

mHealth: Its Implications within the Biomedical and Social Models of Health – a Critical Review

Hossein Adibi, School of Psychology and Social Science, Edith Cowan University, Western Australia

Abstract - At the outset, it should be pointed out that mHealth stands for the provision of health-related services using mobile communication technology. The coverage of mobile phones around the globe including developing countries is growing with enormous speed. Research indicates that mobile phones have the potentials to provide health systems with new possibilities to address problems in accessibility, efficacy and costs of health care. The aim of this article is to discuss these contributions and their implications within the dominant biomedical model as well as social models of health. Further consideration is given to the roles of mHealth in building a bridge between these two models. Our conclusions indicate that mHealth has enormous potential to enhance the quality of health services in number of areas including: remote data collection, epidemic outbreak tracking, chronic disease management, emergency response systems, remote patient monitoring, and health promotion. All these areas largely relate to social model of health rather than to biomedical model. In these and other areas such as mental health, for example, biomedical model have come under increasing criticisms and intellectual pressures to broaden its approach and consider, value and incorporate the contributions of new technology, mHealth within healthcare delivery system. It is in this context that this article recommends that mHealth needs to be incorporated into the formal trainings of medical as well as allied health professionals and practitioners. By taking this approach, then, it is possible to consider mHealth as a viable bridge between the two models.

Index Terms—biomedical model, doctor-patient relations, mHealth, social model.

I. INTRODUCTION

One of the great challenges of 21st Century is how to deal with the exponential increase in health care cost globally. Further challenge is that no government/ nation is ready or able to deal with such a multitude of confronting big issues. Emerging trend in population dynamics point to longer life expectancy and lower birth-rates which leads to further challenge of our traditional approaches. Furthermore, pattern of illness affecting people have changed, particularly in developed nations where the main health problems are chronic diseases. Current literature on health clearly indicates that the dominant biomedical model of health care delivery is not sustainable and needs to incorporate social model in a more effective manner in order to improve the quality of healthcare for billions of people across the globe.

It is in this context that the advancement and use of new technologies, particularly mobile technology and mHealth provide an opportunity to enhance the biomedical model and covers increasing areas closely associated with this model of healthcare delivery.

mHealth stands for the provision of health-related services using mobile communication technology. The coverage of mobile phones around the globe including developing countries is growing with enormous speed. Research indicates that mobile phones have the potentials to provide health systems with new possibilities to address problems in accessibility, efficacy and costs of health care. The aim of this article is to discuss these contributions and their implications within the dominant biomedical model as well as social model of health and illness. Further aim is whether or not mHealth has the potential in bridging the gaps between the two models of health and illness.

This article is engaged in considering how mobile technology can bridge the gap between biomedical and social models of health and play an important role in healthcare delivery systems? In discussing this question, the researcher is attempted first to critically analyse the dominant biomedical model and provide explanations why this model is restricted by its underlying framework and as a result it is unable to provide quality healthcare services to billions of people across the globe. Further attempt has also been made to critically analysis the social model of health as well as to investigate the role of mHealth in bridging the gap between the two biomedical and social models of healthcare.

II. ANALYSIS OF THE BIOMEDICAL MODEL OF HEALTH AND ILLNESS

The biomedical model of health and disease emerged from the Enlightenment belief in the application of science to the solution of human problems (Wainwright, 2008). However, the biomedical model of health and disease is based on three philosophical and theoretical foundations and perspectives. These are Rene Descartes Philosophy of 'Rationalism', Positivism of August Comte and Structural-Functionalism of Talcott Parsons. In order to fully comprehend the reasons for its persistence and success in dominating the healthcare system for so long, there is a need to critically review these philosophies and theoretical frameworks and demonstrate their relevancy and connections to biomedical model.

III. RENE DESCARTES PHILOSOPHY

Rene Descartes (1596-1650) was a 17th Century French philosopher who is often called the “Father of Modern Philosophy” or the “Father of Western Philosophy” (Russell, 2004:516-517). Descartes laid the foundation of rationalism by breaking away from traditional Scholastic-Aristotelian philosophy and promoting mechanistic sciences (*Internet Encyclopaedia*). Descartes in his search of the truth, came to conclusion that without any doubt “I exist”. He then coined his famous phrase: “*I think, therefore I am*”. “In explaining natural phenomenon, Descartes rejects the splitting of corporeal substance into matter and form as well as appeal to final ends – divine or natural phenomenon”. (Carlson, 2001:8). Descartes is often regarded the first thinker to emphasize the use of reason to develop the natural sciences (Grosholz, 1991). However, Descartes’s philosophy of ‘Rationalism’ advanced by Baruch Spinoza and Gottfried Leibniz but also opposed by Thomas Hobbes, John Locke and Hume.

Descartes in his reasoning to separate mind from body, rejected the use of substantial forms and their concomitant final causes in physics. He argued that these notions were the result of the confusion of the idea of the body with that of the mind. This mistake should be avoided by clearly distinguishing the idea of the mind from the idea of the body. Descartes considered himself to be the first to do this. “His expulsion of the metaphysical principles of substantial forms and final causes helped clear the way for Descartes’ new metaphysical principles on which his modern mechanistic physics was based. (*Internet Encyclopaedia of Philosophy*, p.3.).

Thus Descartes regarded mind and body as separate entities and considered the body as a machine and described the mechanics of how action and sensation occurs. The assumption of the duality of body and mind has been adopted by the biomedical model. Thus scientific advancement in 18th and 19th centuries coupled with the continuing belief that the mind and body are separate laid the foundation of biomedical model of health and illness. Further development of this philosophy led to the emergency and rise of positivism.

IV. POSITIVISM OF AUGUST COMTE

Positivism is considered to be the second philosophical ground on which the biomedical model is based. Positivism is a philosophy of science and asserts that the only authentic knowledge is scientific knowledge. Such knowledge is only possible to produce through positive affirmation of theories and employing scientific methodology which is based on the analysis of the evidence which is observable, empirical and measurable.

August Comte was the pioneer of positivism. His argument is that society is like physical world and operates according to general laws. Therefore we can employ scientific methods that are used in studying physical world, to study social facts. Comte argued that “much as the physical world operates according to gravity and other absolute laws, so also does society” (Macionis, 2012:11).

On this basis, Comte developed his Law of Three Stages for society. In his view “society has undergone three progressive phases in its quest for the truth. These include: the theological

(where God and the divine subsumes human rights); the metaphysical (the post-Enlightenment humanist period, where the universal human rights of humanity are most important); and the positive (the final scientific stage where individual rights are more important than the rule of any one person)” (*The Basics of Philosophy*).

The underlying reason for Comte to develop these laws was related to his rejection of the French Revolution and searching the laws of stability. “Comte, was confronted by the numerous theories of progress of his age, was more anxious to discover principles of “order” and stability” (Bottomore, 1975:74). It is on this basis that Positivism is considered to be a conservative perspective to maintain the social inequality in society. In contrast, critical sociology, for example focusing on change and advocating for more equitable society.

However, underlying principle of positivism includes the following:

- The logic of enquiry is the same across all sciences (both social and natural).
- Like that of natural sciences, the aim of positivism is to reduce explanations of all phenomena to the smallest number of principles or laws.
- Research should be empirically observable with human senses, and should use inductive logic to develop statements that can be verified and tested.
- Science should be value-free as possible. The ultimate goal of science is to produce knowledge, regardless of politics, morals and values. (*The Basics of Philosophy*, p.1).

One of the influences of positivism in social research led to the emergence of empiricism which is still dominant in a number of areas within social sciences. The method of positivism is over simplifying: “Positivism is what the natural sciences are supposed to do and is the foundation of statistical theory, exemplified by Popper’s defence of quantitative methods in the *Poverty of Historicism* (Popper, 1961)” (Bond, John and Senga, 1986:316).

Another relatively recent example is the work of Paul Lazarsfeld at Columbia University. He established the Bureau of Applied Social Research and exerted a tremendous influence over the techniques and organisation of social research. Jeabek Hynek (2001:224-229) in the bibliography of Paul Lazarsfeld states: “Lazarsfeld’s many contributions to sociological method have earned him the title of the ‘founder of modern empirical sociology’”.

However, despite significant contributions of empiricism, it has been criticised in the social science literature on a number of grounds. For example Atkinson (1978) in criticising Positivism, provides a list of assumptions made by positivists together with the kinds of criticism of positivism made by sociologists. Here one example serves the purpose: “Positivist assumption: Social phenomena have an existence external to the individuals who make up a society or social group and can thus be viewed as objective facts in much the same way as natural facts. Criticism: Social phenomena are of an essentially

different order to natural ones owing to their symbolic nature and the subjective interpretations of social meanings by individuals in a society.” (extracted from Table 12.1 from Bond and Bond , 1986:321).

Kevin White in criticising Positivism argues that dominance of statistics in social science after the Second World War was positivistic influence and still is continuing. The problem with statistical model is that it excludes the narrative and situational and qualitative accounts of truth. White in explaining the problem of positivist method states that: “It is tied to an approach that evades the impact of structural factors on individuals’ health. Thus social class has not been a priority for epidemiologists. In fact, epidemiologists usually actively exclude measures of class in their attempt to identify risk factors, since class, by any measurement, is overwhelmingly the causative factor in the production and distribution of disease” (White 2009: 65-66). The third theoretical perspective which has been supporting biomedical model is structural functionalism.

V. STRUCTURAL FUNCTIONALISM

Emile Durkheim (1858-1917), Talcott Parsons (1902-79) and Robert Merton (1910-2003) are the key distinctive theorists of functionalist perspective. Structural functionalism studies the way social structures function to maintain social order and stability. This perspective is based on the assumption that a society is a system of integrated parts, each part (structure) has certain ‘needs’ (functions) that must be fulfilled to ensure social order is maintained (Germov, 2014 5th edition).

Structural Functionalism argues that society resembles an organism consisting of a balanced set of institutions. Each institution considered to be as structure providing a particular set of social needs (functions) in sustaining stability in society. In explaining this characteristic, Talcott Parsons (1954:143) states that: “Every social system is a *functional entity*. That is, it is a system of interdependent structures and processes such that it tends to maintain a relative stability and distinctiveness of patterns and behaviour as an entity by contrast with its – social or other – environment, and with it a relative independence from environmental stimuli, but is not completely assimilated to its environment, maintain rather an element of distinctiveness in the face of variations in environmental conditions. To this end it is analogous to an organism”.

Parsons views health as a valued social commodity, an essential resource for individual achievement and the smooth running of society. He insists that illness should be seen as a social phenomenon rather than as a physical entity or property of individuals. In Parson’s work ill health was to be understood in terms of the functioning of society as a whole. He states in *Social System* (1951:430) that “too low a general level of health, too high an incidence of illness, is dysfunctional: this is in the first instance because illness incapacitates the effective performance of social roles”. Parsons also conceptualised illness as ‘deviance’. Even apparently non-motivated illnesses such as accidents or degenerative and infectious diseases embody motivational

aspects in so far as an individual might consciously or unconsciously expose themselves to risk (Gerhardt, 1989).

Parsons in furthering his argument coined the term ‘sick role’ referring to the niche that is provided for the individual to recuperate from illness free from the stresses of everyday life. “Sick role” contains four features: two described as ‘rights’ of person and two as ‘obligations’. The two rights are a) exemption from normal social roles. b) exemption from blame for ill health. Two obligations include: a) to seek competent professional help and cooperate with the physician or other health providers. B) to get well and assume his/her roles.

However, while ‘sick role’ provides legitimacy and recognition for a person who is sick and society obligation to its members to get well, yet it has been criticised in the literature. Criticisms can be grouped as follows:

1. Entry to sick role is not as straightforward as Parsons suggests (Frank, 1991:205).
2. Ill health is not morally neutral in the way that Parsons implied.
3. The sick role pertains to acute conditions and can’t relate to chronic illness.
4. Parsons assumes that patients are passive and willingly comply with the physicians whereas this is not the case. Based on these theoretical and philosophical frameworks, biomedical model developed a set of principles and assumptions that will be discussed further.

VI. PRINCIPLES OF THE BIOMEDICAL MODEL

Biomedical model is based on a number of assumptions which can be described as follows: (These are extracted from: Hardevy, 1998:9):

- Dualistic: the divide between mind and body is at the heart of biomedical model.
- Mechanistic: causes and rules are open to ‘discovery’, classification and understanding by scientific methods.
- Reductionist: biological explanations of disease are sought out from the observed behaviours of the body and the particles associated with the conditions.
- Empirical: knowledge is generated by observation and can be confirmed through a process of experimentation.
- Interventionist: medical knowledge can be applied to ‘repair’ damage or sick biological systems.
- Disease is an affliction of the body and is separate from the psychological and social processes of the mind.
- Every disease has a specific pathologic origin whose treatment can best be accomplished by removing or controlling its distinctive causes
- The person as a unique individual is not included in the biomedical mode (Engel, 1981).

The biomedical model has been very useful and using it as a guide, researchers have made enormous achievements. The persistence of the biomedical model is undoubtedly due to its great success in treating infectious diseases. Research in microbiology, biochemistry, and related fields resulted in the discovery and development of a large variety of drugs and drug-based techniques for effectively treating many diseases.

Medical scientists and researchers conquered many infectious diseases, such as polio and measles, through the development of vaccines. They also developed antibiotics, which made it possible to cure illnesses caused by bacterial infection. This approach became medicines' primary method for dealing with many of the problems it is called upon to treat, as its thinking became dominated by the use of drugs as 'magic bullets' that can be shot into the body to cure or control afflictions (Dubos 1960). We have daily news on how clinical science and technology working with one another and characterized the cutting edge of modern medicine. Thus progress has been made and continuing with enormous speed.

However, despite these great advances in understanding disease and their treatments, the biomedical model has become under significant criticism from both within medicine and from a range of social and behavioral disciplines such as sociology and psychology.

At the heart of criticism is the dualism of body and mind. In fact sociology of the body is concerned to demonstrate the dialectical (or two-way) relationship between the physical body and human subjectivity, often expressed through the concept of the 'lived body'. This conception is, in fact, part of a theoretical legacy that predates thinking that now goes under the banner of the sociology of the body. In this context, feminist work has been important although often under acknowledged. Also phenomenology has made great contributions, particularly through the work of Merleau-Ponty, which stresses the irreducible fusion of mind and body. "The vision of soul and body is not an amalgamation between two mutually external terms, subject and object, brought about by arbitrary decree. It is enacted at every instant in the movement of existence" (1962: 88-9). Further in this context and in discussing our experience, Annandale (1998: 75) states: "Our being-in-the-world, is lived through our body's habitual relation to the world".

Biomedical model is also based on the premise that every disease has a specific pathogenic origin whose treatment can best be accomplished by removing or controlling its cause using medical procedures. Often this means administering drug to alleviate or cure the symptoms. According to Kevin White (2006), this view has become the taken-for-granted way of thinking about sickness in Western society. The result is that sickness has come to be regarded as a straightforward physical event, usually a consequence of a germ, virus, cancer, or genetic affliction causing the body to malfunction. "So for most of us" states White (2006:142), "being sick is a biomedical process that is natural and not anything to do with our social life". This view still is prevalent despite the fact that it now applies to only a very limited range of medical conditions (Cockerham, 2007:6).

Another criticism of the biomedical model is its tendency towards victim-blaming (Rayan 1971). Biomedical model also ignored to acknowledge that improvements in living conditions, especially diet, housing, public sanitation, and personal hygiene, were important in eliminating much of the threat from infectious diseases. There is general agreement in the research literature that a rise in living standards naturally improves health and reduces mortality (Nettleton 2005).

Research also indicates that increased capacity to purchase goods and services, along with better work conditions, had a stronger effect on reducing mortality than improvements in nutrition and sanitation. In this instance, the decisive variable was ultimately structural namely, the collective actions of workers in obtaining higher wages and an improved work situation (Blane (1997).

Another important point that has been discussed in the literature relates to 'the neutrality' of medicine and 'free-value' principle of biomedical perspective. Medical knowledge and the medical profession are constructed through complex social processes that embrace the apparently neutral and objective sites of scientific endeavor such as the laboratory (Latour, and Woolgar, 1979). As the history of biomedicine suggests, the practice of medicine contains social and political dimensions that may be obscured by the faith invested in medical neutrality. The development of the natural sciences from the eighteenth century transformed the understanding of human sexual difference by situating it with the different anatomies of men and women. "These differences were seen not only in reproductive organs and functions but as science advanced in every aspect of women's bodies. Menstruation became identified in animals and women. Deviation in the menstrual cycle were thought to produce insanity and by the late nineteenth century this accounted for a significant number of admission to the asylum (Busfield, 1996). Attention to these and other features as well as to the mapping of such sex differences is important as they provided the basis for the exclusion of women from the public sphere. These criticisms have led to the development of social model of health.

VII. SOCIAL MODELS OF HEALTH AND ILLNESS

The term social model of health refers to approaches that focus on the social determinants of health and illness (Gerhardt 1989). In explaining the context of social model of health, Broom (1991:52) points out: "the social model locates people in social contexts, conceptualizes the physical environment as socially organized, and understands ill health as a process of interaction between people and their environments".

In explaining the differences between the two different approaches of biomedical and social model of health, Germov (2014:17) states: "While the biomedical model concentrates on treating disease and risk-taking among individuals, the social model focuses on societal factors that are risk imposing or illness inducing (for example, toxic pollution, stressful work, discrimination, and peer pressure". Social model also highlights the influences of social class, ethnicity, gender, occupation and income on health and illness of individuals and social groups. It is within this approach that the social model aims to alleviate health inequalities. We need to address poverty, employment opportunities, workplace health and safety in order to improve the overall health of the individual and the community.

In pursuing this reasoning, Bond and Bond (1986: p.11) compare aspects of healthcare with that of the social model

and points out: “These are rehabilitation, prevention of illness and the social management of illness, rather than on biological and medical aspects of health care”. In this context, social model gives equal priority to the prevention of illness along with the treatment of illness.

The social model has a number of features. Its first feature relates to the production and distribution of health and illnesses. In this process many illnesses are socially produced. For example “exposure to hazardous work practices are often beyond an individual’s control and therefore need to be addressed at societal level” (Germov, 2014:18). Its second feature relates to the way a particular society organizes, funds, and utilizes its health services. It is within this context that the dominant medical model significantly has shaped health policy and health funding to benefit its own interests. This is done through” largely by undermining preventive approaches and nursing, allied, and alternative health practitioners”. (Geromov, 2014:18).

Social model argues that the way society is structurally organized affects the etiology of health and illness. For example a major characteristic of modern western capitalist societies is their preoccupation with economic growth. In pursuing this aim, relevant social and economic policies are introduced that neglect a variety of health hazards. Analysis of productions and consumptions of food reveals the dominance of capitalists’ self- interests rather than focus for the healthy aspects of these processes. An obvious example is that “Sugar is probably the only known serious dietary cause of tooth decay” (Bond and Bond, 1986: 85).

In analyzing the fundamental causes of disease and illness of health and disease in a broader perspective, Link and Phelan (1995:80-94) point to factors such as socioeconomic status and societal inequality, race, gender, community and neighborhood, exposure to stressful life events of a social nature and access/ lack of, to a supportive social network.

Thus social perspective of health focuses on the social patterns of health and illness. It has become widely accepted that health, healthcare and illness cannot be understood in isolation. Patterns of disease, illness, treatment and provision of health services are crucially influenced by social class, ethnicity, gender, age and disability. Thus social and economic conditions and their effects on people’s lives determine their health status and their risk of illness. For example, the lower an individual’s socioeconomic position the worse their health (Adibi, 2014).

Social perspective also seeks social explanations for the illness rather than just focusing on biological and psychological explanations. It has become a common knowledge now that it is the living and working conditions that fundamentally shape why some groups of people get sicker and die sooner than others. Studies of morbidity (illness) and mortality (death) have consistently shown that the poor have the highest rates of illness. For example, Gavin Turrell (1999) and his colleagues by analyzing the data on health inequality conclude that socioeconomic differences in health are evident for both females and males at every stage of the life-course. Similarly, Waitzkin (2000) by undertaking social determinant approach explains that how poor living and working conditions such as

poverty, discrimination, lack of educational and employment opportunities, inadequate nutrition and housing directly influence the state of health and illness.

Another obvious factor supporting social perspective is life expectancy. The average life expectancy at birth of people living in least developed countries of the world is around 20 years less than that for developed countries such as Australia, which has an average life expectancy of 81.4 years (WHO 2008). It should be emphasised here that the high life expectancy of Australian people “is not due to any biological advantage in the Australian gene pool, but is rather reflection of our distinctive living and working conditions”, (Germov, 2014:4).

However, the fundamental cause for the existence of such high discrepancy is found to be within social determinant of health referring to the complex, integrated and overlapping social structures and economic systems. This includes social and physical environments and health services (WHO, 2010).

However, it is important here to emphasize that the social model does not deny the existence of biological or psychological aspects of disease that manifest in individuals, or deny the need for medical treatment. Instead, the social model highlights that health and illness occur in a social context and that effective health interventions, particularly preventive efforts, need to move beyond the medical treatment of individuals. As Germov points out (2014:16) the social model is not intended as a replacement for the biomedical model but rather coexists alongside it”. It is within this context that mHealth has the potential and capacity to build the bridge between these two perspectives. This of course requires mutual understanding of the contexts and social nature of our living as well as valuing and supporting the role of new technology, and mHealth in particular.

VIII. MHEALTH: BUILDING BRIDGES BETWEEN BIOMEDICAL AND SOCIAL MODELS

mHealth has enormous potential to bring the biomedical and social models of health together and increasingly bridge the gaps to reach to a realistic balance between these two perspectives. It is within this context that discussions will be presented in areas that are more in the domain of social model of health than biomedical perspective. However discussion on culture, gender and domestic violence, for example, clearly reveal that how peoples’ health status are greatly influenced by these factors and how mHealth applications have the potential to bridge the biomedical and social model of health in these areas

Our social life is organized and influenced by culture. There is increasing recognition of the important role of culture as a factor associated with health and health behaviors. Culture is also considered to be a potential means of enhancing the effectiveness of health communication programs and interventions.

Culture is dynamic and one of the most obvious drivers of change is technology. Mobile phone advancement during last two decades created an opportunity to be used in health domain as well. This has led to the development of mHealth. Despite technological advancement, cultural understandings

and structure of health care play important parts in determining health and illness. In order to understand the reasons behind the use/resist to use mobile technology in health area, we need to understand the cultural context.

At present digital culture is flourishing and influencing many areas of our lives. For example, there are growing awareness and use of mobile phones with little resistance in a number of areas including: the rise of mobile learning, mobile commerce, mobiles for information and entertainment. However, mobile phones increasingly are used in Doctor-patient interactions.

Evidence indicates that the use of mobile phones will enhance doctor-patient interactions leading to improvement of patients' health status. Tirado, (2011:2) in his research indicates that: "The health of Hispanics and other minority populations can be improved by accessing mobile devices to receive vital health messages, monitor their conditions, and receive other health-related wireless intervention".

In the larger context of 'patient support', for example, mobile phones will ease patients' communications not only with nurses and doctors but also with people close to patients and fellow patients who are suffering from the same disease. This is a visible reflection of the changing characteristics of our cultural norms and cultural worlds.

A critical part of all doctor-patient interactions involves eliciting information from the patient. There is increasing evidence acknowledging that mHealth can enhance the communication between doctors and patients through the flow of information (Forgas, 2010). The core skills which are needed to facilitate the process of information gathering are skills which help to facilitate the patient involvement in the medical interview in a way that enables the doctors to arrive at an accurate diagnosis of a patient's problem or symptoms (Weiner, 2012). This also has implications in social model of healthcare. It has become a common knowledge that patients are not passive rather they are the primary source of information about their own health. By empowering them, they become more able to provide detail information about their situation that a physician needs in order to reach an accurate diagnosis. In this context mHealth can play a significant role if both parties are able and willing to undertake this method and use mHealth rather than face-to-face interactions.

This is already happening and literature in this area indicating the growing direct use of mobile phones as an alternative to face-to-face patient/doctor visits (Caffery & Smith, 2010) Heaney and Elwyn and Sheikh, 2010). Now there is visible possibility by using non-voice applications technology can be used to reach patients even when they are away from healthcare settings. Thus smartphone can add a distinctive opportunity for the exchange of further information leading to better communication between doctors and patients with much improved outcomes (Adibi, 2014). In fact, mHealth has been shown to increase knowledge, encourage healthy behaviors, and improve chronic and acute disease. These areas can be considered to be the domains of both biomedical and social models of healthcare.

In addition, patient communications with family and friends becomes an essential element of support and comfort. Thus mHealth has the capacities to improve patients' engagement

and empower them to better express and explain their opinion and views on their health conditions. mHealth has the capacity to make health care safer by giving patients tools to manage their own health. While this discussion mostly relate to the domain of social model of healthcare system, yet the role of mHealth in the interaction between doctors and patients can be used in both models of health care and bring these two perspectives closer.

The use of mHealth also has interesting implications in the area of gender. For example women have higher rates of illness, but men die younger. Women have more frequent illness and disability, but the problems are usually not life threatening ones. In contrast, men suffer more from life threatening diseases, and these cause lead to more permanent disability and earlier death for them.

The sexual division of labor has tended to concentrate men in the occupations in which health hazards are greatest. Certain occupations are significant sources of injury and disease. These include construction, mining, waterside work and farming which are mainly done by men (Adibi, 2014). In addition, men especially young men and adolescents are more likely to engage in a range of dangerous activities such as risky driving, contact sports, and physical aggression. Consequently, males suffer higher rates of non-intentional and intentional injury (Broom, 2009).

In discussing gender bias in society, World Health Organization states: "Gender biases in power, resources, entitlements, norms and values, and the way in which organizations are structured and programs are run damage the health of millions of girls and women (WHO, 2008). While this has wider implications in the use of health resources, it also creates great potential for mHealth applications in gendering health. For example, mHealth applications can provide access to health information to millions of people, particularly to women and young girls in sensitive areas of health that has not been available publicly. Particularly access to information in sex education would be a huge step forward to educate millions of teenage boys and girls in developing countries with modest costs.

Another aspect of the gender inequalities relates to power and control within the family unit. One of the prevalent unhealthy examples is the occurrence of domestic violence and how mHealth can be developed and used to save people's lives in such dangerous situations.

For human beings, homes are our social, cultural, physical and environmental heritage for all yet for many women home is a place of pain and humiliation (Adibi, 1999). Family/partner violence happens in many forms including physical, sexual, emotional, spiritual, social, economic and psychological abuse. It can occur within any relationship and is about the power and control.

Domestic violence is a complex issue and there is no single cause that leads to abuse. However, there are a number of risk factors associated with perpetrators and victims of violence. For example alcohol is a significant risk factor causing domestic violence particularly in indigenous communities (Michell, 2011:2).

Domestic violence is a serious health problem and it affects people from infants to the elderly and in all stages of life. While governments provide services to assist victims yet mHealth can play a distinctive role in this area. There have been attempts to produce mobile phones that by pushing one button it is immediately connected to the police. One of the examples of such smartphones is called Aurora and developed by Komosion for Women NSW, part of the NSW Government of Family and Community Services (ABC News, 2013). However, developing such applications requires the cooperation and close working of technologists with social scientists to complement both technological innovations with social and health aims.

IV. CONCLUSIONS

The health of human beings and the health of the whole world can be maintained through a dialectic balance between the needs of people (including social, physical, biomedical, spiritual, mental, cultural, economic and political) and the satisfaction of such needs by the appropriate utilisation of relevant human and environmental resources. However, in 21st century our healthcare system is facing a pervasive global challenge with huge ramifications for costs and human welfare. The medical model of healthcare as the dominant model is facing many of these serious challenges. It is obvious that the cost of health delivery is increasing exponentially across the globe. At the same time, people living longer and populations aging. All these have implications for present healthcare system.

Alongside this is the advancement of mobile technology and smartphones and in particular mHealth applications increasingly attracting attentions both within and outside of the dominant medical model. In fact traditional boundaries around biomedicine and the social world fracture and health is deeply embedded in our social world. It is also growing recognition that the new technology is providing exciting opportunity to deal with these challenges. In particular mHealth applications have demonstrated excellent potential to deal with these challenges in a number of areas both in biomedical and social model of health. This very recognition also is opening a fresh avenue to build bridges between the two models in a holistic manner to tackle health problems in many fronts and for millions of people. Of course mHealth itself is facing a number of great challenges but it has the capacity not only overcome these challenges but also enhance the cohesiveness of holistic approach in bridging the existing gaps between the two models of health. It is in this context that more research is needed to be undertaken and requires not only intellectual but also financial backing in order to take worthwhile positive steps forward. Therefore, this article recommends that mHealth needs to be incorporated into the formal trainings of medical as well as allied health professionals and practitioners. By taking this approach, then, it is possible to consider mHealth as a viable bridge between the biomedical and social models of health and disease.

REFERENCES

- [1] ABC News: www.abc.net.au/news/2013-05-06/smartphone-technology Australian Bureau of Statistics 1996, *Women's Safety Australia*, Cat.no. 4128.0, ABS, Canberra.
- [2] H. Adibi, "Social Perspectives on Health: mHealth Implications" in Adibi, S (Ed) (2014). *Mobile Health (mHealth): Multidisciplinary Verticals*. Published by: Taylor & Francis (CRC Press).
- [3] H. Adibi, "Health Homes" in Honari M and Boleyn T., *Health Ecology: Health, Culture and Human-environmental Interactions*. Published by Rutledge, 1999, PP.193-206.
- [4] A. Ellen, *The Sociology of Health and Medicine: A Critical Introduction*, published by Polity Press, 1998.
- [5] J.M. Atkinson, "Discovering Suicides in the social Organisation of Sudden Death" Macmillan, London
- [6] D.Blane, M. Bartley, and G. Davey Smith, 'Disease Aetiology and Materialist Explanations of Socioeconomic Mortality Differentials', *European Journal of Public Health*, 1997, pp.385-91.
- [7] J. Bond, and S. Bond, *Sociology and Health Care*, Churchill Livingstone, London, 1986.
- [8] T.B Bottomore, *Sociology As Social Criticism*. George Allen & Unwin: London, 1975.
- [9] D. Broom, 'Gender and Health', in Germov, John (2014, 5th Edition) *Second Opinion: An Introduction to Health Sociology*, Oxford University Press, Australia.
- [10] J. Busfield, J. Men, women and Madness: *Understanding Gender and mental Disorder*, Basingstoke: Macmillan, 1996.
- [11] L. Caffery, and A.C. Smith. "A literature review of email-based telemedicine", *Stud Health Technol Reform* 2010, pp. 161: 20-23.
- [12] N. Carlson. *Philosophy of Behaviour*. Massachusetts: Pearson: Allyn & Bacon, 2001.
- [13] W. Cockerham. *Social Cause of Health and Disease*. Polity Press, 2007.
- [14] R. Dubos. *Mirage of Health*. London: George Allen and Unwin. As historian Roy Porter (1997:595), 1960.
- [15] G.L. Engel, "The Need for a New Medical Model: A Challenge for Biomedicine" in *Concepts of Health and Disease*, edited by A. Caplan, H. Englehardt and J. McCartney. Reading, MA: Addison-Wesley, 1981.
- [16] Forgas, 2010). Forgas, Joseph P., (2012) "Affective Influences on Interpersonal Behavior: Towards understanding the Role of Affect in Everyday Interactions", in Forgas, Joseph P.,(ed) (2012) *Affect in Social Thinking and Behavior.*, Published in UK: Taylor & Francis Group.
- [17] A. Frank. "From sick role to health role: deconstructing Parsons". In R. Robertson and B. Turner (eds) *Talcott Parsons: Theorists of Modernity*, London: Sage, pp. 205-16, 1981.
- [18] J. Germov, "Imaging Health Problems as Social Issues", in John Germov (2014) 5th edition *Second Opinion*. Oxford University Press.
- [19] U. Gerhardt. *Ideas about Illness*. Cambridge Polity Press, 1989.
- [20] U. Gerhardt. *Ideas about Illness*. Basingstoke: Macmillan, 1989.
- [21] E. Grosholz. *Cartesian Method and the Problem of Reduction*. (<http://books.google.com>) Oxford University Press, 1991.
- [22] M. Hardey. *The Social Context of Health*. Published by Open University Press, 1998.
- [23] D. Heaney, G. Elwyn, and A. Sheikh. "The quality, safety and content of telephone and face-to-face consultations: a comparative study", *Qual Saf Health Care* 2010, 19, pp. 298-303.
- [24] *Internet Encyclopaedia of Philosophy* <http://www.iep.utm.edu/descarte>
- [25] H. Jeabek. Paul Lazarsfeld – The Founder of Modern Empirical Sociology: A Research Biography. *International Journal of Public Opinion Research*, 2001, 13, pp. 229-224.
- [26] B. Latour, and S. Woolgar. *Laboratory Life: The Social Construction of Scientific Facts*. London: Sage, 1979.
- [27] B.G. Link, and J. Phelan, "Social Conditions as Fundamental Causes of Disease" *Journal of Health and Social Behaviour*, 1995, Extra Issue:80-94.
- [28] J. Macionis, John. *Sociology 14th edition*, Boston: Pearson, 2012.
- [29] M. Merleau-Ponty. *Phenomenology of Perception*. London: RKP, 1962.

- [30] L. Michell, "Domestic violence in Australia – an overview of the issue", *Parliament of Australia*, www.aph.gov.au/about_parliament/Parliamentary_Department, 2011.
- [31] S. Nettleton. *Power, Pain and Dentistry*. Buckingham: Open University, 1992.
- [32] S. Nettleton "The Sociology of the Body" . In *The Blackwell Companion to Medical Sociology*, ed. William Cockerham, 43-63. Oxford, UK: Blackwell, 2005.
- [33] T. Parsons. *The Social System*. New York: Free Press, Parsons, Talcott (1954). *Essays in Sociological Theory*. The Free Press: New York.
- [34] W. Rayan. *Victim Blaming*. Vintage, New York, 1971.
- [35] B. Russell *History of Western Philosophy* (<http://books.google.com>), 2004.
- [36] M. Tirado. "Role of Mobile Health in the Care of Culturally and Linguistically Diverse US Populations", *Perspect Health Inf Manage*, 2011 Winter; 8 (Winter): 1e. PMID: PMC 3035829.
- [37] Turrell, G., Oldenburg, B., McGuffog, I. & Dent, R. *Socioeconomic Determinants of Health: Towards a National Research Program and a Policy and Intervention Agenda*, Centre for Public Health Research, School of Public Health, Queensland University of Technology, Brisbane, 1991.
- [38] D. Wainwright. *Illness Behavior and the Discourse of Health*, in Wainwright, David (2008) *A Sociology of Health*. SAGE Publications.
- [39] H. Waitzkin, *The Second Sickness: Conditions of Capitalist Health Care*, 2nd ed, Rowman & Littlefield, Lanham, 2001
- [40] J.P. Weiner, "Doctor-patient communication in the e-health era", *Israel Journal of Health Policy Research*, 2012, pp.1:33. www.ijhpr.org/content/1/1/33
- [41] K. White. *An Introduction to the Sociology of Health and Illness*, second edition, SAGE Publication: London, 2009.
- [42] WHO, (2008) World Health Report www.who.int/social_determinants/
- [43] WHO (2010) NCHSTP White Paper on Social Determinants of Health, "Establishing a Holistic Framework to Reduce Inequalities in HIV, Viral Hepatitis, STDs, and Tuberculosis in the United States" www.cdc.gov/socialdeterminants/doc/SD4-White-Paper-2010.