

Theoretical Substruction of Wiener and Dodd's Theory of Illness Trajectory in Patients with Liver Cirrhosis

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ABSTRACT

This study applied Wiener and Dodd's Theory of Illness Trajectory to patients with liver cirrhosis using a theoretical substruction approach. The purpose was to examine how the theory operates within the context of liver cirrhosis, assess its applicability, and identify areas in which theoretical refinement may be warranted. Through theoretical substruction, the original theory was reorganized into four major concepts—uncertainty, disruption in the illness trajectory, coping with uncertainty, and reconstruction of life. Seven variables were subsequently derived and operationalized using validated empirical indicators appropriate for chronic illness populations. The analysis revealed that patients with liver cirrhosis experience profound uncertainty across physical, identity-related, and temporal dimensions. This multidimensional uncertainty contributes to a perceived loss of control, resulting in disruptions in the expected trajectory of life. Coping with uncertainty involves engaging in uncertainty abatement work and interacting with family, healthcare providers, and broader support networks. Over time, these processes support patients in integrating illness into everyday life and reconstructing a renewed sense of continuity and meaning. Overall, the findings suggest that Wiener and Dodd's theory is generally applicable to the chronic illness experience; however, certain aspects may require adaptation to adequately reflect the unique physiological and psychosocial characteristics of liver cirrhosis. This theoretical evaluation offers direction for future research aimed at refining and extending the Illness Trajectory Theory to broader chronic illness contexts.

Keywords: Illness Trajectory Theory, Theoretical Substruction, Uncertainty, Liver Cirrhosis.

INTRODUCTION

The Theory of Illness Trajectory proposed by Wiener and Dodd (1993) is a middle-range theory that explains the trajectory of living with illness through the process by which patients diagnosed with chronic conditions such as cancer endure and alleviate uncertainty [1]. The theory presents concrete strategies for how individuals can mitigate the heightened uncertainty brought on by illness and offers empirically observable behavioral indicators that nurses can use to understand patients' experiences and guide nursing interventions. For these reasons, the theory is considered to have substantial practical utility for both patients and nurses [1].

Nevertheless, several limitations of the theory have been identified. First, the Illness Trajectory Theory focuses on the "person" within the nursing metaparadigm and was primarily developed

for patients with chronic illnesses such as cancer and their families [1]. Importantly, the theory originated as a grounded theory based on qualitative data collected mainly from patients undergoing chemotherapy and their caregivers. Consequently, its applicability to other patient groups including individuals with chronic illnesses who are not receiving chemotherapy has been questioned [4].

Furthermore, McCormick (2002) and Mishel (1990) argue that uncertainty should not be understood solely as a negative state; rather, it can serve as a source of opportunity or be perceived positively depending on the circumstances[2,3]. However, the Illness Trajectory Theory conceptualizes uncertainty as synonymous with a loss of control, portraying it primarily in negative terms [1]. This constrained conceptualization has been critically discussed in subsequent scholarship [4].

Therefore, the present study seeks to apply the Theory of Illness Trajectory to patients with liver cirrhosis (LC) and construct a theoretical substruction. Theoretical substruction is a systematic process used to examine how a theory operates within real-world contexts, thereby enabling researchers to assess the practical applicability of the theory. Moreover, by identifying theoretical gaps or limitations that emerge during its application, theoretical substruction provides a foundation for refining or reconstructing an existing theory. Accordingly, this study aims to evaluate the applicability of the Illness Trajectory Theory to the illness experiences of patients with liver cirrhosis and to derive research questions that may guide future efforts to strengthen or revise the theory based on insights gained through this process.

THEORETICAL FRAMEWORK

According to the Theory of Illness Trajectory, the diagnosis of an illness intensifies uncertainty in an individual's life, leading to multifaceted experiences of uncertainty across the physical, identity, and temporal dimensions [1]. Liver cirrhosis (LC), an irreversible chronic disease characterized by hepatic fibrosis and structural distortion, presents a wide range of symptoms as the disease progresses, including fatigue, jaundice, ascites, spider angioma, and esophageal varices [5]. These physical changes not only alter external appearance but also impair cognitive functioning and contribute to persistent fatigue, ultimately affecting one's self-image and generating psychological distress and identity disruption [5,6]. In addition, recurrent fluctuations in symptoms, the unpredictable disease trajectory, and the need for frequent medical visits diminish one's sense of temporal predictability, thereby intensifying temporal uncertainty [5,7].

Thus, the illness experience of individuals with LC reflects disruptions across the physical, self-concept, and temporal domains—dimensions the theory conceptualizes collectively as uncertainty. Prior studies have similarly reported that patients with LC experience persistent and structured uncertainty throughout the entire course of the disease [8].

According to the theory, such multidimensional uncertainty leads patients to experience a loss of control over their lives and reinforces a sense of being unable to influence the course of the illness [1]. The Theory of Illness Trajectory does not frame uncertainty as something to be eliminated or avoided; rather, it views uncertainty as a condition that individuals must recognize, endure, and respond to. The theory articulates this process through the notion of *uncertainty abatement work*, a concrete form of action in which the patient assumes the role of

a central worker. Importantly, this process unfolds within the context of the individual's daily life and is enacted through social interactions embedded in a total organization of relationships, including family, healthcare providers, and broader support networks [1].

Through these efforts to cope with uncertainty, patients gradually begin to integrate the illness into their lives and construct a way of living with the disease. Ultimately, this transition represents a reconfiguration of the life trajectory, wherein the threats inherent in uncertainty are reframed as an integral and adaptive component of one's lived experience.

THEORETICAL SUBSTRUCTION

The most fundamental elements of a theory are its *constructs*, which represent the highest and most abstract level within the theoretical system [9,10]. Noting that constructs cannot be directly observed or measured, Gibbs (1972) argued that theoretical substruction aimed at empirical application should not begin at the level of constructs[10]. Instead, he proposed that the process should start with *concepts*, which constitute the first level at which theoretical elements can be operationalized.

Accordingly, the present study adopts Gibbs' (1972) model of theoretical substruction and begins with concepts as the initial, operable level of the theory[10]. These concepts are then progressively specified into *variables* and subsequently into *empirical indicators*, thereby establishing a hierarchical structure that enables the empirical application of the theory.

Identification of Theoretical System

In the initial stage of theoretical substruction, the researcher selects the theory to be applied and hierarchically arranges its components according to their level of abstraction within the theoretical system. This process also involves clarifying the theoretical definitions of each component [11]. Although a theory is generally composed of constructs, concepts, and variables, Gibbs' (1972) model of theoretical substruction posits that constructs—being the most abstract level of a theory—are limited in their direct applicability to real-world contexts[10]. Therefore, concepts serve as the starting point for constructing the theoretical system.

Based on this rationale, the present study identified four concepts relevant to the illness experience of patients with liver cirrhosis: *uncertainty*, *disruption in the illness trajectory*, *coping with uncertainty*, and *reconstruction of life*. The definitions of these concepts are as follows:

1. **Uncertainty:** Uncertainty exists in everyday life but becomes significantly intensified in the context of illness. Specifically, patients experience physical uncertainty, uncertainty related to self-concept, and temporal uncertainty during illness [1].
2. **Disruption in the Illness Trajectory:** Disruption in the illness trajectory refers to the breakdown of the expected flow of life as individuals attempt to live with their illness. This disruption arises as physical uncertainty undermines one's sense of control, resulting in a state in which continuity and coherence of life are dismantled [1].
3. **Coping with Uncertainty:** Coping with uncertainty is not a simple stimulus-response reaction but rather a dynamic and relational process contextually shaped within one's biographical trajectory and social interactions. It functions as a core regulatory mechanism through which individuals attempt to restore equilibrium in their life trajectory [1].

4. **Reconstruction of Life:** Reconstruction of life refers to the process of redefining one's life trajectory from a new perspective following the onset of illness. This involves integrating the illness experience into one's life, accepting life with illness, and continuously readjusting one's life structure after the prior trajectory has been disrupted [1].

Next, *variables* refer to elements that further specify a concept or constitute its underlying components, serving as the link between the theoretical system and the operational system [10,11]. In the present study, seven variables were derived from the concepts identified earlier: *physical uncertainty*, *Identity Uncertainty*, *temporal uncertainty*, *Loss of Life Control*, *uncertainty abatement work*, *social interaction*, and *living with illness*. The definitions of these variables are as follows.

1. **Physical Uncertainty:** Physical uncertainty refers to the ambiguity surrounding why bodily changes occur, what these changes signify, and what consequences they may lead to in the future [1].
2. **Identity Uncertainty:** Identity uncertainty describes a state in which individuals experience confusion about who they are as their roles, goals, and self-perceptions shift due to illness [1].
3. **Temporal Uncertainty:** Temporal uncertainty denotes the inability to predict how long the illness will last, how it will progress, and what impact it may have on the future [1].
4. **Loss of Life Control:** Loss of life control refers to the perception that one is unable to influence or regulate the direction and course of life when faced with illness-induced disruption [1].
5. **Uncertainty Abatement Work:** Uncertainty abatement work refers to the series of practical actions through which individuals attempt to understand their circumstances, reduce uncertainty, and endure its effects by employing various strategies in response to illness-related ambiguity [1].
6. **Social Interaction:** Social interaction encompasses the continuous and recurring exchanges of communication and behavior among patients, family members, acquaintances, and healthcare professionals as they respond to the disruptive experience of illness. These interactions play a crucial role in managing the illness trajectory, constructing meaning, and enduring uncertainty [1].
7. **Living With Illness:** Living with illness refers to the process through which individuals integrate the experience of illness into their daily lives, redefine new standards of normalcy, and reconstruct continuity and meaning within their life trajectory in the context of changed circumstances [1].

Description of the Theoretical System

In theoretical substruction, the process that follows the organization of the theoretical system involves articulating the relationships between concepts and variables [11]. Based on Wiener and Dodd's Theory of Illness Trajectory, the present study structured the theoretical system around four central concepts: *uncertainty*, *disruption in the illness trajectory*, *coping with uncertainty*, and *reconstruction of the illness trajectory*.

First, following a diagnosis, patients experience various forms of uncertainty across the physical, identity, and temporal dimensions. Although uncertainty exists even outside the context of illness, it becomes markedly intensified during illness and emerges as a central issue

influencing all aspects of life. Accordingly, this study identified *uncertainty* as a major concept and derived three variables—physical uncertainty, identity uncertainty, and temporal uncertainty—as its subcomponents.

Second, as patients confront these uncertainties, they experience a disruption in their illness trajectory. During this process, they come to perceive that they can no longer regulate or exert influence over the direction and course of their lives, ultimately experiencing a loss of control. Therefore, the present study designated *disruption in the illness trajectory* as a core concept and derived *loss of life control* as its associated variable.

Third, following the disruption in the illness trajectory, patients attempt to cope with uncertainty. This coping does not entail eliminating or avoiding uncertainty; rather, it involves understanding, mitigating, and enduring it. As central workers, patients engage in *uncertainty abatement work*, and this process unfolds through interactions with family members, healthcare professionals, and other support systems. Thus, the present study identified two variables—uncertainty abatement work and social interaction—as subcomponents of the concept *coping with uncertainty*.

Finally, through coping with uncertainty, patients do not seek merely to return to their pre-illness lives; instead, they accept the altered reality and reconstruct the meaning and direction of their lives. This includes integrating the experience of illness into daily life and restoring continuity and coherence that had been disrupted. Consequently, the present study defined *reconstruction of the illness trajectory* as a major concept and derived *living with illness* as its corresponding variable.

Operational System

After articulating the relationships within the theoretical system, the next step in theoretical substruction involves the measurement and operationalization of the study variables [11]. Fawcett and Downs (1986) defined the operationalized tools used to measure variables as *empirical indicators*, a term that has become well established and commonly used in the field of nursing [12]. Accordingly, following the recommendation of Dulock and Holzemer (1991), the present study adopts the term *empirical indicators* to refer to the instruments used to operationalize the study variables [9]. The empirical indicators employed in this study are as follows.

1. **Physical Uncertainty:** Physical uncertainty was measured using the *Body Image Scale (BIS)* originally developed by Hopwood et al. (2001) for patients with cancer and later adapted and validated by McDermott et al. (2014) for individuals with chronic illnesses such as irritable bowel disease [13,14]. The scale consists of nine items rated on a 4-point Likert scale (0 = not at all to 3 = very much). Total scores range from 0 to 27, with higher scores indicating greater dissatisfaction with or distortion of one's body image.
2. **Identity Uncertainty:** Identity uncertainty was assessed using the *Self-Concept Clarity (SCC) Scale* developed by Campbell et al. (1996), which measures the degree to which an individual's beliefs about the self are clearly defined and internally consistent [15]. The scale contains 12 items rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). Total scores range from 12 to 60, with lower scores indicating greater inconsistency, contradiction, or confusion in self-concept.
3. **Temporal Uncertainty:** Temporal uncertainty was measured using the *Intolerance of*

Uncertainty Scale (IUS) developed by Carleton et al. (2007), which assesses anxiety related to an unpredictable future and the extent to which such anxiety impairs functioning [16]. The scale consists of 12 items rated on a 5-point Likert scale (1 = not at all characteristic of me to 5 = entirely characteristic of me). Total scores range from 12 to 60, with higher scores indicating greater anxiety and functional impairment related to future unpredictability.

4. **Loss of Life Control:** Loss of life control was evaluated using the *Sense of Control Scale (SOCS)* developed by Mirowsky and Ross (1991). This instrument measures the extent to which individuals feel they can influence their lives versus the degree to which they perceive themselves as constrained by external factors [17]. The scale includes 12 items rated on a 7-point Likert scale (1 = strongly disagree to 7 = strongly agree) and is composed of two subscales: *Personal Mastery* (4 items), which assesses perceived competence and control over life, and *Perceived Constraints* (8 items), which assesses the degree to which individuals feel restricted by external forces. Higher scores on each subscale indicate greater levels of the corresponding construct, allowing for a quantitative evaluation of overall perceived control.
5. **Uncertainty Abatement Work:** Uncertainty abatement work was measured using the *Brief COPE*, developed by Carver (1997) as a shortened version of the COPE Inventory [18]. This self-report instrument assesses a wide range of coping strategies used in response to stressful situations. The scale includes 14 subscales with 28 items, each subscale consisting of two items. Responses are rated on a 4-point Likert scale (1 = I have not been doing this at all to 4 = I have been doing this a lot). Subscale scores are calculated by summing the corresponding items, and interpretation is based on subscale-level scores rather than a total score. Higher subscale scores indicate greater use of the corresponding coping strategy. Using the Brief COPE allows assessment of how actively patients engage in uncertainty abatement work when confronted with illness-related threats.
6. **Social Interaction:** Social interaction was evaluated using the *Lubben Social Network Scale (LSNS)* developed by Lubben (1988). This tool measures an individual's social network by assessing the size, frequency, and emotional/functional closeness of relationships with family and friends [19]. The scale consists of 10 items rated on a 6-point Likert scale (0 = none to 5 = nine or more). Total scores range from 0 to 50, with higher scores indicating broader, stronger social networks characterized by active emotional and practical interactions and higher levels of social support.
7. **Living With Illness:** Living with illness was measured using the *Living with Chronic Illness Scale (LCIS)* developed by Rodriguez-Blázquez et al. (2021), which comprehensively assesses the experience of living with a chronic condition [20]. The scale comprises 26 items rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). Total scores range from 26 to 130, with higher scores indicating greater acceptance of the illness, more effective coping, integration of illness into daily life, and better overall adaptation.

Theoretical Substruction Framework

The final stage of theoretical substruction involves diagramming the concepts, variables, empirical indicators, and the relationships among them within the theory [11]. This step clarifies the coherence and logical consistency between the theoretical system and the operational system, and visually demonstrates how the theory can be applied to an actual

research design and its corresponding measurement tools. The Theoretical Substruction Framework for the present study is presented in [Figure 1].

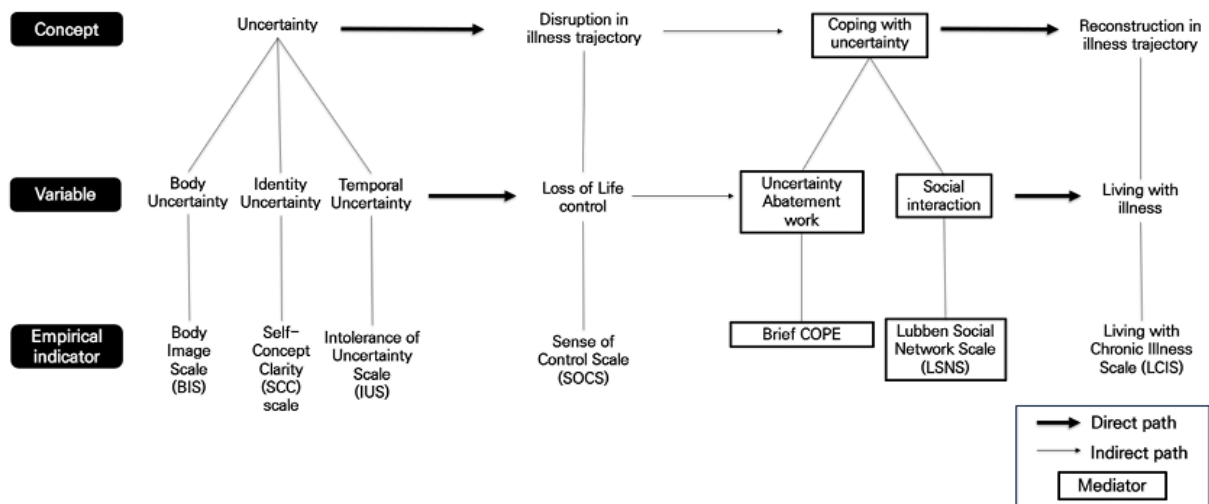


Figure 1: Theoretical Substruction Framework

STATEMENT OF RESEARCH QUESTIONS

This study applied Wiener and Dodd's (1993) Theory of Illness Trajectory to patients with liver cirrhosis and conducted a theoretical substruction. Theoretical substruction is a process that examines how a given theory functions within real-world contexts, thereby assessing its applicability and exploring possibilities for theoretical refinement or extension. Accordingly, this study interpreted the illness experiences of patients with liver cirrhosis through the lens of the theory and identified theoretical gaps or limitations that emerged during the application process, with the aim of proposing directions for supplementing or reconstructing the theory. Based on these objectives, the following research questions were derived:

1. How do the three dimensions of uncertainty—physical, identity-related, and temporal—affect the sense of control over life among individuals with chronic illness?
2. How do the capacity for performing uncertainty abatement work and levels of social interaction influence the degree of uncertainty experienced by individuals with chronic illness?
3. How does coping with uncertainty, as reflected through uncertainty abatement work and social interaction, affect the reconstruction of life among individuals with chronic illness?
4. To what extent is the Theory of Illness Trajectory an appropriate theoretical framework for explaining the illness trajectories of individuals

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