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Implementing Twaddle Triad to Reach a New Framework for an Integrative and Innovative Medicine

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Abstract: The concepts of disease, illness, and sickness, included in Twaddle triad, capture fundamentally different aspects of human health including medical, personal, anthropological, and social related phenomena. All the aforementioned scientific disciplines offer a variety of valuable insights, but they are not strongly connected to each other to describe a unique vision of health phenomena, and this represents a gap in the current literature. This article provides a review of the theoretical discussions on the Twaddle Triad, considering critiques and elements of interest, analyzing its connections with the concepts and the processes of recovery. The concept of recovery has been fully linked to Twaddle triad by means of its three main processes, curing, healing, and habilitating, in order to arrive to a new framework proposal that is able, connecting variables and attributes of each framing concept, to better describe and deepen multifaceted elements around different types of health problems.

Keywords: illness, sickness, disease, recovery, Twaddle triad

Introduction

Definition of Health

Defining health is not simply a conceptual element. It is a matter of definition because it has several connections for health services, practice, and policy.[1] The concept of health strongly influences how it is socially constructed in contemporary society.[2] Social representations of health influence health needs and expectations, health systems, policy makers, and several other important aspects of health. Health perception has an important influence on people's health behaviors.[3]

The definition of health has undergone significant evolution over time. Indeed, "Western medicine was initially developed in the 19th and early 20th centuries focusing on a reductionist concept of health, based on the absence of diseases or infirmities and defined by physical parameters".[1]

Only recently has this cartesian and mechanistic vision of health been modified thanks to the World Health Organization (WHO), which introduced a multidimensional and multidisciplinary approach to the concept of health, defining it as a "state of complete physical, mental and social well-being, not merely the absence of disease or infirmity".[4] Over the course of a century, this definition has spread throughout the world and played an important role in the development of national health systems. However, the WHO definition of health is not appropriate for addressing the new challenges facing society. One of the main reasons for this has been the claim that health is confused with happiness or complete well-being. As the saying goes, if health is understood as life, many problems arise. People are in a perfect state, when they feel happy. Because health care is an important process in achieving health, it seems that all areas of human life fall under the control of health-related institutions, especially medicine. For example, if one is sad, one is not very happy, therefore they are not very healthy and vibrant. Consequently, according to the WHO constitution,

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there seems to be a legitimate demand for the use of mood-enhancing drugs and other medical means to make people potentially healthy, ie happy.[5]

According to Daniel Callaghan,[6] the most common complaint about the definition of WHO is that it is broad, especially its relationship between health and well-being and good intentions, which have many implications. The pursuit of perfect health appears to be a danger to most people.[7]

The concept of health is also changing due to the effects of globalization, which fundamentally facilitates the daily movement of people, animals, technology, goods, capital, and services are also changing.[8] For these reasons, another approach was also introduced, namely one health. The One Health concept is a revitalized and improved version of the One Medicine concept developed in the 1960s.

The One-Medicine concept was developed by Calvin Schwabe in the 1970s.[9] It revitalizes and improves the One Medicine concept developed by Calvin Schwabe in the 1970s. Humans and animals are inseparable in nutrition, life, and health. It will guide research and capacity-building efforts for the prevention, detection, and response to communicable diseases. Moreover, adding the environment to One Health has greatly improved our ability to deal with today's complex health challenges.[10–12]

Twaddle Triad: Between Critiques and Elements of Interest

One of the models that has had a great impact in the medical humanities study of health and disease is certainly Twaddle's triad of disease, illness, and sickness.[13] This three-dimensional distinction has been noted in theoretical medicine since the 1950s,[14,15] but Andrew Twaddle first applied it in his doctoral thesis in 1967.[13]

According to Twaddle, disease is

> a health problem that consists of a physiological malfunction that results in an actual or potential reduction in physical capacities and/or a reduced life expectancy.[16]

Thus, 'Ontologically, disease is an organic phenomenon (physiological events) independent of subjective experience and social conventions. Epistemically, it is measurable by objective means'.[17]

> Illness is a subjectively interpreted undesirable state of health. It consists of subjective feelings states (eg pain, weakness), perceptions of the adequacy of their bodily functioning and / or feelings of competence,[16] and ontologically, this dimension is the subjective emotional state of the individual, often referred to as symptoms. Epistemologically, it can only be observed directly by the person. Indirectly, it is only accessible through the person's report.[17]

Sickness is considered a social phenomenon that creates new rights and obligations, and "Ontologically Twaddle conceives of sickness as an event located in society… defined by participation in the social system".[16] Epistemically, sickness is accessed by "measure levels of performance with reference to expected social activities when these levels do not meet social standards".[17]

Subsequently, this model was criticized and revisited by Lennart Nordenfelt, who argued that the triad is fruitful only in relation to general health theory.[18]

Nordenfeldt[18] argues that the definition of disease excludes central phenomena in modern medicine from consideration as disease, such as injuries, disabilities, and defects that reduce human capacities but are not explicitly included in the definition. Nordenfeldt also draws attention to the consequences of the claim that illness is a reduction in physical capacity. Thus, Nordenfeldt, while starting from Twaddle's assumptions, proposed some variations of the dimensions.[19,20]

Subsequently, both Twaddle's triad and Nordenfelt's criticisms were further taken up and explored in depth by Hofmann.[17] In particular, this author emphasized the need to consider the three dimensions as interrelated with each other. The researcher notes that this analysis reveals epistemological and normative differences between illness, sickness, and disease, in particular, the predominance of illness.[17]

At this point, we must discuss recovery, another important term related to regaining health, well-being, or a lost ability, including the ability to work and perform in society and that is directly related to Twaddle's triad as Friedman[21] states in this context. In particular, recovery is the return to the stage before illness, disease, or sickness. In other words, recovery is the return of a patient to his original state of health.[21]

In light of what has been reported so far, this article starts from a specific research question: how can Twaddle's triad be refined to better address the complexities of modern healthcare, considering critiques and evolving definitions of health?

Therefore, the purpose of this article is to attempt to make suggestions to Twaddle's triad in such a way as to make it more appropriate to the current healthcare context and, at the same time, to try to suggest other dimensions that could come into play in the model of which the medical humanities are able to grasp and analyze.

Materials and Methods

According to the purpose of the following paper, we used the methodology suggested by Gerrit van der Waldt.[22] We follow the 5 steps to construct a conceptual framework suggested by this scholar (Figure 1).

Step 1 Choose the Topic

In this study, the topic is to make Twaddle's three-stage argument more relevant to the current health care context, while at the same time suggesting other dimensions within the model that social scientist can grasp and analyze.

Step 2 Choose the Title

Considering the topic of the article, the appropriate title that focuses on the study aim and illustrates the relationship between different variables is *Implemented version of Twaddle's triad*.

Step 3 Isolate the Key Concepts and/or Constructs in the Title

We identified the following specific variables described in the literature:

- Disease
- Illness
- Sickness
- Recovery

Figure 2 illustrates the most basic conceptual framework for these key concepts.

However, such a simple sampling is insufficient to effectively guide the literature review and operationalize the research.

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Based on typical expectations of conceptual frameworks. Based on typical expectations of conceptual frameworks, this example cannot be considered a sufficiently complete stage. It is therefore necessary to unpack these concepts further; alternatively, these concepts need to be further framed.

Step 4. Do a Literature Review and Identify Related Concepts and Variables

Review relevant and updated research on the title of the study in general and on concepts and constructs in particular. Ideally, consult established scientific articles and peer-reviewed books, as these are more reliable sources of information.

This step is performed by formulating and answering questions such as *what to cover in the literature review*? And *which variables*?.

In this step, the content of the concepts will populate rapidly into more details and the broader design of the study will emerge. In the tabular columns below, the respective concepts associated with the title used as examples are expounded in more detail. This is performed by answering the mentioned questions, thus placing the study as a whole in sharper focus. The content of each dimension (ie right columns) is open for interpretation based on the particular a priori knowledge of the authors, research approach and methodology followed, as well as the thoroughness of the literature review. The content merely serves as a guideline for researchers embarking on a study of similar nature.

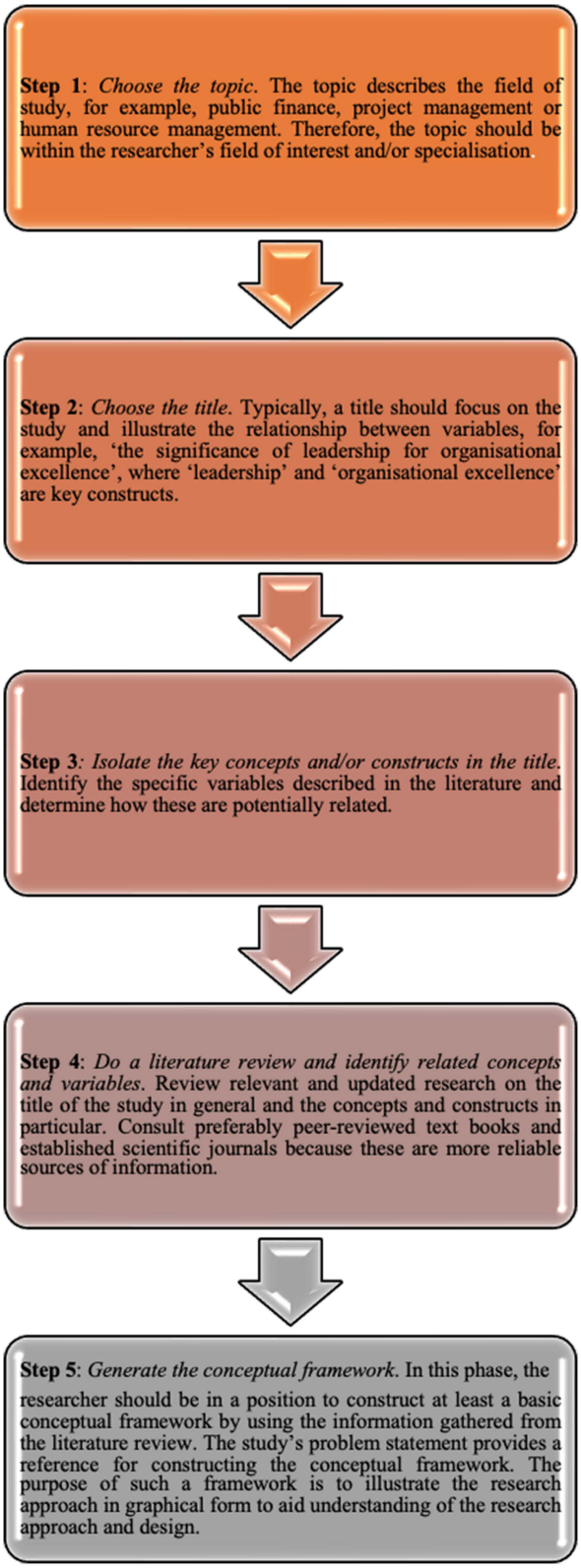

Figure 1 Flow diagram.

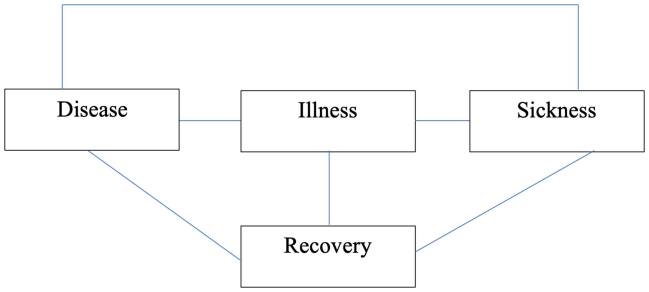

Figure 2 Basic conceptual framework.

Step 5. Generate the Conceptual Framework

At this stage, the information obtained from the literature review should be in a position to develop at least a basic conceptual framework. The research questions posed will serve as a reference for the construction of the conceptual framework. The purpose of this framework is to schematize the results.

Results

Each side's information can be interpreted based on the researcher's prior knowledge, the research methods and procedures followed, and the thoroughness of the literature review.

The Complex Dimensions of Disease

Table 1 shows the Framing concept regarding the concept of disease.

According to Twaddle, disease is

> a health problem that consists of a physiological malfunction that results in an actual or potential reduction in physical capacities and/or a reduced life expectancy.[16]

Disease state is objectively verified by objective elements of the disease state provided by the health provider to confirm the presence of functional impairment or distress. This moment of verifiability is performed by a medical expert (physicians or equivalent).[23] Disease is also considered a deviation from normal health standards; the absence of symptoms and signs indicates good health.[24]

The term disease also includes any condition related to the failure of adaptation to physiological changes, as it may occur during ageing and pregnancy.[25] Furthermore, any form of injury is included in the definition of a disease. Injury is

Table 1 Framing Concept 1-Disease

Question	Attributes
What to cover?	• Definitions of disease. • Typology. • Severity.
Which variables?	• Injury • Failure of adaptation to physiological changes (ageing, pregnancy;) • Acute disease or Chronic disease • Physical and or Mental disease • Asymptomatic disease or Symptomatic disease • Iatrogenic disease • Life threatening disease • Genetic or environmental disease • Communicable or non-communicable • Disability

tissue damage caused by the acute transmission of any of the five types of physical energy (kinetic/mechanical, thermal, chemical, electrical, and radiological) to an individual, or by a sudden interruption of the normal energy pattern required to sustain life.[26]

Considering the typology of the course of time, we can encounter acute and chronic diseases. Acute diseases generally have a sudden onset, short course, and are likely more likely to resolve as cure is usual. On the other hand, chronic diseases generally have a gradual onset, lengthy course, and unlikely to resolve as cure is rare.[27]

There are also physical and mental diseases. While the physical ones are related to the various systems of the body, the mental ones are related to the mind. Moreover, both kinds of diseases are intertwined as among factors related to subjects that suffer from mental disorders, an important role is played by the presence also of physical diseases. Furthermore, physical diseases can generate mental diseases.[28] The disease may have signs and symptoms or may even be asymptomatic.[29]

Iatrogenic diseases occur when the adverse effects of a therapeutic or diagnostic regimen cause a condition unrelated to the condition for which the regimen is recommended.[30]

Another important issue is life-threatening disease, when patients are not ready for life or beyond suicidal ideation, especially during illness, functional impairment, or relapse. of the disease, which negatively affects their daily life and negatively affects the functioning of their age groups.[31]

Furthermore, some diseases are related mainly to genetic factors, while others to environmental factors, but often genetic and environmental factors contribute to a given disease or phenotype in a non-additive manner, resulting in a gene–environment interaction.[32]

In addition, diseases are often classified as either communicable or non-communicable. Infectious diseases include communicable diseases such as tuberculosis, although non-communicable diseases (NCDs) are the most common chronic diseases. Recently, however, many people have rejected the use of the term non-communicable disease, as it implies that these diseases are also the flu. In fact, modern society facilitates the rapid exchange of new behaviors between people. Therefore, social "vehicles" including peer groups and community equity are used to change behaviors related to illness. In this way, chronic disease-related negative behaviors spread among families, communities, and populations across demographics.[33]

Disability refers to a condition that makes it difficult for a person to perform certain activities and can be included in a wide range of general health conditions, often related to chronic diseases.[34]

The Complex Dimensions of Illness

Table 2 shows the Framing concept regarding the concept of illness.

Regarding illness, there are different elements to take into consideration.

Table 2 Framing Concept 2-Illness

Question	Attributes
What to cover?	• Definitions of illness • Typology • Adaptation or disadaptation • Social determinants of health
Which variables?	• Emotional response • Somatic Illness • Mental illness • Personal experiences on health systems
Theoretical framework	• Microsocial models of illness (Adaptation theory, Labelling theory, The Suchman model) • Meso-macrosocial models of illness: (Andersen et al, model,[35] Economic model of illness, Geographic approach to illness).

The concept of illness may include anxiety, pain, itching, lack or loss of ability, and general depression.[16–18] For Hofmann,[17] illness is a negative physical phenomenon as perceived by the person themselves. According to Frank,[36] illness becomes a way for patients, caregivers, family, and friends to tell stories of illness that are constructed around the patient's experiences of illness in the present, their experiences of past medical discourses, information from medical discussions, and the illness narratives of friends and family. Kleinman and Seaman[37] argue that the underlying dimension of illness lies in the experience of illness, which does not depend on the body or consciousness of the ill person. In this regard, Fabrega[38] and Kleinman et al[39] state that patients' preexisting experiences govern their perceptions, labeling, descriptions, and evaluations of the discomfort caused by the disease. According to Kleinman,[40] illness is culturally shaped - how we perceive, experience and cope with illness and conditions. Kohli and Dalai[41] confirm that cultural beliefs influence patients' diagnoses, symptoms of illness, and perceptions of life and death. Moreover, illness is always shaped by the individual culture of the affected person. While patients' meanings and experiences of illness are shaped by cultural and social systems, society also contributes to the meanings and experiences of illness.[42] As Pierret[43] points out, patients' families, economic institutions, religion, ethnicity, the media, and the state are referred to a social structures' that correspond to the social context of illness, and each part of the social structure is seen as important in interpreting the patient's experience of illness.

For Seidlein and Salloch,[44] illness consists of an immediate and reflected assessment of the illness from the patient's perspective. The latter may involve the patient's interaction with the health professional's perspective of the illness. It can shape the patient's physical and mental perceptions and explanatory models.

According to Parsons,[14] illness can be divided into two dimensions: mental and somatic illness. Somatic illness is defined as a lack of performance on tasks, while mental illness is defined as a lack of performance on roles.

Regarding the main theoretical frameworks on illness, we have identified them at the microsocial level.

1) Adaptation theory: According to this approach, illness is considered a sort of deviance. Illness is both a biological and cultural event, as well as a social event. Deviance as a framework for analyzing illness behavior is limited in answering the question of what causes illness. Social control and deviance in medicine are embedded in a model of adaptation to illness. The concept of adaptation allows us to discuss non-adaptive behaviors and maladaptation that can occur at any stage of illness and are influenced by cultural, economic and social factors. Therefore, illness is even considered a sociocultural event.[45]

2) Labeling theory assumes that when people encounter social events and behaviors, they will see differences in behavior in a different light depending on the culture involved. Society, rather than individuals, labels positions, events, and behaviors positively or negatively based on existing social and cultural mores. What one social group or subgroup labels as deviance becomes normal behavior or status for another.[46] Doctors often label patients with a diagnosis and prognosis based on social, biological, and cultural mores. Labeling has consequences for the patient. The label attached to a disease and its social implications often determine the level of legitimacy given to the patient during the struggle. Some labels are temporarily negative or positive, while others are permanently stigmatizing.[47]

3) The Suchman model: This model recognizes the diversity of behaviors of the parties in the doctor-patient relationship and can explain the concepts of patient "exchange", "fragmentation of care", and "interruption of care". Explain concepts such as delays in care, self-care, and interruptions in care. Suchman[48] divided the sequence of "medical events" into five stages.

1. Stage of symptom experience - The patient perceives that something is wrong. This perceptual stage consists of three parts - physical, cognitive, and emotional - and forms the patient's perception of the disease phenomenon;

2. Assumption of the disease state - potential patients attempt to alleviate symptoms through self-care, advice from a network of lay referrals and temporary confirmation from their environment that they are ill;

3. Medical stage - The patient decides to seek medical care. This is a decision to seek scientific care rather than care from lay people. The patient seeks legitimization of his role as a sick person and cares for his illness;

4. Dependent patient role stage - patients in this stage delegate some aspects of their care and treatment decisions to their doctor;

5. The recovery or rehabilitation stage - The stage where the patient has given up the illness and returned to normal functioning.[48]

At the meso- and macrosocial level we included the following theories:

1) Andersen et al model: Andersen et al[49] took the Suchman model a step further and included institutional and structural influences on illness; Andersen and Aday[35] listed the social determinants of health as follows.

1. Population characteristics, including predisposing characteristics (age, gender, attitudes), enabling factors (insurance, income) and healthcare need factors (severity, chronicity, frequency).
2. Health system characteristics, including accessibility, service mix, and organizational factors.
3. Environmental factors, including political, geographic, environmental, and economic factors.[35] These factors influence service use and personal health practices, influence health status, customer satisfaction, and ease of access to services in different contexts.[50] The focus on access to services is not to fully explain illness but to incorporate macrosocial and demographic factors into a behavioral account.[51]

2) Geographic approach: this approach focuses on the proximity of services as a determinant of health service utilization.[52] It assumes that the greater the distance a patient has to travel to access health services, the less likely they are to do so. In developed countries, proximity does not affect utilization. Despite this finding, there are several neighborhood clinic strategies.[53] The rationale for this may be political rather than scientific or social. Distance and location are examples of social contexts that influence morbidity and mortality, as well as behavior during illness, and should be factors in illness analysis.[45]

3) Economic model of illness: According to this approach, individuals seek medical care based on their ability to pay, or whether it is government or privately subsidized, and care is paid for by a third party; illness is considered an interaction between wealth, medical institutions, and individuals was identified a set of criteria for determining the economic basis of illness criteria for determining the economic basis of illness. This model presents four stages that make up the demand for health services:

1. The existence of a physiological need for the service;
2. Recognition of this need;
3. The desire to manage the need through health services; and
4. Ability to translate the need into actual demand for services.

It is clear that the decision-making calculations ignore noneconomic, cultural, and social norms and social networks[52] while useful for decision-making calculations, economics cannot fully explain the illness globally.[45]

The Complex Dimensions of Sickness

Table 3 shows the Framing concept regarding the concept of sickness.

According to Frankenberg, the sickness regards "the implications, for social relations in general and for such problems as social production and reproduction, of illness and disease".[54] Another social scientist defined sickness as cultural performance, Prout,[55] and suggested that sickness as a cultural performance plays a central role in the construction of social meaning.

In the current literature, sickness is also related to the concept of sickness absence, which is

Table 3 Framing Concept 3-Sickness

Question	Attributes
What to cover?	Definitions of sickness Role performance Types of Healthcare systems
Which variables?	Sickness absence Cultural performance
Theoretical framework	Sick role theory, Social network theory.

is a commonly used indicator of disability in work. It is a multidimensional phenomenon affected by medical, psychological, social, and economic factors. The sickness absence represents a temporary inability to do and perform one's job

As a social construct, sickness absence is viewed as a situational and negotiated state of work disability, which is affected by the values, norms, and goals of society at a specific historical time. This negotiation involves several stakeholders in addition to the claimant: the employer, physicians, and other health-care professionals, as well as representatives of insurance agencies.[56] Work characteristics and working conditions also affect sickness absence, for example, the extent to which workers can modify their work.[57]

In other words, sickness means that the sick person plays a socially determined complementary role. In this view, society assigns a role to the sick person (the sick role, according to Parsons[14]) and excludes them from normal economic activities on the grounds that they are not productive members of society.

The main theories on sickness are the following:

1) Sick role theory: It is a social role, and the "sick role" is characterized by the duties and obligations of the parties in the doctor-patient relationship and is shaped by the society to which they belong.[58] The patient role is defined by the following conceptual rules:

1. The sick person is exempted from the normal social roles that they assume during the period of disease. This exemption is legitimized by the society as represented by the doctor. Normal role performance and responsibilities are suspended in order for the sick person to "recover". The intensity of the exemption depends directly on the severity of the disease.

2. The sick person is not responsible for his disease. Sickness cannot be controlled by the individual. Regaining health requires a process of treatment outside the individual.

3. The sick person has a duty to try to improve. Sickness is socially undesirable, and therefore society places an obligation on the sick person to recover, of course, with the help of a doctor.

4. The sick person should seek help from competent technicians and cooperate with caregivers.[59]

This concept is important because the sickness process is a set of actions, habits, and expectations that participants take during the sickness that can resolve the event and return to health. Turner[60] argued that the management of disease by physicians is part of general social work, such as social hygiene, health education about proper lifestyles, and organizing social work. This is done with the support of the community and the government. The role of doctors among patients promotes stability and reconciliation in society.

2) Social networks theory: Cockerham[59] defines social networks as the social relationships that people have in their daily interactions, and which serve as the normal means of exchanging ideas, information, and affection. These networks include an individual's local social world, such as family, friends, and colleagues. Attention to social networks in sickness offer an alternative to individual-oriented macrosocial models of sociopsychological and demographic characteristics. Social networks play an intermediate role between microsocial and macrosocial approaches; Freidson[61] suggested that lay referral system has a strong influence on patients' access to the health care system. Connection to social networks can increase the presence and effectiveness of healthy living and the use of preventive health services.[62] Social networks directly influence adherence and treatment effectiveness even after people became sick outlines the mechanisms by which social networks influence care.[63,64]

Another factor that affects sickness is the type of health system. In the Beveridge model, sickness is introduced into the welfare system, and the tax-based national health system ensures better access because it has coverage of international and reduced health care providers and insurance. Although these systems appear to be good at managing all healthcare costs, they do a poor job of providing users with options and long wait times. On the other hand, one of the characteristics of the Bismarckian type is that sickness is related to access to insurance, because the system is based on a large number of service providers and many options. However, the main challenge of this system is cost management.[65] During time, health systems mixed these different models, and this also led to an intermediate vision between the models as regards sickness.[66]

The Complex Dimensions of Recovery

Table 4 shows the Framing concept regarding the concept of recovery.

Table 4 Framing Concept 4-Recovery

Question	Attributes
What to cover?	Definitions of recovery Typology
Which variables?	Hope Taking personal responsibility Getting on with life Spirituality Illness Management Healthy Lifestyle Identity Relationships Work Recreation Curing Healing Habilitating Adaptation

Recovery, in general, is a dynamic process of change characterized by improvement in health and social functioning and increased well-being and purpose in life.[67]

Treatments may be designed to cure the disease, treat related symptoms, and replace lost function. Drugs, surgery, and several procedures can be used for this purpose.[68] Although the term cure is often used in medicine with the meaning of a permanent solution, this can be very difficult to achieve for many medical conditions such as chronic disease.[69] The state of the disease can be evaluated in terms of clinical outcomes such as survival or type and importance of symptoms. Moreover, clinical signs can be used as diagnostic or prognostic variables.[70]

From a phenomenological perspective, recovery is the first-person experience defined as healing or recovery from illness, where the individual subjectively experiences being recovered or not. On the other hand, recovery related to the context of social perspective and thus called "habilitating" is the specific view coming from the social environment that considers the individual as recovered or not.[21] In fact, in this context it is generally expected that the sick individual will seek appropriate help during the process of recovery in order to return also to the previous social functioning.[59] In this context, the concept of habilitation is a condition in which individuals who have disabilities regain the ability to function in society.

Habilitation, or recovery from sickness, can also be acquired by adapting to a new condition. These processes can also be related to health policies and specific social organization.[21]

Curing, healing, and rehabilitation are not always synchronized, and sometimes, as in chronic conditions, one or more of these processes cannot be possible.[21]

According to Noordsy et al,[71] the definition of recovery consists of three key concepts or criteria that are operational and measurable. The dimensions are as follows: hope, taking personal responsibility, getting on with life.[71] The first two dimensions, due to their characteristics, could be considered as healing or recovery from illness, while the last dimension could be considered as rehabilitation or recovery from illness.

In detail:

1) Hope: Loss of hope is a common reaction to health problems. People with health problems often feel impoverished, stigmatized, and excluded from opportunities to participate in social roles. Excluded from opportunities to participate in social roles. They do not only suffer from symptoms of health problems. Attempts to persuade people with health problems to follow treatment often emphasize the message of hopelessness about their health problems. Patients often describe a period of hopelessness before entering the recovery process.[72] Hope is central to the recovery

process. People who believe that change cannot be achieved effectively are not willing to move from health problems to functional recovery. Hope for positive change is a prerequisite for the development of motivation, and motivation is a prerequisite for behavior.[73] Motivation is a prerequisite for behavior.[71] If one feels hopeless and all attempts seem doomed to failure, then patients often hope to see sprouts, sometimes from unexpected sources. This hope sprouts from the healing process. It is defined as an important step in the emergence of the healing process. Hope is therefore one of the main pillars for recovery.[71] Some patients said that spirituality helped them develop hope and meaning in their lives. It helped them develop hope and meaning in their lives, facilitating the healing process.[71]

2) Taking personal responsibility: this element usually results from a fundamental shift in the patient's relationship with disease, illness, health, and wellness.[74] Taking responsibility for one's behavior and life roles is associated with progress in recovery. It has been associated with progress in recovery both in consumer testimony and in our clinical experience.[71] Acceptance of the existence of the disease facilitates recovery from the disease. It makes it easier for the sickness recovery.[75] This dimension has two subcomponents: health management and healthy lifestyles. The first is the effective treatment of the disease. Improving the therapeutic relationship is an element of disease self-management and leads to skills in medication self-management and relapse prevention planning. There is considerable evidence that improvements in general health services can lead to improved health.[71,75]

3) Moving on in life: This aspect is about the person's ability to fulfill their role as a healthy adult in society. The first element of "moving on" is identity, the patient's view of his role in life. Patients say that the process of recovery requires a change from seeing themselves as patients to understanding themselves through their role in life, as in the case of non-patients.[76] Livelihood work is essential to the healing process. This is because they allow people with health problems to identify themselves as members of the community and not as outsiders.[77] Symbols such as parent, church member, trusted worker, volunteer, and role model are important aspects of personal identity beyond death. In addition, self-awareness is multitasking, "self-care", and can protect individuals from the negative psychological and social effects of stress.[71] Friendships, relationships, family and work are an important part of a person's identity and well-being.[76–78]

A further element is recreation. Recreation includes participation in leisure activities designed for enjoyment, such as vacations, entertainment, and sports. Deliberately creating opportunities to have fun is associated with a sense of hope and optimism and a sense of optimism.[71]

Empirical Issues

From an empirical point of view, there are few articles that have concretely applied Twaddle's triad and they show many of the limitations of this model which have already been analyzed.

Moretti and Scavarda,[79] use the graphic novel in humanities and investigate the contribution of Graphic Medicine, to try to improve to strengthen all three dimensions of Twaddle's triad as graphic pathographies portray the visceral aspects of personal experience with an illness in an economical manner. They expand both patients' and caregivers' narratives of illness. Furthermore, as part of an unofficial iconography of illness and disability, graphic novels can reverse stereotypes and challenge the stigma of vulnerability, changing its cultural representation (illness). Finally, comics and graphic novels are important in medical training, to make students reflect critically on clinical practice and on the biomedical conception of disease according to a biopsycho-social model.

Moretti[80] to account for the complexity of Alzheimer's, a disease with significant social repercussions, used Twaddle triad to examine people with the disease that are able to develop their own illness (subjective experience of a pathology) only at an early phase of its progression, because the disease involves irreversible cognitive impairment, and the loss of numerous functions related to memory. This is why Alzheimer's can be understood to be a disease without illness.

Recently Sekagya et al[81] studied only two dimensions of the triad, illness and disease, among Baganda traditional spiritual healers, the *Balubaale*, in Central Uganda, who engage ancestral spirits during health care and management. They show that the words and concepts describing disease and illness are descriptive and contextualized to include the problem, the prospected root-causes, and the therapeutic approaches involved. The words for illness "olumbe", disease "obulwadde" have spiritual and social dimensions, contextual meanings and attachments.

Paz et al[82] in their study on Lyme borreliosis analyzed the dimensions of disease, illness and pathology and they influence each other, and the best clinical outcomes are those that have brought together the "disease", "illness" and

"sickness" regardless of the degree of subjectivity of the patients. A favorable outcome should also restore confidence in the health care system and get rid of misconceptions.

Samela et al[83] studied hidradenitis suppurativa using the triad to assess whether the same clinical severity, corresponds to different illness severity in men and women. Specifically, sex-related differences in illness and sickness between the patients included in fact according to these scholars poorer health could derive from combinations of employment and family roles. Probably, these sociological factors may impact patients' sickness perception and that psychological factors mediate the effect of social roles and positions on patient's illness perception.

This brief examination represents an example of the few empirical studies that have attempted to apply the triad of nonsense in which, however, the analysis of all three dimensions with an integrated and interdisciplinary approach is rare. For these reasons, recognizing the potential of this model, it is necessary to try to improve its applicability and empirical and concrete use.

Framework Proposal

The basic idea of our framework (Figure 3) is to keep in mind the polysemous nature of the three dimensions.

This means considering disease sickness and illness as containers of different meanings that can be adapted depending on the type of health problem, context, etc. considered. Thus, according to our proposal, it is no longer necessary to resort to a fixed and static triad, but to a model that can be modified depending on the health situations that one intends to study. This can, for example, resolve all those critical issues for which there may be disease but not illness. Therefore, disease is no longer simply the biomedical definition of the disease, but a set of types of biomedical definition capable of giving ample space even to those conditions that were previously excluded, as in the case of disability; but also, for example, introducing the different types of healthcare system which, as we have seen, can act on sickness and beyond.

The conventional scheme partially intersects disease, illness, and sickness in the framework we propose; there is subsumption (the three dimensions have blurred boundaries), differentiated relationships (boundaries of different thickness), and plurality (different definitions, attributes, and variables). The blurred boundaries show that there are many configurations for many types of health problems.

Our framework thus considers the polysemic expression of the ontological meaning and of the epistemological and practical sense of Twaddle's triad. The first sense refers to the attributes that determine and characterize each dimension: the typologies, the various definitions, and, when possible, also the theoretical approaches that act as both a theoretical

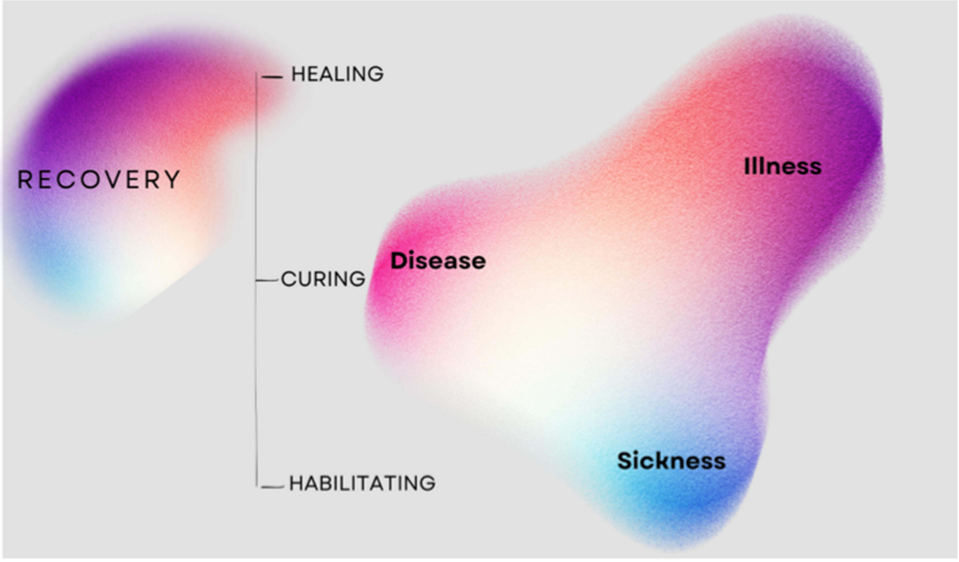

Figure 3 Framework proposal.

and empirical reference. The different dimensions, attributes, and variables are not independent; each is inherent to the others. This polysemy has material consequences, as again theorized. The attributes lead to other practices for multi-dimensional analysis of a health problem.

The element that has been added is the concept of recovery in its 3 declinations, although they too are to be considered nuanced and interrelated with each other.

"Curing" refers to the biomedical perspective and specifically is the counterpart of "disease", "healing" refers to the first-person perspective and specifically is the counterpart of "illness", and "habilitation" refers to the social perspective and specifically is the counterpart of "sickness". Curing, healing, and habilitating are three different processes that interact under certain conditions. Although there are multiple links between these conditions, they are not always synchronized. In fact, very often, as in recovery from a chronic disease, one or more of the processes may not be possible. These three processes may also take unequal amounts of time or require different types of processes and resources. To achieve the best possible sound conditions in each situation, trying to cure a disease, heal an illness, and habilitate a sickness, all three of the aforementioned processes need to be considered.[21]

Interdisciplinary Approach

The framework we proposed underlies an interdisciplinary approach aimed at allowing health professionals to coexist and collaborate with social scientists. Interdisciplinary means the synthesis of different disciplines, creating new levels of discourse and knowledge integration.[84] Social sciences are the backbone of the contemporary medicine because they play a vital role in the development of medicine. Many social science disciplines, such as anthropology, sociology, demography, political science, etc., bring diverse methods and concepts to the field of medicine and contribute to the coexistence of public health.[85]

As an example: anthropologists in this model could analyze the cultural processes of illness and sickness, rather than purely understood by medical profession as disease; as well as the cultural and symbolic experience of the various forms of recovery and therefore healing, curing and habilitating. Thus, for this type of social scientist this new framework triad be of use amongst laymen patients, particularly in times of physician-patient interactions over ailment diagnosis with ethnographic approach. Sociologists, on the other hand, could not only collaborate directly with anthropologists and health professionals, but also capture all the social and societal aspects of the various dimensions of the framework with qualitative, quantitative, digital, etc. approaches. through, for example, the three classic levels of analysis of social phenomena, namely the macro, meso and micro approach.[86]

More generally, social scientists, using this type of model, could operate on three dimension: first focus on the results of operations or understanding medical conditions through actions performed, not through established definitions; second, problem-solving, or how therapeutic actors shift between existence and creativity; third, methodological negotiation or analysis of patient-provider communication through practice and interpretation. We believe that this new framework will enrich new and existing projects in the medical field, from medicine to wearables.[87]

A Case Study for an Example of Application of the Framework

Consider the following example about a patient with diabetic foot ulcer (DFU), a common and serious complication of diabetes, characterized by a non-healing chronic wound with important related issues. In this case, "disease" is represented by diabetes (as the systemic clinical alteration of the body) and the foot wound (as the local complication) that are related to specific pathophysiologic factors and events. "Illness" is represented by somatic issues that the lesion may cause (pain, bed smell, liquid exudation, etc.,), by specific emotional responses (frustration, disappointment, fear, non-acceptance of body image and modification, etc.,), by previous personal experiences on health systems (feelings of trust or mistrust), by mental illness (previous or current caused by the disease itself). "Sickness" includes two main domains sickness absence (work leave for disability, change of working hours and work tasks, etc.,), and the sick role (exclusion from economic activities or from normal social roles, such as participating in meetings or playful activities). In this context, it is important to highlight that there is a strong relationship between the environment of the patient with a DFU and the related prognosis. Financial issues seem to have a major impact, but this effect can be moderated by social protection systems. Socioeconomic and socio-educational deprivations seem to have a complex relationship with DFU

risk and prognosis.[88,89] In such a context with all these issues to fix, the process of recovery is quite complex. While diabetes that is a chronic condition, cannot be completely fixed, the local complication, DFU, in some cases, under appropriate medical and surgical treatments, may be improved or even resolved to such an extent that the disease becomes negligible. In other cases, when this is not possible the patient could undergo limb amputation with permanent disability condition with important consequences especially in the illness and sickness areas. An amputee patient will need to wear a customized prosthesis and a long period of motor rehabilitation. During this period, the patient could be considered recovered from the local disease (the ulcer was removed by the amputation) while the issues related to the illness domain could be particularly important as well as issues related to sickness and both domains will have to be worked on simultaneously to avoid for example further consequences such as social deprivation, and economic loss for working activities that will definitely affect the subject quality of life and potentially may cause more diseases and sickness. As we can note, from the same disease condition could arise different scenarios with completely different approaches of curing, healing and habilitating. Our model clearly indicates how the boundaries between curing, healing and habilitating are blurred (Figure 1), and that all three strategies must be integrated until the highest possible percentage of success is achieved in the three domains of recovery. Medical curing with social, economic and health policy support should work together with dedicated pathways for each kind of disease. And only in this way can we achieve the highest level of well-being even in a chronic disease such as diabetes.

Limitations of the Framework

There are several drawbacks to using theoretical framework. One challenge is the lack of understanding of the meaning of the concept, making it difficult for researchers to choose the right framework. Furthermore, there is no single theoretical framework that applies to all social science research, leading to confusion and uncertainty in choosing an appropriate framework. Another weakness is that the choice of framework is based on one's beliefs and interests rather than on its application and paradigmatic focus on the research question. This may lead to inconsistencies in the research questions, methods and frameworks chosen.

Future Research and Practice Directions

Regarding the implications of the proposed framework for healthcare policy and education the following considerations can be drawn.

The multidimensional nature of our framework highlighted the role of policy analysis of public health issues, ranging from injury and disease prevention to healthcare reform. Perceptions regarding illness, disease, sickness and recovery are linked to the responsibility of politicians, and all affected populations influence government responses. Furthermore, an integrated approach can be useful for addressing the fragmentation of political institutions, resistance to concentrated interests, and fiscal constraints that typically lead political leaders to adopt incremental policy changes rather than comprehensive reforms, even in the face of serious public health concerns. Then, identify the connection between the different elements of our framework situations where large-scale transformation of health policy can occur, focusing on critical moments in policy development and the role of policy entrepreneurs in seizing innovation opportunities. Finally, our framework spurs action on the challenges facing officials and agencies responsible for implementing and administering health policies. Health professionals who understand the impacts of this complex dimensions of health policy can conduct more realistic research and evaluations, better anticipate opportunities and constraints on government action, and design more effective policies and programs. Furthermore, the use of a model of this type could be very useful within the training courses of health professionals, since it allows and requires an integrated approach of skills with which it is possible to observe and conceive illness, sickness and disease in unitary and interdependent manner, in line with the inter- and transdisciplinary training of training courses in the healthcare area.

Conclusions

Therefore, our proposal could be considered as an attempt aimed at making a model more "elastic" whose principles and foundations remain valid and necessary for the theoretical and empirical study of different types of health problems.

Disease, Illness, Sickness, and the respective types of Recovery can represent an additional opportunity to try to act on complex concepts such as those relating to health problems. Ours is a proposal, one of many that can be put forward.

Hopefully, our proposal does not remain just a theoretical research work, but it may have both a possible expansion and field application through empirical research.

The refined Twaddle's triad has significant implications for healthcare policy. It emphasizes the need for a multidisciplinary approach to health, which can lead to more effective health systems and better patient care.

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