheng et al., 2002; Grzyb et al., 2007; Wrzesinska & Kocur, 2008; Bennett, Piesse, Palmer, Badcock, Tennant, & Kellow, 1998; Drossman, Creed, Olden, Svedlund, Toner, & Whitehead, 1999;. Quartero, Post, Numans, de Melker, & de Wit, 1999; Filipovic et al., 2013; Whitehead, 1996 Cheng, Yang, Jun, & Hutton, 2007). This implies that the clinical management of FD necessities more effective approaches towards training discriminative coping strategies for stressors with different controllability through methods such as cognitive reforming.

In univariate analyses, 4 coping strategies (problem engagement, support seeking, acceptance, and positive reinterpretation and growth) had significant relationships with FD. However, in the hierarchical analysis of total population, when they were added into the regression equation at the final step, they

failed to illuminate the variance on adjustment beyond the 0.05 significance level. In the hierarchical analysis of employees with high stress index, only acceptance strategy remained significant (analysis was not shown). This meant that FD was more strongly associated with the frequency of stressors and their perceived intensity than was coping strategies. In clinical practice, this would be translated into a more efficient approach by FD patients towards altering their stress appraisal.

There were some limitations in the current study. First, the generalization of the conclusions is limited by potential selectivity bias, in that all subjects were employees of Isfahan University of Medical Sciences and less than half of the sample completed both waves of the questionnaires. Lack of information of non-responders may limit the external validity of the study. Second, the diagnosis of FD was based on the questionnaire that was completed individually by the participants. In other words, the diagnosis of FD was not confirmed by a physician. Third, due to the cross-sectional design of the study, directional influence of variables cannot be claimed. Additional research using a multivariable prospective design would be helpful to more closely assessing the temporal association of different stressors and FD. Effective treatment approaches require a better understanding of more specific relationships of stressors and coping strategies. Another study limitation was the lack of data on the psychological profile of the subjects which was relevant to this study.

In conclusion, the findings of the present study were consistent with other literature regarding the result that individuals with FD had more frequent and higher perception of intensity of stressors and lower levels of social supports.

Conflict of Interests

Authors have no conflict of interests.

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Solitary Rectal Ulcer Syndrome: A Biopsychosocial Assessment

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Case Study

Abstract

Background: Solitary rectal ulcer syndrome (SRUS) is a chronic disorder of the gastrointestinal tract and its etiology is not well understood. There is no specific treatment for this syndrome and patients with SRUS may, for years, experience many complications. The aim of the present research was the biopsychosocial study of patients with SRUS.

Methods: The study participants consisted of 16 patients with SRUS (7 men and 9 women). Their medical records were reviewed retrospectively to evaluate the clinical spectrum of the patients along with the endoscopic and histological findings. Moreover, psychiatric and personality disorders [based on Diagnostic and Statistical Manual of Mental Disorders, 4th ed, Text Revision (DSM IV-TR)], psychosocial stressors, early life traumas, and coping mechanisms were assessed through structured interviews.

Results: At presentation, mean age of the patients was 39 years (16 to 70). Common symptoms reported included rectal bleeding (93.8%), rectal self-digitations (81.2%), passage of mucous (75%), anal pain (75%), and straining (75%). Endoscopically, solitary and multiple lesions were present in 9 (60%) and 4 (26.7%) patients, respectively, and 87% of lesions were ulcerative and 13.3% polypoidal. The most common histological findings were superficial ulceration (92.85%) and intercryptic fibromuscular obliteration (87.71%). Common psychosocial findings included anxiety disorders (50%), depression (37.5%), obsessive-compulsive personality disorder (OCPD) or traits (62.5%), interpersonal problems (43.75%), marital conflicts (43.75%), occupational stress (37.5%), early life traumas, physical abuse (31.25%), sexual abuse (31.25%), dysfunctional coping mechanisms, emotional inhibition (50%), and non-assertiveness (37.5%).

Conclusion: Given the evidence in this study, we cannot ignore the psychosocial problems of patients with SRUS and biopsychosocial assessment of SRUS is more appropriate than biomedical evaluation alone.

Keywords: Solitary rectal ulcer syndrome (SRUS), Biopsychosocial assessment, Psychosocial factors

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Introduction

Solitary rectal ulcer syndrome (SRUS) is an uncommon, chronic, benign anal disorder, with an estimated prevalence of one in 100,000 persons per year (Martin, Parks, & Biggart, 1981). It occurs most commonly in the third decade in men and in the fourth decade in women (Kennedy, Hughes, & Masterton, 1977; Sharara, Azar, Amr, Haddad, & Eloubeidi, 2005). Often, SRUS is underdiagnosed due to its wide spectrum of clinical presentation and variable endoscopic findings (Al-Brahim, Al-Awadhi, Al-Enezi, Alsurayei, & Ahmad, 2009). Rectal bleeding, constipation, mucous discharge, and straining on defecation are the most common presentations (Abbasi et al., 2015; Al-Brahim et al., 2009; Tjandra et al., 1992). Diarrhea and abdominal pain are also sometimes observed (Chong & Jalihal, 2006). In addition, 26% of patients are asymptomatic (Tjandra et al., 1992). It is essential to differentiate SRUS from other chronic or malignant diseases. Although the name suggests the presence of a solitary ulcer in the rectum, some studies have reported SRUS patients with polyps, multiple lesions, or even ulcer in the colon. Thus, the disease is also known as the three–lies disease" (Crespo, Moreira,, Redondo, Lopez San, & Milicua Salamero, 2007).

The diagnosis of SRUS is based on symptomatology in combination with endoscopic and histological findings (Al-Brahim et al., 2009). Its characteristic features include fibrosis or obliteration of lamina propria, thickening or hypertrophy of mucosa, and crypt architecture distortion (Al-Brahim et al., 2009; Bahadori Hesari, Gouhari Moghadam, Derakhshani, & Vafaei, 2006; Suresh, Ganesh, & Sathiyasekaran, 2010).

The pathogenesis of SRUS is not well known, but it is believed that multiple factors contribute to its development. The most accepted causes of this disease are direct trauma or local ischemia due to mucosal prolapse, straining during bowel movements, or self-digitations (Chong & Jalihal, 2006; Kuijpers, Scheve, & Ten Cate, 1986; El-Hemaly et al., 2012).

There is no specific cure for SRUS. Only the symptoms may be improved by current treatments that include the use of bulking agents, laxatives, sucralfate, bowel retraining with or without biofeedback, and surgery (Meurette et al., 2008; Zhu, Shen, Qin, & Wang, 2014).

In recent years, it has generally been accepted that illness and health are the result of an interaction between biological, psychological, and social factors (Sarafino & Smith, 2014). The biopsychosocial model is now widely accepted as the most important approach to chronic illnesses. In this model, aspects of biological, psychological, and social domains are most important to understanding and promoting the patient's health (Engel, 1980). Previous studies have stated that psychosocial factors including chronic life stressors, life traumas (e.g., abuse history), psychiatric or psychological co-morbidities, and the patient's coping mechanisms may influence the nature and severity of the symptoms of chronic gastrointestinal (GI) disease (Gastroenterology and Endoscopy News, 2003; Drossman, Talley, Leserman, Olden, & Barreiro, 1995). Thus, the biopsychosocial model has been increasingly used for functional GI diseases such as irritable bowel syndrome (IBS) (Tanaka, Kanazawa, Fukudo, & Drossman, 2011).

SRUS is a disease with almost unknown etiology and a chronic disabling condition that affects the quality of life (QOL) (Meurette et al., 2008). Thus, it seems, this model is suitable for the evaluation and treatment of these patients. In the literature review, we found no study on psychosocial aspects in patients with SRUS. Therefore, the aim of this study was an initial assessment of the biopsychosocial aspects of SRUS.

Methods

After obtaining the approval of the ethics committee of Isfahan University of Medical Sciences, Iran, based on the computer data, all

patients with SRUS who referred for treatment to two medical centers affiliated to Isfahan University of Medical Sciences from 2004 to 2014 were identified. As a result, 30 patients were identified, 16 of whom agreed to participate in the study. The aim of the study was explained to the participants and a written informed consent was obtained from each.

The clinical records of these patients and laboratory, colonoscopy, and histological findings were retrospectively reviewed. Subsequently, they were interviewed by a psychiatrist for the evaluation of psychiatric and personality problems through structural interviews based on Diagnostic and Statistical Manual of Mental Disorders, 4th ed, Text Revision (DSM IV-TR) and a psychologist for the assessment of early life traumas (physical and sexual abuse), psychosocial stressors in recent years, and dysfunctional coping mechanisms through open response questions.

The statistical analysis was performed using SPSS software (version 20, SPSS Inc., Chicago, IL, USA) and frequency analysis was also performed.

Results

In total, 16 patients with SRUS were studied. There were 7 men (43.8%) and 9 women (56.2%) and 69% of them were married. Their age ranged from 16 to 70 years (mean: 39 years). The duration of their symptoms ranged from 1 to 21 years (mean: 8 years). In addition, 7 patients had undergone abdominal and anorectal surgery (procedures such as hemorrhoidectomy, sphincterotomy, rectocele, herniorrhaphy, and ppendectomy). Eight patients (50%) had a comorbidity of functional GI diseases [IBS and functional dyspepsia (FD)]. Moreover, 8 patients (50%) had a history of psychiatric disorder and 4 patients (25%) had rectal sex.

Table 1 shows the clinical manifestations of the patients. Rectal bleeding (15, 93.8%), rectal self-digitations (13, 81.2%), passage of mucous (12, 75%), anal pain (12, 75%), and straining (12, 75%) were the most common symptoms. All patients had more than one symptom.

In laboratory evaluations, only 1 patient was diabetic (BS > 126), 3 patients had anemia (HB < 12), and the results of the remaining tests, including erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), anti-neutrophil cytoplasmic antibody (ANCA), perinuclear neutrophil antibodies (PANCA), platelet count (PLT), white blood cell count (WBS), and stool exam, were normal.

Furthermore, rectoscopic and histological findings have been summarized in table 2.

Table 1. Frequency of clinical manifestations of patients with SRUS (n = 16)

Symptoms*	Number	%
Rectal bleeding	15	93.8
Rectal self-digitations	13	81.2
Passage of mucous	12	75.0
Anal pain	12	75.0
Straining	12	75.0
bloating	11	68.8
Constipation	11	68.8
Abdominal pain	11	68.8
Long- time defecation	10	62.5
Frequent bowel movements	10	62.5
Diarrhea	7	43.8

*All patients have more than one symptom at presentation.

Table 2. Rectoscopic and histological findings of patients with solitary rectal ulcer syndrome (SRUS) (n = 16)

Rectoscopic findings*	Number	%
Site of lesion < 6 cm above anal verge	6	33.3
Site of lesion > 6 cm above anal verge	10	66.7
Single ulcer	9	60.0
Multiple ulcers	4	26.7
Polypoidal/nodular	2	13.3
Erythematous mucosa	4	26.7
Hemorrhoids	3	20.0
Histological findings**		
Superficial ulceration, congestion, or ecstatic venues	13	92.85
Intercryptic fibromuscular obliteration	12	85.71
Hypertrophy/thickening of muscularis mucosae	7	50.00
Fibrosis of lamina propria	4	28.75
Mucosal architecture distortion	4	28.75

*A patient might have more than one type of lesion; ** Histological findings of two cases were not available.

Colonoscopy findings revealed that the site of lesions was less than 6 cm above anal verge in 66.7% of cases and more than 6 cm above anal verge in 33.3% of cases. On the basis of appearance, single and multiple ulcers were observed in 9 (60%) and 4 patients (26.7%), respectively, while polypoidal/nodular lesions were observed in 2 patients (13.3%). In addition, 4 patients (26.7%) had erythematous mucosa and 3 patients had hemorrhoids.

Histological findings of patients showed superficial ulceration, congestion, or ecstatic venues (13, 92.85%), and intercryptic fibromuscular obliteration (12, 87.71%) were respectively the most common findings.

Table 3 illustrates the frequency of psychiatric disorders, psychosocial stressors in recent years, and early life traumas (physical and sexual abuse) among the patients. Almost half of the patients (50%) were suffering from anxiety disorders including general anxiety disorder (GAD), obsessive compulsive disorder (OCD), post-traumatic stress disorder (PTSD), and social phobia. Unipolar mood disorders such as major depression disorder (MDD) and dysthymia were the next most common (37.5%) disorders among the patients. Interpersonal problems (43.75%), marital conflicts (43.75%), occupational stress (37.5%), and death of a family member (31.25%) were, respectively, the most common psychosocial stressors experienced by patients in recent years. Regarding early life trauma, 5 patients had experienced physical abuse (31.25%) and sexual abuse (31.25%).

An overview of the biopsychosocial assessment of each patient is presented in table 4. The results show that almost all patients had many clinical symptoms. All of them, except 3 patients, suffered from one or more psychiatric disorders specially anxiety disorders. The majority of patients had traits or disorders of obsessive compulsive personality (n = 10). Ineffective coping mechanisms such as emotional inhibition (n = 6) and non-assertiveness (n = 8) were common among the patients. Psychosocial stressors were experienced by all patients. Most patients experienced more than one stressor and half of them complained of interpersonal and marital conflicts. Frequency of early life traumas such as physical and sexual abuse (31.25%) among these patients was significant.

Table 3. Frequency of psychiatric disorders, psychosocial stressors in recent years, and early life traumas (physical and sexual abuse) among patients with solitary rectal ulcer syndrome (SRUS) (n = 16)

Psychiatric disorders *	Number	%
Anxiety disorders	8	50.00
Depressive disorders	6	37.50
Adjustment disorders	4	25.00
No diagnosis	3	18.75
Psychosocial stressors **		
Interpersonal problems	7	43.75
Marital conflicts	7	43.75
Occupational stress	6	37.50
Death of a family member	5	31.25
Illness	3	18.75
Family problems	3	18.75
Financial problems	2	12.50
Captivity in war	2	12.50
Addiction of offspring	1	6.25
Love problems	1	6.25
Educational problems	1	6.25
Early life trauma		
Physical abuse	5	31.25
Sexual abuse	5	31.25

*****Patients may have had more than one psychiatric disorder.
****** Patients may have had more than one stressor.

Discussion

The purpose of this study was an initial assessment of biopsychosocial aspects of patients with SRUS.

Biomedical findings of the study were notable. Although, some studies have reported SRUS in young adults (Chong & Jalihal, 2006; Bahadori Hesari et al., 2006; Amaechi, , Papagrigoriadis, Hizbullah, & Ryan, 2010), mean age of participants of the present study was 39 years. Almost half of the patients had pervious surgeries especially anorectal surgery that may be indicative of underdiagnosis of SRUS. Moreover, half of the patients had co-morbidity of functional GI diseases especially IBS.

Table 4. Summary of biopsychosocial assessment of solitary rectal ulcer syndrome (SRUS) cases (clinical presentation, psychiatric and personality disorders, ineffective coping mechanisms, and psychosocial stressors (n = 16)

Age	Sex	Clinical presentation	Psychiatric disorder	Personality disorder or trait and ineffective coping mechanisms	Psychosocial stressors and early life traumas
70	F	Rectal bleeding, straining, Constipation, Bloating, Abdominal pain, Self-digitations	Adjustment disorder	Emotional inhibition	Interpersonal problems
42	M	Rectal bleeding, Straining, Mucous discharge, Anal pain, Constipation, Long-time defecation, Frequent bowel movements, Abdominal pain, Bloating, Self-digitations	GAD PTSD	OCPD	Marital conflict, Family problems, Death of a child (son), Captivity in war, Physical abuse, Sexual abuse
16	F	Rectal bleeding, straining, Mucous discharge, Constipation, Long-time defecation, Frequent bowel movements, Abdominal pain,‹Bloating, Self-digitations	MDD Social phobia	Non-assertiveness	Interpersonal problems, Sexual abuse, Physical abuse
26	F	Rectal bleeding, mucous discharge,‹anal pain, abdominal pain	GAD	OCPD	Marital conflict, Illness
24	F	Rectal bleeding, Straining, Mucous discharge, Anal pain, Constipation, Long-time defecation, Frequent bowel movements, Abdominal pain, Bloating, Self-digitations	Adjustment disorder	OCPD	Interpersonal problem, Educational problems
24	M	Rectal bleeding, Straining, Mucous discharge, Anal pain, Constipation, Long-time defecation, Frequent bowel movements, Abdominal pain, Bloating, Self-digitations	Dysthymia GAD	OCPD	Occupational stress, Family problems
52	F	Rectal bleeding, Straining, Mucous discharge, Anal pain, Constipation, Long-time defecation, Frequent bowel movements, Abdominal pain, Bloating, Self-digitations	GAD	OCP trait Non-assertiveness, Emotional inhibition	Occupational stress, Family problems
34	F	Rectal bleeding, Straining, Mucous discharge, Anal pain, Constipation, Long-time defecation, Frequent bowel movements, Abdominal pain, Bloating, Self-digitations	OCD	OCP trait (Perfectionism) Non-assertiveness	Marital conflict, Interpersonal problems, Physical abuse

Table 4. Summary of biopsychosocial assessment of solitary rectal ulcer syndrome (SRUS) cases (clinical presentation, psychiatric and personality disorders, ineffective coping mechanisms, and psychosocial stressors (n = 16) (Continue)

Age	Sex	Clinical presentation	Psychiatric disorder	Personality disorder or trait and ineffective coping mechanisms	Psychosocial stressors and early life traumas
62	F	Rectal bleeding, Straining, Mucous discharge, Anal pain, Constipation, Long-time defecation, Frequent bowel movements, Abdominal pain, Diarrhea, Bloating, Self-digitations	Adjustment disorder	-	Marital problems, Death of father and brother, Financial problems
29	F	Rectal bleeding, Straining, Mucous discharge, Anal pain, Constipation, Long-time defecation, Self-digitations	-	OCPD Non-assertiveness Emotional inhibition	Financial problems, Interpersonal problems, Marital conflict
26	M	Rectal bleeding, Straining, Mucous discharge, Constipation, Long-time defecation, Frequent bowel movements, Bloating, Self-digitations	MDD	OCP trait (Perfectionism) Non-assertiveness	Occupational stress, Interpersonal problems, Physical abuse, Sexual abuse
38	M	Rectal bleeding, Straining, Mucous discharge, Anal pain, Long-time defecation, Self-digitations	Adjustment disorder	Non-assertiveness Emotional inhibition	Occupational stress
64	F	Rectal bleeding, Straining, Mucous discharge, Anal pain, Long-time defecation, Frequent bowel movements, Abdominal pain, Diarrhea, Bloating, Self-digitations	Dysthymia OCD	-	Family problems, Marital conflict, Death of a son, Sexual abuse
57	M	Rectal bleeding, Anal pain, Constipation, Long-time defecation, Self-digitations	-	OCP trait (Perfectionism)	Occupational stress death of two brothers
25	F	Rectal bleeding, Anal pain, Constipation, Abdominal pain, Bloating	MDD OCD	Dependent personality Non-assertiveness Emotional inhibition	Interpersonal problems, Illness
44	M	Mucous discharge, Anal pain, Frequent bowel movements, Diarrhea, Bloating, Self-digitations	-	OCP trait (Perfectionism) Non-assertiveness Emotional inhibition	Occupational stress, Death of a friend, Captivity in war, Sexual abuse

F: Female; M: Male; GAD: General anxiety disorder; PTSD: Post-traumatic stress disorder**;** MDD: Major depression disorder; OCD: Obsessive compulsive disorder; OCPD: Obsessive-compulsive personality disorder

In terms of clinical presentations, the frequency of all symptoms in our patients was significant (43–93%). According to most studies, rectal bleeding, passage of mucous, anal pain, and straining were the most common symptoms (Abbasi et al., 2015; Abid et al., 2012; Al-Brahim et al., 2009; Chong & Jalihal, 2006; Crespo et al., 2007; Bahadori Hesari et al., 2006; Chiang, Changchien, & Chen, 2006). Disturbances of bowel function including constipation (68.8%) and diarrhea (43.8%) were relatively common. Nearly all patients reported problems with defecation and the most common of them was excessive straining with the feeling of incomplete evacuation (75%).

They needed to spend a long time in the toilet (62.5%) or go to the toilet frequently (62.5%). Rectal self-digitations usually followed failures to relieve tenesmus after straining for long periods of time (Abid et al., 2012). This is an abnormal defecation behavior that was more common in patients in the present study (81.2%) than other studies (Chong & Jalihal, 2006; Bahadori Hesari et al., 2006). There are different hypotheses about the etiology of SRUS and direct trauma is one of the most important of them. Self-digitation due to difficult defecation may lead to direct trauma and ulcer formation (Crespo et al., 2007; Contractor & Contractor, 2003). Moreover, history of rectal sex as a probable factor of inducing direct trauma was reported by 25% of patients. Therefore, direct trauma may be a major cause of SRUS.

In the present study, other medical conditions such as diabetes, ulcerative colitis, parasites, inflammatory diseases, platelet problems, and anemia were assessed through laboratory tests. According to our data, the incidence of these conditions was not considerable.

Among rectoscopic findings, a considerable number of cases of lesions were ulcerative (87%), but only two of the lesions were polypoidal/nodular. Although, 60% of the lesions were single ulcers, 5 patients had multiple ulcers. The presence of polyps, erythematous lesions, and multiple ulcerations in patients provides further evidence that the term SRUS is misleading. This finding was consistent with the studies by Al-Brahim et al. (2009), Chong & Jalihal (2006), and Crespo et al. (2007).

Histological features are key diagnostic factors in SRUS. The diagnosis is confirmed through the presence of a combination of surface serration, fibromuscular obliteration, hypertrophy/thickening of muscularis mucosae, fibrosis of lamina propria, mucosal architecture distortion (Suresh, et al, 2010; Madigan & Morson, 1969). In the current study, superficial ulceration, fibromuscular obliteration, and hypertrophy/thickening of muscularis mucosae were the most common features.

The psychosocial assessment of patients with SRUS revealed interesting findings. For instance, comorbid psychiatric disorders, especially anxiety disorders and depression, were the most common among these patients. Most patients (83%), were suffering from a psychiatric disorder. This is consistence with studies that reported 42% to 61% anxiety disorders and depression in gastrointestinal patients (Drossman & Chang, 2003; Olden & Drossman, 2000).

As personality aspects, OCPD and OCP traits, especially perfectionism, cause a high level of stress, 10 patients (62, 5%) had these personality problems. On the other hand, dysfunctional coping mechanisms such as emotional inhibition and non-assertiveness were common among them. Therefore, it is understandable that these patients experience psychological problems.

According to the biopsychosocial model, psychological distress also affects somatic symptoms and their outcome (Drossman et al., 2003). The findings of the study also indicted that psychosocial stressors in these patients were significant. Relationship difficulties, including marital conflicts or interpersonal problems, and occupational stress were the most commonly observed

psychosocial stressors among them. Furthermore, history of physical and sexual abuse in early life was prevalent among the patients. Early life traumas in GI patients may strongly influence the severity of the symptoms, illness behaviors, daily function, and treatment outcome (Drossman et al., 1996; Drossman et al., 2011). In some studies, patients of a GI clinic who had a history of abuse reported more severe pain and greater psychological distress. Moreover, they spent more days in bed with poorer health status, more frequent visits to the physician, and more surgical procedures (Drossman et al., 1995, Drossman et al., 1996). Therefore, an evaluation of these psychological traumas may also be important in the treatment of SRUS.

Several limitations in this study needed to be addressed. This study was a retrospective study on a small number of patients without a control group. It was not possible to draw any conclusions on treatment modalities. Obtained psychosocial data on the patients were only based on interviews and no standard self-administered questionnaires were used. Thus, we should be cautious in generalizing the findings. However, this study is a new assessment of SRUS and may be the first biopsychosocial assessment of these patients.

In conclusion, SRUS is a chronic disorder with a spectrum of clinicopathological abnormalities. Rectal bleeding, passage of mucous, anal pain, and straining are the most common symptoms of SRUS. Direct trauma through self-digitations or rectal sex may be important in the etiology of SRUS. Furthermore, the assessment of psychosocial aspects including psychiatric comorbidities, maladaptive personalities, dysfunctional coping mechanisms, chronic life stressors, and early life traumas, especially physical or sexual abuse, may be important in the treatment of patients with SRUS. Therefore, it seems that biopsychosocial assessment of SRUS is more appropriate than biomedical evaluation alone.

Conflict of Interests

Authors have no conflict of interests.

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Back to Future Health Blueprint: The Effects of a Brief Bioenergy Economy Program on a Patient with Tethered Cord Syndrome

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Case Study

Abstract

Background: The spinal cord congenital abnormalities may prevent normal cephalad movement of the conus medullaris such as tethered cord. A child or even an adult with these abnormalities may develop progressive neurological dysfunction due to traction on the cord or nerve roots. As the most problematic technical consideration in surgery for the release of the tethered cord is how to preserve functions of neural elements and rebuild the dural sac to maintain normal cerebrospinal fluid (CSF) circulation; the priority is to treat the condition through less invasive methods. Bioenergy economy (BEE) is an integrative healing model which tries to abstract healing modalities and integrate them into a psychosomatic health system. In contrast to reductionistic and pathology-based approach of biomedical treatment, bioenergy healing is a salutogenic, holistic and metadiagnostic approach which creates healing responses from a blueprint of healthy body.

Case Report: We report the process of a bioenergy economy intervention in a 10-year-old boy with clinical signs of drop foot, urinary incontinence, urinary reflux, and low back pain who was candidate for surgeries by neurosurgical and urological criteria. The clinical results indicated that after about two years of 12 healing sessions in a brief bioenergy economy package of biofield scanning, biofield attunement, and hand-on self-healing, the patient's clinical signs remarkably improved to the extent that he returned to normal activities of his age and followed an athletic lifestyle.

Conclusion: From a biosemiotic viewpoint, it can be discussed that bioenergy economy, by focusing on enhancing the pathways of salutogenesis was effective to evoke healing response in the patient's body. The effect of the bioenergy economy practice may be due to the healing images and intentions flowed through patient's body and healer-healee biofields' coupling and interactions.

Keywords: Tethered cord syndrome, Bioenergy economy, Bioenergy healing, Energy medicine, Psychosomatic medicine

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Introduction

There are two historical discourses in medicine; the healing and the treatment. Healing is based on enhancing self-organizing servomechanisms while treatment relies on stabilizing the imbalances, improvement of the pathophysiologies, or elimination of the etiologies.

In other words, healing or salutogenic approach is holistic and metadiagnostic despite of reductionistic and pathology-based approach of treatment. It seems that healing responses come from a blueprint of healthy body, as Harolf Saxon Burr (1972) named it. Many of the healing phenomena could be

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explained by a form of somatic recall of this healthy memory.

Now the question is: When the development of body is blocked in some ways, will a coherent health blueprint be formed to be activated during healing response? Is this blueprint hidden in our somatic memory or imprinted in the genome? Is there any way to epigenetic healing; upward-down organizing of gene expression?

Here, we do not have enough evidences to answer above-mentioned questions but present a contemplative clinical story. This story presents the healing journey of Ilia, a 10-year-old boy who suffered from tethered cord syndrome. In the next pages, we will follow the effects of a very simple bioenergy-based program on the multisystemic complications of this developmental and congenital problem.

Congenital abnormalities of the spinal cord or cauda equina can prevent normal cephalad movement of the conus medullaris during early life such as tethered cord (Michelson & Ashwal, 2004). Pathologic entities that have been regarded to be the cause of actual tethering include a thickened tight filum terminale (Anderson, 1975; Fitz & Harwood-Nash, 1975; Hoffman, Hendrick, & Humphreys, 1976), intradural fibrous adhesions (Anderson, 1975; Yashon & Beatty, 1996), intradural lipomas with or without a connecting extradural component (Anderson, 1975; Bruce & Schut, 1979), diastematomyelia (Dale, 1969; Gilmor & Batnitzky, 1978), and adherence of the neural placode following previous closure of a myelomeningocele (George & Fagan, 2005; Heinz, Rosenbaum, Scarff, Reigel, & Drayer, 1979; Hudgins & Gilreath, 2004). Imaging studies, such as spinal magnetic resonance imaging (MRI), show that the conus medullaris caudad to the lower end plate of L2 is evidence of tethering.

A child or even an adult with these abnormalities can develop progressive neurological dysfunction due to traction on the cord or nerve roots. However, pediatric and adolescent patients with tethered cord differ in terms of the mode of onset, clinical manifestations, and outcome (Pang & Wilberger, 1982). In tethered spinal cord release, the surgeon should be concerned about preserving functions of the neural elements and rebuilding the dural sac so that normal cerebrospinal fluid (CSF) is maintained.

There is no conventional nonsurgical treatment for releasing tethered cord. At first sight, using energy healing for this purpose makes sense exclusively as a palliative care.

Energy medicine or energy healing, a branch of complementary and alternative medicine, holds the belief that healers can send healing energy into one's body through the use of different methods such as hands-on, hands-off, and distant (or absent). There are various schools of energy healing known as biofield energy healing, spiritual healing, contact healing, distant healing, therapeutic touch, and Reiki and Qigong as the National Center for Complementary and Alternative Medicine (NCCAM) describes (2005).

The energy-based therapies are used in several clinical conditions such as anxiety, chronic pain, and wound healing (Oschman & Pert, 2000). But the traditional origins of these methods have made them more cultural measures for health promotion than scientific approaches. Bioenergy economy (BEE) is an integrative healing model which tries to abstract healing modalities and integrate them into a psychosomatic health system. This methodological healing system is based on biosemiotic interactions and translations of consciousness, information, energy, and matter (CIEM) and biofield interactions which are addressed in energy medicine, as a biomedical basic science (Goli, 2010).

Bioenergy economy focuses on enhancing the CIEM pathways of salutogenesis. In this study, we employed a brief bioenergy economy package of biofield scanning and attunement, hand-on self-healing, healing meditation, and bioenergetic exercises.

Case Report

Ilia was born in February 2001 with an imperforated anus and the day after, he

tolerated a colostomy surgery. He was not able to empty his bladder completely and due to his urinary reflux, he began to use antibiotics till the end of 2 years old. During the first year of his life, he went under three more surgeries to repair his imperforated anus. Fecal incontinence was observed when he was 2 years old. When he was 5 years old, he usually had constipation and he went under z-plasty surgery due to anus stenosis.

At 10 years old, he was referred to the neurologist as he had claudication in his right leg. He had also severe urinary and fecal incontinence, urinary reflux relapse, back pain, looseness of right big toe, and monoparesis in right foot. He also began to have nocturia. In lumbosacral MRI of the patient (Figure 1), a tethered cord was observed and this time, a drop foot added to his symptoms.

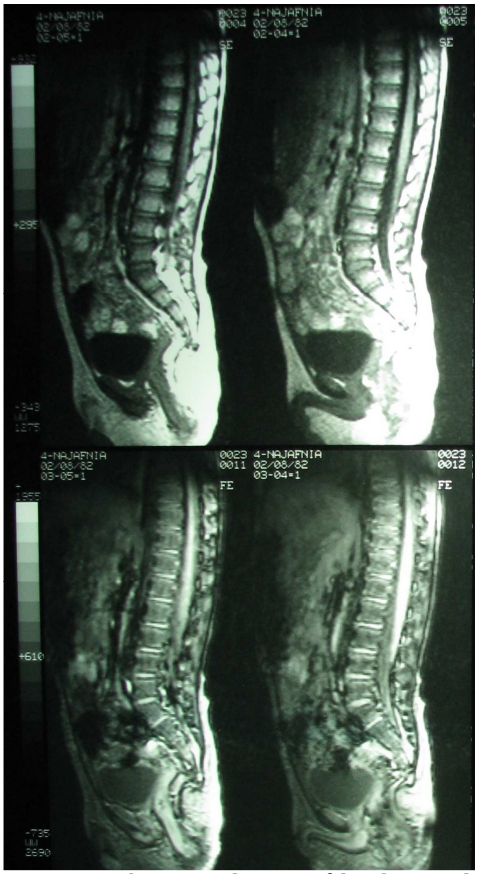

Figure 1. The sagittal view of lumbosacral area showing a tethered cord

Due to the severity of symptoms and to prevent more nerve damage, neurosurgeons decided to release the tethered cord through surgery. He was not able to empty his bladder completely. He had kidney destruction due to urinary reflux. So, it was decided to control his urinary reflux by medication (which later proved to be useless) –250 mg of cephalexin (one every night), detrusitol (twice daily), and 10 mg of baclofen (twice daily)– and surgical treatment was postponed to a date after tether cord operation. All physicians examined Ilia forbade him from doing physical activities, even carrying his backpack. He was only allowed to walk slowly. He began to have nocturia. The voiding cystourethrogram (VCUG) showed a grade-4 vesicoureteral urinary reflux (Figure 2).

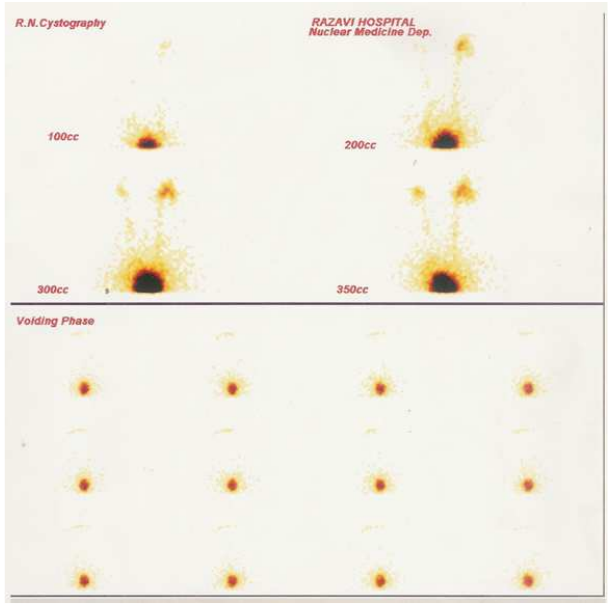

Figure 2. Voiding cystourethrogram (VCUG) shows grade-4 vesicoureteral urinary reflux.

Three days before surgery, the patient referred to a physician who had psychosomatic fellowship and practiced bioenergetic interventions. In the first session, Ilia received bioenergy healing and biofield attunement, his loosened right big toe became strong to the extent that he could easily exert pressure on his therapist's hand. As it was a sign of recovery, his parents postponed the surgery for five months to continue energy healing. From this date on, he had healing sessions (12 sessions) with his therapist and exercises he was supposed to practice individually every day (self-healing) –hands-on energy emission every night at a fixed time in a receptive state (to receive distant energy by his therapist), walking, and nighttime bioenergy walking– for

about two years.

During the first year, a steady gradual decrease in symptoms intensity was observed. In spite of this, sometimes the intensity of symptoms increased especially after he had healing sessions. He had also pain in his calves, soles, and back when walking. In general, the symptoms had decreased to the extent that he could do normal life activities. One more time, the surgery for tethered cord was postponed for another two months; then, due to the considerable decrease in symptoms of urinary incontinence and the strength of his right leg, the surgery was cancelled and he was released. The surgeon stated that Ilia could have his regular daily movements and activities without any limitation. He began to exercise in the gym; a pleasant event he had never experienced before in his life.

One new symptom was that he had developed urticaria at nights. But at the end of one year of bioenergy economy practicing, his physical sate was almost stable. His ultrasound images showed no sign of kidney destruction. Besides, his leg movement was normal, and no urinary incontinence was observed. He had no problem swimming three times a week; while before this time, he had fecal incontinence when he exercised. At this point, his pediatric urologist examined him using VCUG, isotope scanning, ultrasound of kidney and bladder, and bladder pressure assessment, decided not to operate him for urinary reflux. Figure 3 shows the repaired function of vesicoureteral sphincters bilaterally.

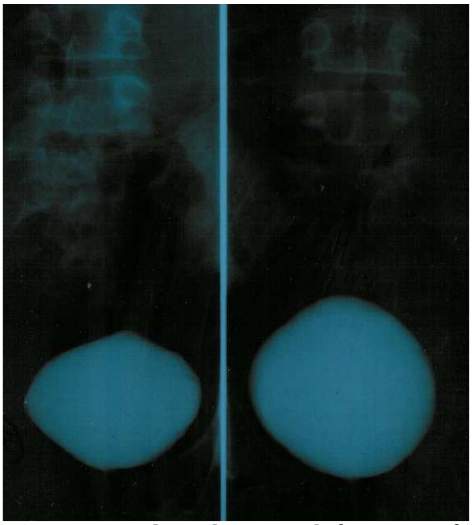

Figure 3. Bilateral repaired function of vesicoureteral sphincters

He also decreased previous medication almost to the half –125 mg of cephalexin (one every night), detrusitol (1 daily), and 10 mg of baclofen (1 daily). In addition to the stop of urinary and fecal incontinence, his grade-four urinary reflux decreased to grade one reflux. Kidneys were healthy, bladder pressure was normal, but he was not able to empty his bladder completely. The urologist advised him to use bogie, but his parents did not accept.

Ilia continued healing sessions with his therapist and self-healing practice. During the following 9 months, his symptoms steadily decreased with severe and mild fluctuations. Besides, it seemed that the anus stenosis he had since he was a baby was recovered because he had no trouble excreting. Figure 4 shows final MRI of lumbosacral area. It may not completely show cephalad movement of the conus medullar but complete functional improvement was seen in practice.

Figure 4. Final magnetic resonance imaging (MRI) of lumbosacral area

During the course of healing, the dermatologist diagnosed that he had developed vitiligo on his face, back, and shoulders. Ilia used the prescribed ointment for a month that caused the spots to be lightened. Four months later, he had no sign of vitiligo, and seldom had previous symptom relapse. Sometimes, after healing session, he had mild relapses of the symptoms, but at the end of the second year,

the symptoms vanished. He had seldom nighttime urinary incontinence. Therefore, the urologist stopped the medication. Three years past of outset of bioenergy economy program, no relapse of symptoms were observed and his health condition was stable. He chose a profession in sports and enjoys his life doing athletic activities.

Discussion

Some cohort studies showed that changes in bladder-sphincter function after untethering are usually transient due to the partial denervation. Although a small group of children seem to benefit from untethering, others may become worse and the same outcome cannot be predicted (Boemers, van Gool, & de Jong, 1995); but some studies report that tethered cord release is beneficial due to its urodynamic outcomes since patients suffered from tethered cord with abnormal urodynamics showed to improve 48% after tethered cord release; and the neurogenic detrusor overactivity improved more (59%) in urodynamics. It seems that urodynamic outcome is not predicted by the level of the conus on MRI. The concern is that patients with a normal bladder may suffer from urodynamic deterioration following a surgical operation (Guerra, Pike, Milks, Barrowman, & Leonard, 2006).

This study followed the process of a bioenergy economy program in a 10-year-old boy patient who was candidate for surgeries by neurosurgical and urological criteria due to clinical signs of drop foot, urinary incontinence, urinary reflux, and low back pain. After about two years of 12 healing sessions and bioenergy attunement, and daily self-healing trainings, the clinical signs got remarkably better. His low back pain and drop foot were completely ameliorated, MRIs showed a partial cephalad movement of the conus medularis, and the grade-4 reflux in urodynamic system (Vesicouretral reflux) decreased to grade-1 reflux; and after many years of limitations in physical activity because of pain and weakness, he returned to normal activities of his age, and even followed an athletic lifestyle.

From a biosemiotic viewpoint, we can follow the healing signs in the forms of bioenergy pulsations, molecular changes especially in gene expression and, of course, before that in healing images and intentions. These signs flowed through Ilia's body and in healer-healee biofields' coupling and interactions.

Some in-vitro studies show how intention can change the bacteria growth. These effects are probably due to systematic control of frequency-intensity of biofield emission. Interpersonal and intrapersonal energy signs are interpreted by electromagnetic receptors and can alter cell function (Blackman, Elder, Weil, Benane, Eichinger, & House, 1979; Benveniste, 1998). There is still unknown that how images, intention, or reflections are interpreted as biofield emissions.

Attunement by promoting healer-healee's biofield and synergy, hands-on techniques via reprocessing and resonating biofield, and healing meditation by integrating brain activities can coconstruct an effective salutogenesis.

The healing responses, like what we observed in Ilia, are not so rare; but we prefer to keep them out from medicine discourse and label them as spontaneous regression or a miracle or simply ignore them. We are at the beginning of an integrative medical model which flies with two wings of healing and treatment. Many case studies, clinical trials, and laboratory studies are needed to explain healing and to explore its material, energetic, symbolic, and reflective pathways.

Conflict of Interests

Authors have no conflict of interests.

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