

Do biomedical models of illness make for good healthcare systems?

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Current medical models assume that all illness is secondary to disease. Revision is needed to explain illnesses without disease and improve organisation of health care

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Cultural and professional models of illness influence decisions on individual patients and delivery of health care. The biomedical model of illness, which has dominated health care for the past century, cannot fully explain many forms of illness. This failure stems partly from three assumptions: all illness has a single underlying cause, disease (pathology) is always the single cause, and removal or attenuation of the disease will result in a return to health. Evidence exists that all three assumptions are wrong. We describe the problems with current models and describe a new model, derived from the World Health Organization's international classification of functioning framework,^{1 2} that provides a more comprehensive, less biologically dependent account of illness.

Importance of models for understanding illness

The model of illness adopted by society can have important consequences. In the first world war, for example, soldiers complaining of symptoms after experiencing severe stresses were sometimes shot as malingerers, but today they are considered victims and eligible for financial settlements. Social acceptance that a behaviour or reported symptom constitutes an illness bestows privileges on an individual and formal duties on society.³

Currently, most models of illness assume a causal relation between disease and illness—the perceived condition of poor health felt by an individual. Cultural health beliefs and models of illness help determine the perceived importance of symptoms and the subsequent use of medical resources.⁴ The assumption that a specific disease underlies all illness has led to medicalisation of commonly experienced anomalous sensations and often disbelief of patients who present with illness without any demonstrable disease process.

Current models of illness

Despite their importance, models of illness are rarely explicitly discussed or defined. The often criticised but nevertheless dominant 20th century biomedical models originate from Virchow's conclusion that all disease results from cellular abnormalities.⁵ The biomedical model is clearly relevant for many disease based illnesses, has intuitive appeal, and is supported by a wealth of supporting biological findings.

By embracing reductionism, however, biomedical models of illness combine several closely related sets of beliefs. These can be summarised as follows:

- All illness and all symptoms and signs arise from an underlying abnormality within the body (usually in the functioning or structure of specific organs), referred to as a disease
- All diseases give rise to symptoms, eventually if not initially, and although other factors may influence the consequences of the disease, they are not related to its development or manifestations
- Health is the absence of disease
- Mental phenomena, such as emotional disturbance or delusions, are separate from and unrelated to other disturbances of bodily function
- The patient is a victim of circumstance with little or no responsibility for the presence or cause of the illness³
- The patient is a passive recipient of treatment, although cooperation with treatment is expected.

Many different models of illness exist, originating in professions,^{w1 w2} specialties,^{w3} and elsewhere.^{w4} The social model primarily focuses on the causation of disability by society rather than the whole spectrum of illness.⁶ The biopsychosocial model is perhaps the most popular.^{7 w4} Over 400 Medline titles include the word, and it is increasingly used in many areas of medicine.^{w5-w8} In contrast to the biomedical model, it recognises that psychological and social factors influence a patient's perceptions and actions and therefore the experience of what it feels like to be ill.



TOPPHOTO

Changing attitudes to stress among soldiers since the first world war show the importance of medical models

P+ References w1-w26 and a table detailing implications of the model are on bmj.com

Current problems

People often experience anomalous sensations.^{8 w9} The model of illness adopted will influence whether a person or their health adviser interprets a change in their state as indicating disease,⁹ when someone should enter and leave the sick role, and often the health care given. Only a small minority of potential symptoms lead to involvement with health care, but a small change in the rate of interpreting anomalous sensations as symptoms by any party will have a major influence on the use of healthcare systems.

Being ill, and being allowed to enter the sick role, has social and personal advantages for the person.³ Sick people may be absolved from social responsibilities, they are not held responsible for their condition, and they will often be eligible for healthcare benefits for which they do not pay directly. The sick role is most effective when it is validated by a doctor, but increasingly other health and non-healthcare professionals contribute to validation; indeed, ill people can now classify themselves as sick—for example, through self completed incapacity benefit forms in the United Kingdom.

Already many patients present with symptoms that are not attributable to any underlying pathology or disease.¹⁰ Nevertheless, such patients are often given a medical diagnosis, implying an underlying structural cause and reflecting cultural expectations.

Unfortunately, the use of diagnostic labels has implications for the patient, society, and ultimately for the credibility of medicine. Any illness provided with a (medically validated) diagnostic label is widely assumed to be secondary to defined pathology, to be capable of confirmation independently of the symptoms, and to have a specific treatment that health services should supply.

The problems arising from illnesses without a definable cause have been well documented.¹¹ They are most appropriately termed functional somatic syndromes,^{12 w10 w11} recognising that psychological and social factors strongly influence the presentation of somatic symptoms.^{w12} However, suggesting that patients do not have a disease (pathology) to explain their illness may understandably upset them¹³ and creates difficulty for healthcare bureaucracy which relies on the patient's specific disease label.

Funding is determined by diagnosis (in health related groups or similar) and ignores the initial cost associated with diagnosis (patients present with problems, not diagnoses). It also fails to recognise that a major part of healthcare cost relates to disability.¹⁴ Resources are primarily allocated for the diagnosis and specific treatment of disease. Little attention is paid to other interventions despite good evidence of their effectiveness. Examples include the provision of equipment,^{w13 w14} the use of specialist multidisciplinary stroke rehabilitation units,^{w15} and the altering of patients' beliefs.^{w16} Most healthcare systems also assume that treatment after diagnosis is brief and acts quickly. Indeed, the medical model might more accurately be termed the surgical model, given the pre-eminence of surgery in popular culture and health organisation.

Finally, most biomedical models also seem strongly linked to primitive forms of intuitive mind-body dualism. Health commissioners, budgetary systems, health-

care professionals, and the public all act as if there is some clear, inescapable separation between physical and mental health problems, ignoring evidence that a person's emotional state always affects their function and presentation of physical symptoms.^{w17 w18} For example, separate services exist for people with physical disability and for those with mental health problems.

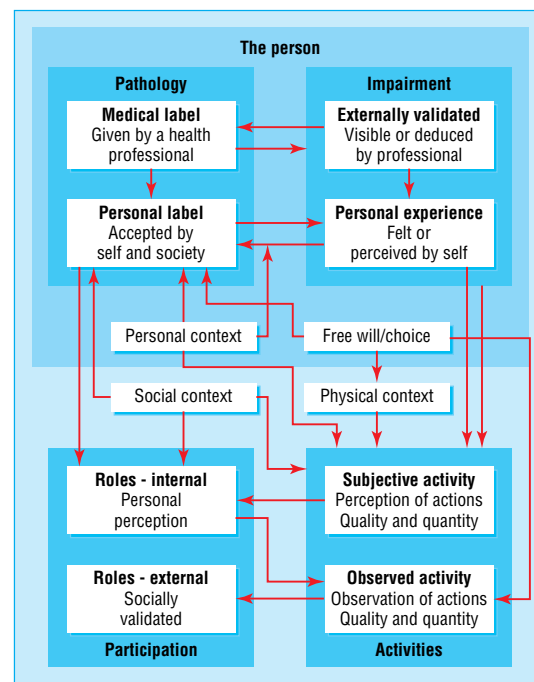
New model

Two main factors fostered our new model. Firstly, WHO's international classification of impairment, disability and handicap^{w19} and its later development, the international classification of functioning, disability and health,² both recognise that disease has consequences at different levels, often influenced by contextual factors. Secondly, the power of a systems analytical approach to illness has been recognised.^{7 15 w2} An earlier version of this model formed the basis of the UK national guidelines on stroke and multiple sclerosis.^{w20 w21}

The main modifications to the international classification of functioning model are:

- A division of each main domain into a subjective (patient experienced) and objective (externally observed) component¹⁶
- The addition of a further human factor that is essential in any analytical model—namely, the potential contribution of free will and personal choice¹
- A clarification of context, with separation of personal and social contexts.

Our model (figure) suggests that illness is a dysfunction of the person in his (or her) physical and social environment. It is centred on the (ill) person, who does not necessarily have to consider himself ill (for example, if someone is deluded). The model suggests that people with illness should be considered as follows:



Proposed model of illness

Example case

A 54 year old man who had a stroke eight months ago. He still has some weakness in his left leg and clumsiness in his left arm. He has not returned to his work in a hospital finance department and is depressed and irritable. His condition can be considered in the following domains:

Pathology

Objective (medical) description—Mild stroke (right lacunar infarct) due to hypertensive vascular disease, with incidental osteoarthritis of the right hip
Subjective (patient's) description—Severe stroke

Impairment

Objective description—Mild clumsiness of the non-dominant left hand with slight weakness of the left leg and mild hip pain. Cognition is normal
Subjective description—Left arm is useless and the left leg is weak and unreliable

Activities

Objective description—Good recovery of personal activities and has the ability to do most activities if he wishes
Subjective description—Still feels severely disabled, unable to garden, fish, or work or to shop alone

Participation

Objective description—He has returned to being a father and husband and a few roles within family and close friends.
Subjective description—Still feels a patient, unable to fulfil any roles well

Personal context

His expectation was for a full recovery; he is still afraid that any stress will cause a second stroke; he believes that work and anything outside the house is stressful; he wants more treatment to cure him

Social context

His wife and friends tell him to take it easy and offer to do anything to help, including paying for private therapy once a week. They want him to get a disabled badge and are angry that it is not given. His employers want him signed off as fully fit and to return to work full time

Physical context

He can access all parts of his house and wear and use normal things. Work is also accessible.

The primary problem here is a disjunction between the view of the healthcare system and the view of the patient and his immediate friends and family. The best solution is to take time to educate him and his family, to help his self confidence in community activities, to help him back to driving his car, and to persuade his employers to take him back on a planned and agreed graduated basis over several months. Therapy as such should not be given because it reinforces the patient role. His mood disturbance is secondary to his loss of roles.

- People have two major systems—their whole self, with dysfunction termed impairment, and their organs, with dysfunction called pathology
- Two influencing factors affect each person—personal context (that is, beliefs, attitudes, expectations, values etc, which derive partly from past experience) and free will
- Each person interacts with two contexts—physical and social or cultural

- The interactions are considered in term of activities (which are usually goal directed actions) and (social) participation (which reflects the meanings attributed to their behaviours by themselves and others).

Implications of new model

This model has many implications (see table A on bmj.com). One characteristic of a systems model is that abnormalities in one system can occur without any of its components being faulty, and so the model explicitly predicts that illness will occur without discernable pathology. The mystery of non-organic or functional¹² illness is no longer medically unexplained.¹⁷ This analysis does not deny the reality of the illness but rather provides the rationale and support for explanations and treatments that direct their focus to the non-medical reasons why people may feel ill.

This model also predicts that the effects of an abnormality may depend crucially on the characteristics of other parts of the system. For example, hip arthritis may become apparent only after a stroke affects the other leg. Consequently, reduction of illness may require intervention at several points, and indeed may not necessarily include removal of the main abnormality; this may explain the success of specialised stroke rehabilitation.^{w15}

The model suggests that some resources should be focused on altering contextual factors. Evidence already supports this approach: teaching carers of stroke patients benefits both the patient and healthcare systems^{w22 w23}; changing social context^{w24} may be effective—for example, reducing time off work with back pain^{w25}; altering personal context may help in some illnesses^{w26}—for example, using cognitive behaviour therapy^{w16}; and improving the physical context reduces expenditure on health care.^{w13}

The role of personal choice, absent in many biomedical models of illness,¹⁸ is central to any progressive explanation of human behaviour: “People are rational, aware self creating agents of their own health ... influenced by consciously chosen goals.”¹⁹ Personal choice plays an important part in the genesis or maintenance of illness, particularly in and through the domain of activities.

This model also illuminates some of the current stresses within health care and illness related benefits systems. Systems focused on pathology (that is, hospitals) work in short time scales and ignore all patient context. However, they have to manage patients with activity limitations, in whom the time scale is longer and context is important. A coherent approach to rehabilitation inevitably requires action from other agencies such as social, housing, or employment services. When the characteristics (speed of priorities, available interventions) across organisational boundaries do not match each other or the needs of the patient, stresses may arise (often referred to as bed blocking in hospital).

Conclusion

The new model undoubtedly has several weaknesses but it strives to provide a fuller understanding of the factors involved in illness at the level of both the

Summary points

Traditional biomedical models of illness focus attention on discovering the pathology rather than understanding the illness

Biomedical models have been associated with huge improvement in medical care

They do not explain functional somatic syndromes and illness without discernable disease.

An expanded model of illness is proposed which emphasises that disease is only one factor contributing to illness and illness behaviour

Widespread adoption could facilitate improvement in delivery of health care and reduce incapacity for work

Contributors and sources: DW has long experience of neurological rehabilitation that has always included a minority of patients with activity limitation not fully attributable to disease. PH has discussed such patients and has investigated some. Both authors have searched the literature, and have discussed models of illness and the process of rehabilitation with each other endlessly. DW is the guarantor.

Competing interests: None declared.

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individual and healthcare systems (box). The model could also be applied outside the health arena—for example, to people in the criminal justice system.¹

Healthcare systems are social organisations, and their continuing health depends on members of society using a congruent model of illness and system of values to decide the rights and responsibilities associated with illness and the sick role, and how these are to be policed where individuals choose to take advantage of the role. We suggest that the use of our model might improve the delivery of better health more than any other change in healthcare organisation. It is time that the medical models underpinning health delivery were debated openly.

A memorable patient

In at the deep end

11 am, 8 August 1998—a date that I shall never forget. It was the day after I had landed in Nairobi, Kenya, where I was to spend my elective. The telephone in my room woke me up. It was my supervising doctor. "There has been a bomb blast at the US embassy in town, we need everyone medically trained in casualty now." With that he hung up.

"I'm not due to start my elective for another week," I thought to myself as I rushed to the hospital. "Nor am I medically trained," I panicked as I entered the hospital grounds. The image that greeted me still haunts me. There were bodies scattered everywhere, and scores more people were being rushed to the hospital by any mode of transport. Most victims had burns or extensive lacerations caused by bomb shrapnel and the falling glass from the surrounding buildings.

In the face of indescribable terror, pain, confusion, and grief, I was expected to treat patients completely unsupervised. "Do whatever you can," barked my supervisor, struggling to stem torrential blood flow from someone's neck. It was then that I saw a young boy sitting timidly in a corner. His face and once pristine white school shirt were drenched in blood. Examination revealed

an 8 cm forehead laceration. All the theatres were full, so I had to suture this large laceration under local anaesthetic. Amazingly this stoic 6 year old didn't even whimper once. He subsequently attached himself to me and shadowed me wherever I went in the casualty department. It wasn't until his petrified parents came into the department searching for him that he started crying. He gave me a big hug and left with his very relieved parents. He was one of the lucky ones—the death toll from that abominable incident was substantial.

On a beautiful tranquil day several weeks later the boy came into the casualty department accompanied by his parents. They had come to thank me for looking after their only child. The scar was slightly uneven but had otherwise healed well. I couldn't help but feel proud of my first postoperative result.

We exchanged email addresses, and I regularly receive correspondence from the boy and his family. His most recent email disclosed that he had started dating a girl. She is his first ever girlfriend—apparently she loves his scar.

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