

Basic Research in Psychosomatic Medicine

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ABSTRACT

At present there is a lack of basic research activities in psychosomatic medicine; though there are many available areas open for basic researchers. The following are the guidelines for enhancing interest of basic science research for those who are interested in psychosomatic medicine: 1. Establishing the need for basic research activities in psychosomatic disorders to provide optimal evidence-based management to suffering patients 2. Type of research needed to improve the treatment regime of psychosomatic disorders [a) basic research in psychosomatic disorders to discover the etiological factors and b) basic research activities which can improve the management and treatment of psychosomatic patients] 3. Basic research areas available are a) biological b) psychological c) social d) ecological and e) combined areas of above reflecting the epigenetic factors in psychosomatic medicine. The criteria for basic research include evidence-based findings in basic research with a goal to enhance the management of psychosomatic disorders. Monitoring the cost-benefit evaluation should be an important part of basic research. Utilizing non-pharmacological therapy, culture, and country-based therapies are required to bring holistic success in human suffering. This paper will discuss the above factors to enhance interest in the many areas of basic research.

KEY WORDS

psychosomatic medicine, basic research, psychosomatic disorders

INTRODUCTION

At present, there is a lack of basic research activities in psychosomatic medicine though there are many available areas open for basic researchers. Basic research in psychosomatic medicine is directed towards delineating the biological mechanisms which are responsible in producing bio-psycho-socio-behavioural and ecological factors of psychosomatic disorders.

AREAS FOR BASIC RESEARCH AVAILABLE IN PSYCHOSOMATIC MEDICINE

Advancement in basic research in psychosomatic medicine has been possible and is based with the advancement of the following areas:

1. Neuroscience — Cannon in 1928⁽¹⁻³⁾ suggested that the physiology of emotion provides a key link between mental status and physical disease. Papez in 1937, published the first neurological model of emotion that involved circuit of cortical and sub-cortical structures. Maclean in 1949⁽⁴⁻⁶⁾ coined the term of limbic system and suggested psychosomatic disorders are caused by impaired communication between the limbic system and cortex⁽²⁾. The methods and means of continuing basic research in psychosomatic disorders were enhanced by advancement in neuroimaging, the development of CT, MRI, EEG, ERPS, PET, FMRI, spect magnetic spectroscopy, and TMS. The above discoveries made it

easier to study impaired communication between the limbic system and cortex^(6,11,15). The relationship of the brain and psychosomatic disorders became easier with the above neuroscience discoveries and advancement.

Research in cognitive neuroscience, study of emotion and body changes became possible for the understanding of the biological basis of psychosomatic disorders. Neurotransmitter system with genetic influence brought knowledge of the information transfer system which helped to explain the biological basis of psychosomatic disorders. Engel's^(8,9,13) bio-psycho-social model also provided further areas of basic research and brought psychosomatic medicine near medical research. Shukala, Solomon and Doshi⁽¹⁷⁾ also saw this model in Ayurveda; the ancient Hindu medicine which dates back two millennium, and saw the vulnerabilities related to the bio-psycho-social model. Ayurveda also described natural acquired immunity. Increasing knowledge of the auto-immune nervous system, relationship with the endocrine system; particularly the hypothalamic pituitary adrenal cortical system, brought the opportunity of advancing basic studies in anxiety and affective aspects of psychosomatic disorders^(4,6,7,19). The continued advances of imaging provided the visualization of brain structure and sequences of changes whereby psychological events are followed by physical events of psychosomatic disorders^(8-10,18). The pathological expression of biological, psychological and sociological parameters of human health and illness, started to reveal sequences in the brain⁽⁹⁾.

2. Advances in psycho-neuro immunology — Solomon in 1993^(11,12) emphasized the important role immunology in psychosomatics; and described the involvement of immunology in psychosomatic disorders and called it psycho-neuro-immunology. Solomon described psycho-neuro-immunology to represent conceptual break-through for understanding the body and its health and disorders in psychosomatic

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medicine. Solomon also postulated integrative or holistic approach for continuing basic research in psychosomatic medicine. Burnet, Medwar, Jones, Selye, Merrill and Kubo^{10-12,18,24} have with their research, stabilized the scientific link between immunology, stress, anxiety and affective aspects of psychosomatic disorders¹⁹. Franz Alexander¹⁶ carried forward the concept that psychosomatic pathology was a result of physiological concomitants.

The basic research done in human and animal studies enhanced the opportunity of enlarging the basic research in psychosomatic medicine. Bi-directional involvement of the immune system and CNS were confirmed by the above basic research. Studies of psychological stressors showed the relationship between the immune system and stress. This started a new era of the role of immunology in psychosomatic disorders; which also involved the brain. These were a window of understanding the changes essential for triggering psychosomatic disorders^{11,12}.

Merrill's²⁴ research on thymus provided the base of research in beta cells, their interaction; and the involvement of related receptors¹⁹. The finding of other NK cells, which are sensitive to psycho-social influences confirm the close relationship with psychosomatic medicine and the immune system. Dunbar¹⁴ in 1948 postulated that specific conflict and the resultant specific patterns of personality style with ego syntonic attempts, underlay a number of psychosomatic disorders. Dunbar founded the American Psychosomatic Society and its journal. Dunbar brought the focus on peptic ulcers, hypertension, rheumatoid arthritis and asthma. These diseases became an essential part of psychosomatic medicine. Burnet and Solomon suggested that brain research in immunology is part of psychosomatic medicine; and Solomon confirmed the idea of the presence of immunoregulators in the brain.

Solomon and Moss¹² in 1964 published "Emotion, Immunity and Disease" in which they suggested that the central nervous system and psychic process could influence immunity. Kubo¹⁰ in his research on animals, put the animals under various stressors and confirmed the influences and changes in immune function. The bi-directional interaction of the immune system and CNS have been confirmed by Ader and Cohen¹⁵ (in 1975) through conditioned immunity changes in natural killer cells and cytokines Interleukon 1. The immune system has been involved in various psychosomatic and psychiatric disorders like depression¹⁹, HIV, cancer and CVS. Selye¹⁸ in 1946 demonstrated the important issue of stress and its consequences as it is related to producing psychosomatic disorders; by mediating the physiological effect on stress in humans. Besides emphasizing hypothalamic pituitary axis, he also explained the neuro-humoral model which included neuropeptides involvement in stress. He also explained the process of coping mechanism.

3. Advances in genetic areas- Identification of a causative gene or genes, or a specific susceptible gene remain a challenging area for basic research in psychosomatic medicine¹⁹⁻²³. However, most of the psychosomatic disorders tend to have a polygenic base (multiple genes involvement) rather than monogenic (single genes involvement). Recent research for curative treatments has involved the role of somatic gene editing and germline gene editing²². In psychosomatic medicine, somatic gene editing can be used for preventing and treating psychosomatic disorders. Somatic gene editing has been accepted without much controversy but involvement of germline editing remains controversial and problematic²². The discovery of dominant genes for psychosomatic disorder is on the horizon, though success remains far in the future.

4. Epigenesis- The basic research in this area involves studying the genes interaction with environmental and outside factors which can play an important part in improving, preventing or successfully stopping the progress of psychosomatic disorders. Epigenesis recognizes the changes produced by the interaction of genes with environmental factors; which is very important for psychosomatic disorders, as the base of psychosomatic disorders include the combination of genes and environmental factors. The study of epigenesis and the genetic basis of psychosomatic disorders is described by Singh^{20,21,23} (in 2010, 2011 and 2017). Singh 2017 has summarized that in psychosomatic disorders; particularly the influence of environmental and outside factors on genetic material; from the very beginning through whole life, are observed; thus, showing the involvement of ongoing epigenetic processes^{9,20,21}. In most psychosomatic disorders the etiological window can be revealed by epigenetic research activity¹⁹. The areas of neurogenesis and neuroplasticity remain available for basic research and can be performed on animal or human post-mortem tissue. Epigenetic genome-wide changes have a greater role in improving the management of psychosomatic disorders.

PSYCHOPHARMACOLOGICAL AREAS AVAILABLE FOR BASIC RESEARCH STUDIES

Psychopharmacological advancements are primarily for helping in treatment though they have led to the understanding of the etiological and preventative aspects of psychosomatic disorders^{9,21}. Neuropathological changes, involvement of receptor system, neurotransmitters, neural pathways and neural pathways identification, are part of basic research. The connective studies of neurotransmitter system, genetic influences, epigenetic changes and information transfer system can also be researched in psychopharmacological area to understand the further advanced changes in psychosomatic disorders. The antecedents of psychopharmacology are multiple; and this rapidly developing youngest branch of science provides further information for psychosomatic disorders and the relationship with the brain. This provides greater opportunities to find the etiology of psychosomatic disorders⁹.

CONCLUSIONS

Basic research for understanding psychosomatic disorders have become essential and basic research in the above-described areas are sure to be rewarding but challenging. The involvement of the brain; the ultimate controller of changes in sickness, health and the production of psychosomatic disorders needs to be studied as fulsome as possible. However, the following guideline for enhancing interest in basic research in psychosomatic medicine is helpful:

1. Establishing the need for basic research activities in psychosomatic disorders to provide optimal evidence-based management to suffering patients
2. Type of research needed to improve the treatment regime of psychosomatic disorders [a) basic research in psychosomatic disorders to discover the etiological factors and b) basic research activities which can improve the management and treatment of psychosomatic patients]
3. Basic research areas available are a) biological b) psychological c) social d) ecological and e) combined areas of above reflecting the epigenetic factors in psychosomatic medicine. The criteria for basic research include evidence-based findings in basic research with a goal to enhance the management of psychosomatic disorders. Utilizing non-pharmacological therapy, culture, and country-based therapies are required to bring holistic success in human suffering.

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