

**A CAUSAL MODEL OF FUNCTIONAL STATUS AMONG  
PERSONS WITH LIVER CIRRHOSIS**



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**A Dissertation Submitted in Partial Fulfillment of the Requirements  
for the Degree of Doctor of Philosophy in Nursing Science  
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โมเดลเชิงสาเหตุของภาวะการทำหน้าที่ของบุคคลที่เป็นโรคตับแข็ง



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การศึกษาแบบภาคตัดขวางในครั้งนี้ มีวัตถุประสงค์เพื่อพัฒนาและทดสอบความสัมพันธ์เชิงสาเหตุของการดื่มแอลกอฮอล์ การรับรู้เกี่ยวกับความเจ็บป่วย การสนับสนุนทางสังคม ความเหนื่อยล้า และภาวะการทำหน้าที่ของบุคคลที่เป็นโรคตับแข็ง กรอบแนวคิดของแบบจำลองเชิงสาเหตุพัฒนามาจากทฤษฎีอาการไม่พึงประสงค์ร่วมกับการทบทวนวรรณกรรมที่เกี่ยวข้อง ใช้วิธีสุ่มตัวอย่างแบบแบ่ง 3 ชั้น กลุ่มตัวอย่างคือ บุคคลที่เป็นโรคตับแข็ง อายุ 40 ขึ้นไป มารับการตรวจที่แผนกผู้ป่วยนอกของโรงพยาบาล 4 แห่ง จาก 3 ภาคของประเทศไทย เครื่องมือวิจัยประกอบด้วย แบบบันทึกข้อมูลทั่วไป แบบสอบถามการดื่มแอลกอฮอล์ แบบสอบถามการรับรู้เกี่ยวกับความเจ็บป่วย แบบสอบถามความรู้สึกลากหลายมิติเกี่ยวกับความช่วยเหลือทางสังคม แบบสอบถามความเหนื่อยล้า และแบบสอบถามภาวะการทำหน้าที่ เก็บข้อมูลในช่วงเดือนพฤษภาคม - สิงหาคม 2563 ทดสอบแบบจำลองเชิงสาเหตุโดยการวิเคราะห์สมการโครงสร้าง ด้วยโปรแกรม SPSS และ Mplus

ผลการวิจัยพบว่า โมเดลที่พัฒนาขึ้นมีความสอดคล้องกับข้อมูลเชิงประจักษ์ และสามารถอธิบายความผันแปรของภาวะการทำหน้าที่ของบุคคลที่เป็นโรคตับแข็งได้ร้อยละ 71.3 ( $\chi^2 = 386.458$ ,  $df = 172$ ,  $p = .061$ ),  $\chi^2/df = 2.397$ ,  $RMSEA = .056$ ,  $CFI = .985$ ,  $TLI = .981$ ,  $SRMR = .048$ ) และพบว่า การสนับสนุนทางสังคมเป็นปัจจัยที่มีอิทธิพลต่อภาวะการทำหน้าที่มากที่สุด โดยมีอิทธิพลทางบวกทั้งทางตรงและทางอ้อมผ่านการรับรู้เกี่ยวกับความเจ็บป่วยและการดื่มแอลกอฮอล์ ( $\beta = .744$ ,  $p < .001$ ) ส่วนการรับรู้เกี่ยวกับความเจ็บป่วยมีอิทธิพลทางลบต่อภาวะการทำหน้าที่ทั้งทางตรงและทางอ้อมผ่านความเหนื่อยล้า ( $\beta = -.291$ ,  $p < .001$ ) การดื่มแอลกอฮอล์มีอิทธิพลทางลบต่อภาวะการทำหน้าที่ทั้งทางตรงและทางอ้อมผ่านความเหนื่อยล้า ( $\beta = -.231$ ,  $p < .001$ ) และความเหนื่อยล้ามีอิทธิพลทางลบต่อภาวะการทำหน้าที่ ( $\beta = -.218$ ,  $p < .001$ )

การศึกษาในครั้งนี้แสดงให้เห็นว่า การสนับสนุนทางสังคม การดื่มแอลกอฮอล์ การรับรู้เกี่ยวกับความเจ็บป่วย ความเหนื่อยล้า เป็นปัจจัยที่มีอิทธิพลต่อภาวะการทำหน้าที่ของบุคคลที่เป็นโรคตับแข็ง ดังนั้นการพัฒนาการปฏิบัติการพยาบาลเพื่อส่งเสริมหรือคงไว้ซึ่งการมีภาวะการทำหน้าที่ที่ดีของบุคคลที่เป็นโรคตับแข็ง ต้องคำนึงถึง การกระตุ้นการสนับสนุนทางสังคม การรณรงค์ให้ลด ละ เลิกการดื่มแอลกอฮอล์ การส่งเสริมการรับรู้เกี่ยวกับความเจ็บป่วยในทางบวก และการจัดการกับความเหนื่อยล้า

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ลายมือชื่อนิสิต .....

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KEYWORD: FUNCTIONAL STATUS, SOCIAL SUPPORT, FATIGUE, ILLNESS PERCEPTION, ALCOHOL CONSUMPTION, LIVER CIRRHOSIS

Surachai Maninet : A CAUSAL MODEL OF FUNCTIONAL STATUS AMONG PERSONS WITH LIVER CIRRHOSIS. Advisor: Assoc. Prof. Pol.Capt. YUPIN AUNGSUROCH, Ph.D., RN. Co-advisor: Asst. Prof. CHANOKPORN JITPANYA, Ph.D., RN.

This cross-sectional correlation study aimed to develop and test a causal relationship among alcohol consumption, illness perception, social support, fatigue, and functional status among persons with liver cirrhosis. The hypothesized model was constructed based on the theory of unpleasant symptoms and the review of the literature. A stratified three-stage random sampling approach was utilized to recruit 400 persons with liver cirrhosis aged 40 years old and older who visited four hospitals from three regions of Thailand. Research instruments consisted of the demographic data form, Alcohol Use Disorders Identification Test Consumption, Brief Illness Perception Questionnaire, Multidimensional Scale of Perceived Social Support, Fatigue Severity Scale, and the Functional Status Questionnaire. Data were collected from May to August 2020. The developed model was verified via a structural equation modeling using SPSS and Mplus program.

The study findings revealed that the hypothesized model fit the empirical data and explained 71.3% of the variance of functional status  $\chi^2 = 386.458$ ,  $df = 172$ , ( $p = .061$ ),  $\chi^2/df = 2.397$ , RMSEA = .056, CFI = .985, TLI = .981, SRMR = .048. Social support was the most the influential factor affecting functional status by having both positive direct and indirect effects on functional status through illness perception and alcohol consumption ( $\beta = .744$ ,  $p < .001$ ). In addition, illness perception had a negative both direct and indirect effects on functional status through fatigue ( $\beta = -.291$ ,  $p < .001$ ). Alcohol consumption had a negative direct and indirect effects on functional status through fatigue ( $\beta = -.231$ ,  $p < .001$ ). Fatigue had only a negative direct effect on functional status ( $\beta = -.218$ ,  $p < .001$ ).

The findings indicated that social support, alcohol consumption, illness perception, and fatigue were important factors influencing functional status among persons with liver cirrhosis. Therefore, further nursing intervention should consider on enhancing social support, reducing alcohol consumption, promoting positive illness perception, and managing fatigue into account to maintain or enhance functional status among persons with liver cirrhosis.

Field of Study: Nursing Science  
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Student's Signature .....  
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# CHAPTER I

## INTRODUCTION

### **Background and significance of the study**

The ultimate goal of persons living with liver cirrhosis who attend medical monitoring at outpatient department is to have ability to conduct activities of daily living independently (Saberifiroozi, 2017). The basic activities of daily living of this population consists of feeding, grooming, transferring, driving, mobility, climbing stairs, shopping, continue working, maintaining good mood, and participating with family and community (Low et al., 2018). If they can do these activities independently, it means that they have ability to extend life longer (Valery et al., 2015a). In other words, the persons with liver cirrhosis who face with difficulties in performing activities to realized needs of daily living including physical, psychological, social, and role performance, called the functional status as per Leidy (1994), should be considered.

Literally, the term functional status does not define as a single definition but instead refers to a family of related terminologies. Other terms such as functional capacity, physical functioning, health status, functional ability, or quality of life are also used in the literature to describe a single label (Orman, Ghabril, & Chalasani, 2016; Wang, 2004; Wu, Wu, Lien, Chen, & Tsai, 2012). These terms are essentially interchangeable, but only the term functional status will be used throughout this study.

Liver cirrhosis is a chronic disease that causes significant global health burden (Moore, 2018). The diagnosis of liver cirrhosis is currently the 11st leading cause of death globally (Asrani, Devarbhavi, Eaton, & Kamath, 2019). The prevalence of liver cirrhosis is high in most Asian countries, especially, Thailand reported highest prevalence that occurred in up to 75% among adults (Methawasin, Chonmaitree, Wongjitrat, Rattanamongkolgul, & Asawavichienjinda, 2016). The highest risk group is the persons aged 45 to 55 years (Poovorawan et al., 2015). It accounts for 26 % of adults' deaths and ranking the 5th in mortality rate across the country. The standardized prevalence rates of liver cirrhosis are 75.3 per 100,000, and more common in male than female (Poovorawan et al., 2015). Therefore, liver cirrhosis is a major health problem in Thailand, especially in adult and older population.

Liver transplantation is the only available medical treatment for liver cirrhosis. Nevertheless, this is impossible for many patients not only in Thailand but also in worldwide because either insufficient resources such as patients' condition, end-stage of disease, an appropriate donor, or cost (Chirapongsathorn et al., 2018; Neuberger, Ferguson, & Newsome, 2014). Over three quarters of this population at every stage of liver cirrhosis have to shifting the focus of patients care to be prolonging medical treatments at outpatient department (Nelson, 2016; Schuppan & Afdhal, 2018). As the progressive cascade of liver tissue destruction continues and liver function becomes more compromised, the individual holding the diagnosis of cirrhosis concedes to diminished physical, psychological, and biochemical function (Asrani et al., 2019). These cumulative events negatively affect an individual's ability to perform basic activities of daily living as well as participate with family and society (Low et al., 2018). When one is being less capable to performing normal daily functioning, then,

they would be at risk for suffering with functional status decline in long-term condition.

Functional status decline is a frequent problem reported by persons with liver cirrhosis who attend medical monitoring at outpatient department (Tapper et al., 2018). Prior studies reported that 60% to 80% of them faced with difficulties in performing basic activities of daily living such as dressing, grocery shopping, driving, and sleeping (Orman, Ghabril, & Chalasani, 2016; Rakoski et al., 2012). Over 50% of persons with liver cirrhosis perceived that cirrhosis threatened their life because of high mortality rate and serious health outcomes (Fagerström & Frisman, 2017). They were uncertain that their illness could not be control by themselves and their psychological functioning was not well adjusted, and it created many changes in their daily life (Fagerström & Frisman, 2017). Jijomon, Lobo, and Castelino (2017) found that 35,7% of them was classified as moderate dependence status which significantly decreased ability to perform normal role and social functioning such as having difficulty to participate in activities they enjoyed, and share time with family and friends, which made them isolated and lonely.

In addition, Lai, Dodge, Sen, Covinsky, and Feng (2016) reported that 35% of persons with early stage of liver cirrhosis suffered with mild to moderate level of functional status decline. While over 50% of them with end-stage of liver cirrhosis reported severely decline of functional status in terms of physical limitation, perceive badly about illness, and less social interaction. Comparing to other groups, persons with liver cirrhosis reported poorer functional status than any person in the group of healthy, chronic hepatitis B virus, and chronic hepatitis C virus, in which longer than 12 months (Alameri et al., 2007). Due to functional status decline, some of them do

not perform or spend less time in performing such specific advance activities as doing rarely exercise, housework, sexual activity, participating with others, maintaining regular working (Abdi, Daryani, Khorvash, & Yousefi, 2015; Bajaj et al., 2011; Fagerström & Frisman, 2017), having badly attitude about disease (Fagerström & Frisman, 2017), and coping with anxiety and depression (Tapper et al., 2018). This finally results in a condition of disability. This indicates that the more advanced of disease, the more suffering with functional status decline. Finally, declining of functional status in this population becomes a serious aspect.

Functional status decline can consequently impact on health and well-being among persons with liver cirrhosis. Existing evidences have indicated that the functional status decline significantly related to health outcomes such as cardiac workload index and reduces liver functioning (de Lima et al., 2015), health status (Asrani et al., 2019), health-related quality of life (Youssef, 2013), healthcare services utilization and cost of medical expenditure (Chirapongsathorn et al., 2018), caregiver burden (Hsu, Lin, Lin, Hsu, & Shih, 2019). Finally, it is a predicting factor of readmission and death (Chirapongsathorn, Talwalkar, & Kamath, 2016).

In sum, functional status decline is a frequent problem reported by persons with liver cirrhosis any stage of disease, especially, the persons who attend medical monitoring at out-patient department. This problem impacts on various dimensions among individual's life living such as affecting ability to perform daily performance, getting back to work, participating with others, and affecting their quality of life. Finally, it is a predicting factor of death in liver cirrhotic persons. Thus, searching for the potential factors related to functional status among this population is important.

Regarding to the Theory of Unpleasant Symptom (TOUS) (Lenz, Gift, & Pugh, 2014) as the theoretical framework to select modifiable variables as well as the existing empirical evidences in relation to quantitative studies and report at least moderate level of correlation to functional status among adults with liver cirrhosis, some studies have reported the potential factors related to functional status among this population. For example, obviously, social support was considered as one of the situational factors that impact on functional status (Lenz et al., 2014). A cross-sectional study by Park and Shin (2017) found that social support was associated with ability to perform individual functioning among patients with liver cirrhosis such as preparing food, exercising regularly, and administering medication ( $r= 0.80$ ,  $p<0.001$ ). Youssef (2013) noted that social support was significantly associated with many dimensions of health-related quality of life including physical, psychological, social, and role functioning ( $r = 0.21$ ,  $p= 0.0005$ ) among persons with liver cirrhosis. Since it has been known that the association between functional status and health-related quality of life is in a positive direction (Wilson & Cleary, 1995). This postulates that cirrhotic persons who have a good health-related quality of life would report a high functional status score as well.

Alcohol consumption was found as the physiological factors in terms of illness behavior - related liver cirrhosis that impacts on functional status of persons with liver cirrhosis (Brumback, Cao, McNamara, & King, 2017). Jacobus and Tapert (2013) indicated level of alcohol consumption was associated with a cycle of functional status decline from the damage of frontal cortical regions of the brain, which altered working memory and physical functioning among patients who continue to drink alcohol. Patients who survive liver cirrhosis and continue drinking reported lower



functional status than former and never drinkers (Brumback et al., 2017). In Thailand, one study found that alcohol consumption was significant associated with limitation of physical, mental, and social functioning among people at risk of liver cirrhosis in Nan province ( $r=0.58$ ,  $p<0.001$ ). The quantity and frequency of alcohol drinking were associated with functional limitation (Rattawitton & Perngparn, 2017). This indicates that greater alcohol intake, the less likely a person is to maintain in functional status.

Illness perception is evident as a psychological factor related to functional status among persons with liver cirrhosis. A study conducted by Langston, Edwards, and Lyvers (2018) found that increased negative illness-related consequence ( $r=-.46$ ), identification of symptom ( $r=-.47$ ), greater illness-related concern ( $r=-.33$ ), emotional response to disease ( $r=-.42$ ), and higher adoption of coping strategies ( $r=-.37$ ) were associated with lower functional status. Furthermore, higher illness identification was significantly predicted functional status such that greater illness identification predicted poorer functional status ( $\beta=-.33$ ,  $t=-3.37$ ,  $p=.001$ ). These findings indicate that persons who have negative illness perception experience functional status decline.

In comparison to other symptoms such as muscle cramps, anxiety, insomnia and lack of appetite, fatigue is the most severely impacted on functional status among persons with liver cirrhosis (Amornchevanun, Pongthavornkamol, Charoenkitkarn, & Tanwandee, 2015; Kim, Oh, & Lee, 2006). Rossi, Galant, and Marroni (2017) found that fatigue was negatively associated with functional status ( $r=-0.52$ ,  $p<0.001$ ) by reduced physical activity, constraints on daily life functioning, working hours, and social activities. Zalai, Sherman, McShane, Shapiro, and Carney (2015) indicated that over 60% of persons with liver cirrhosis rated their fatigue from moderate to extreme

severe intensity level. Moreover, fatigue was the main predictors of functional status ( $\beta = .114$ , 95% CI = .054-.154). Importantly, comparing to other symptoms, development of fatigue was not only specifically associated with increased risk functional status decline but also increased mortality rate (Jones, Al-Rifai, Frith, Patanwala, & Newton, 2010).

In clinical practice, nursing care for enhancing functional status among persons with liver cirrhosis is limited. In Thailand, nurses have been providing a general care to prevent loss of functional status when attend medical monitoring at outpatient department by giving the knowledge related to liver cirrhosis, promoting medical adherence, cheering up and using the anchor mind to help them quit alcohol, and doing exercise (Junpen, 2015). In worldwide, a systematic review study by Trivedi and Tapper (2018) and other related studies noted that the most recommended interventions were nutritional therapy, moderate exercise, and guidance for patient's activity quantity and method. Although these interventions produce certain effects on functional status, yet the results of these interventions have limited on generalization due to using small of sample size, mixing group of patients with chronic liver diseases, lacking of theoretical underpinning, and reporting inconsistent results among trials (Román et al., 2016; Trivedi & Tapper, 2018; Zhang, Liu, Zhu, Hu, & Wang, 2018). Notably, Low et al. (2018) indicated that although nurses concern about enhancing functional status, nearly 60% of them confessed that they do not have enough information to design intervention for this population.

According to the empirical evidence above, apparently nurses play a crucial role to enhancing functional status for persons with liver cirrhosis. However, the existing empirical studies mostly contribute to understanding functional status in

terms of physical and psychological functioning. The realm of care is seemed to be general nursing practice rather than capture the holistically picture of functional status among persons with liver cirrhosis. These barriers impede nurses to be able to understand and develop specific nursing interventions that improve functional status. Hence, exploring causes and effects of functional status and among persons with liver cirrhosis would offer valuable contribution to nursing care and necessary.

Although existing knowledge about relationships among variables including alcohol consumption, social support, illness perception, fatigue, and functional status among persons with liver cirrhosis have explored, yet previous studies only reported bidirectional associations between those factors and functional status in their single studies. There is no study has been examined these variables in the same model simultaneously. Therefore, a causal model evaluation would make explicit those assumptions that the connection between various factors in the same model would articulate for the future intervention to improve functional status for persons with liver cirrhosis. To fill this gap of knowledge, a development of a causal model of functional status which addresses these specific variables to liver cirrhosis is necessary.

In conclusion, it is believed that the study on causal model of functional status among persons with liver cirrhosis in Thailand who attend medical monitoring would offer basic knowledge about pathway of the relationships between factors and functional status as well as provide valuable contribution to nursing care. Understanding the causative of functional status will enhance the knowledge for developing effective nursing intervention to maintain and improve functional status for this population.

### **Research questions**

These research questions were proposed for this investigation.

1. What are the relationships between alcohol consumption, social support, illness perception, fatigue, and functional status among persons with liver cirrhosis?
2. How the hypothesized model explains the functional status of persons with liver cirrhosis and how the model adequately fits with the empirical data?

### **Purposes of the study**

1. To examine the relationships between alcohol consumption, social support, illness perception, fatigue, and functional status among persons with liver cirrhosis.
2. To develop and test the causal model that explains the influences of the alcohol consumption, social support, illness perception, fatigue, and functional status among persons with liver cirrhosis.

### **Conceptual framework of the study**

This study uses the Theory of Unpleasant Symptom (TOUS) (Lenz, Gift, & Pugh, 2014) as the theoretical framework to select the variables and in a combination with review of liver cirrhosis empirical evidence. The TOUS is selected as the guiding framework because it represents the linkage between various influencing factors impact on unpleasant symptom(s) and finally change functional status among persons with chronic illness. Presently, the TOUS is being used as a conceptual framework in nursing research worldwide, and it has had strong empirical support in research which a variety of populations, particularly in liver cirrhosis (Amornchevanun, Pongthavornkamol, Charoenkitkarn, & Tanwandee, 2015; Kim & Seo, 2015; Tang,

Von Ah, & Fulton, 2018). The TOUS composes of three major concepts including symptoms, influencing factors, and performance. Lenz et al. (2014) explain the relationships among these concepts that the symptom experience can produce either a mediating or moderating effect between influencing factors and performance variables. The individual's perception of symptom(s) is influenced by these three factors including the physiological, psychological, and situational factors. Consequently, symptom(s) and its influencing factors impact their performance in terms of functional status.

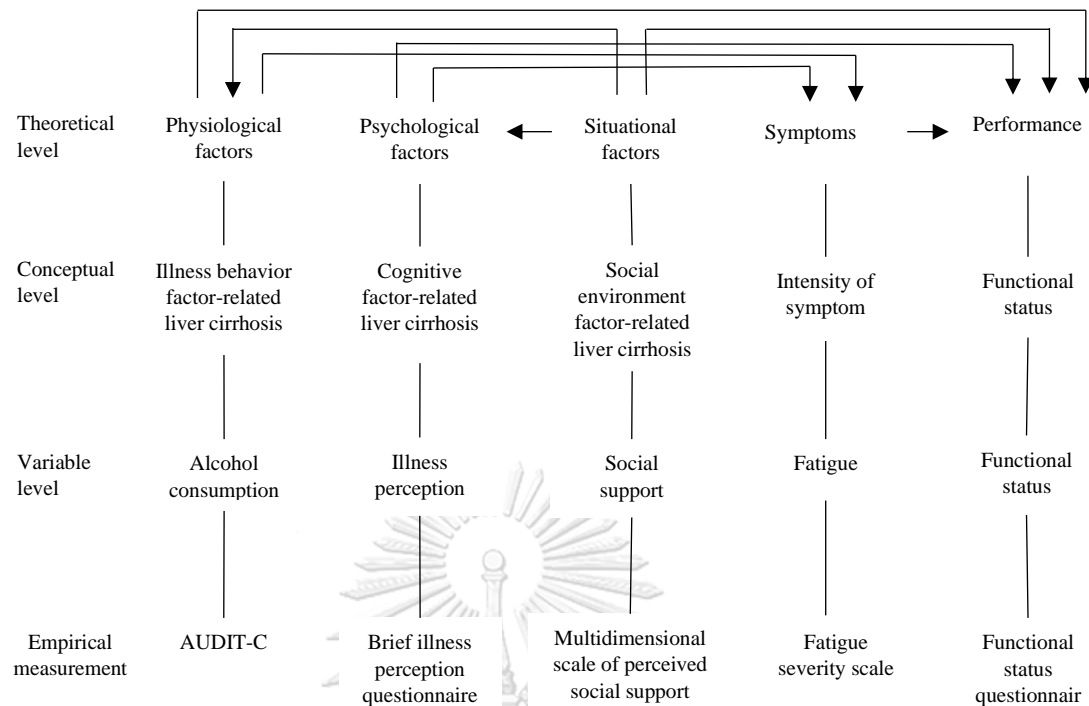
In this study, the TOUS postulates that functional status among persons with liver cirrhosis will change because of influences from experiencing less unpleasant symptom and additional factors including physiological, psychological, and situational factors. Functional status could be maintained or enhanced when these influencing factors are reduced. The reduction of potential factors would facilitate the persons with liver cirrhosis having a high level of functional status, the least amount of dependency, decrease number of readmissions, and reduce risk of mortality. Conversely, when symptom and its influencing factors interfere ability to perform daily functioning among persons with liver cirrhosis, functional status will be decline while the potential of dependence, readmissions, mortality will increase. Experiencing with unpleasant symptom directly affect functional status by causing a reduction in individual's ability to perform activities of daily living. It is possible that changes of functional status typically occur because of a combination of symptom reduction and other influencing factors. Literatures supporting the structure of this theory are described as follows.

Symptoms, originally, Lenz, Pugh, Milligan, Gift, and Suppe (1997) indicated that symptom can occur either in isolation-one at a time-or in combination and potentially in interaction with other symptoms. It is conceptualized as the perceived indicators of a change in normal functioning as experienced by the patient consisting of four interrelated dimensions: duration, intensity, quality, and distress. These together represent the symptom experience. The symptom experience can produce either a mediating or moderating effect between influencing factors and performance variables. From the review of literature, Matura, Malone, Jaime-Lara, and Riegel (2018) found that persons with liver cirrhosis experienced several symptoms including fatigue, abdominal pain, and sleep difficulty. They also reported that fatigue was the most severely impacted and associated with functional status. Importantly, Wu, Wu, Lien, Chen, and Tsai (2011) noted that severity of fatigue has strong significant related to functional status ( $r = - 0.34$ ,  $p = 0.03$ ). Thus, fatigue is considered as the moderating factor in this study due to it is mostly problem reported and related to functional status in persons with liver cirrhosis. Since there is no existing knowledge regarding the pathways among co-occurring symptoms appears in the literature. Thus, targeting one symptom such fatigue rather than several co-occurring symptoms may be the most effective and efficient approach to improving functional status (Lenz et al., 1997) among persons with liver cirrhosis.

Influencing factors, Lenz et al. (2014) categorized the factors that influence symptoms including physiological, psychological, and situational factors. Some factors have presented the relationship with functional status among persons with liver cirrhosis in literature. Those influencing factors include alcohol consumption as the physiological factor in terms of risky behavior-related liver cirrhosis (Gutierrez,

2016), illness perception as the psychological factor (Langston, Edwards, & Lyvers, 2018), and social support as the situational factors (Youssef, 2013). These factors are included in the conceptual framework of this study because they can be identified as modifiable variables that can be applied into nursing practice, nursing interventions, and represented as the professional's nurse authority in order to provide a holistic care for this population. Furthermore, these factors are found as moderate to high level of correlation with functional status (Burns & Grove, 2012).

This study uses the hierarchy of middle-range theoretical deduction proposed by Fawcett and Desanto-Madeya (2013) to explain the derivation of selected variables from the theoretical framework of the TOUS (Lenz et al., 2014) and other related empirical evidence. Fawcett and Desanto-Madeya (2013) suggested that specific concepts and propositions in particularly phenomena must be derived from theoretical model where middle-range theory must be formulated. The concrete concepts must be operationally defined and empirically testable. Hypotheses must be derived from the proposition of the theory. Concepts needed to test the direction and strength of the relationship between concepts. Each concept is linked to empirical indicators which provide a method to measure the variable. Thus, an explicit conceptual-theoretical-empirical structure, using the TOUS, is developed to test proposition of functional status among persons with liver cirrhosis as presented in Figure 1.1.



**Figure 1.1** The theoretical substructure diagram of functional status among persons with liver cirrhosis

### Hypothesizes with rationales

1. Alcohol consumption has a negative direct effect on functional status and an indirect effect on functional status through fatigue in persons with liver cirrhosis.

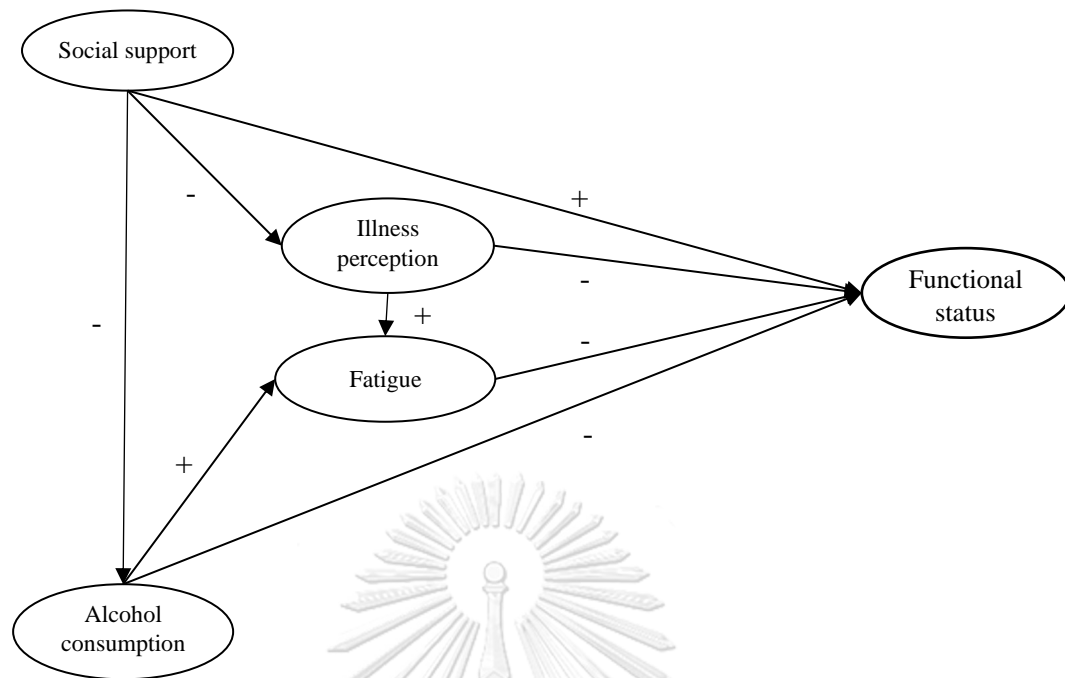
2. Social support has a positive direct effect on functional status and an indirect effect on functional status through alcohol consumption and illness perception in persons with liver cirrhosis.

3. Illness perception has a negative direct effect on functional status and an indirect effect on functional status through fatigue in persons with liver cirrhosis.

4. Fatigue has a negative direct effect on functional status in persons with liver cirrhosis.

Therefore, a hypothesized causal model of functional status among persons with liver cirrhosis could be drawn as shown in Figure 1.2.





**Figure 1.2** The hypothesized model

Regarding to the hypothesized model, alcohol consumption is recognized as a physiological factor in terms of illness behavior-related liver cirrhosis. A meta-analysis study reported that alcohol consumption seriously impacted on liver function and functional status in persons with liver cirrhosis (Alfarsi et al., 2018). Some studies suggest that functional status decline is linked with the pattern and level of alcohol consumption. For instance, moderate level of alcohol consumption was associated with lower activity daily living disability, lower rate of self-reported mobility limitation, and lower physical performance (Rakoski et al., 2012; Samokhvalov, Popova, Room, Ramonas, & Rehm, 2010). Recently, Vasiliadis, Payette, Berbiche, Grenier, and Hudon (2018) reported that alcohol consumption was significantly impacted functional status over a 3-year period among cirrhotic adults with heavy drinking ( $p < 0.001$ ). In addition, social support is evident as an antecedent of functional status. Samokhvalov et al. (2010) reported that lacking support from family

and friends increased amount and frequency of alcohol consumption than persons who receive well support.

Another point, fatigue is also found as the consequent of drinking alcohol. Woolley, Allen, and Wessely (2004) noted that 60% of persons who reported moderate alcohol intake suffered with increased tiredness after drinking. Fatigue caused this population perceived ability to face up to problems or ability to enjoy normal day-to-day activities. Conversely, a reduction in alcohol use would result of decrease an exacerbation of physical symptoms such fatigue. Thus, it can be hypothesized that alcohol consumption has a negative direct effect on functional status and an indirect effect on functional status through fatigue in persons with liver cirrhosis.

Social support is a situational factor that influences functional status (Lenz et al., 2014). In Thai culture, the family serves as the central role of support for persons with chronic illness. The value of filial piety among Thai people in terms of looking after their family member is strongly cultural believed (Tan, Wutthilert, & O'Connor, 2011). This phenomenon suggests that when Thai people perceive that their love one's health could benefit from promote functional status; their actions may strengthen illness person's resolve to perform activities of daily living. Positive family action can also reinforce a persons' participation and encourage them to be independent (Tan et al., 2011), which would enhance functional status as well.

Previous study by Youssef (2013) have found a positive associated between social support and daily activities functioning among persons with liver cirrhosis ( $r=0.21$ ,  $p=0.0005$ ). Applebaum et al. (2014) also indicated that higher social support was significantly associated with higher functional status ( $\beta=.21$ ,  $p=.003$ ). This

demonstrates that when social support decreases then functional status would also decrease or and vice versa. In addition, Russ et al. (2016) found that persons with liver cirrhosis who had poor social support increased volume of alcohol consumption. In addition, one study found that chronic liver disease patients with high levels of fatigue had more frequent thoughts about the impact of fatigue ( $p < 0.005$ ), more likely to perceive that their daily functioning has been negatively affected and have difficulty to engage in everyday activities compared with those with low levels of fatigue ( $p < 0.001$ ) (Blackburn et al., 2007).

There is evident that persons with liver cirrhosis avoid telling about their disease because afraid of the cause if disease such as drinking alcohol will destroy relationship with others (Vaughn-Sandler et al., 2014). Lack of social support was a major cause of concern that persons with liver cirrhosis perceived difficulty to dealing with progression of disease, treatment, and daily living (Untas et al., 2015). This means that receiving a good support from social around would help persons with cirrhosis feel relieve from negative illness perception, which in turn increasing their ability to perform daily functioning. Thus, it can be hypothesized that social support has a positive direct effect on functional status an indirect effect on functional status through illness perception and fatigue in persons with liver cirrhosis.

Illness perception is considered as the psychological factors that impact functional status among persons with liver cirrhosis Langston, Edwards, Lyvers, and Stapleton (2017). In descriptive study by Hayward et al. (2017) reported that patients with liver cirrhosis had high levels of concern about their disease, felt they did not have much personal control over it, and perceived that it would persist for a long duration of time. When persons with liver cirrhosis have negative perception about

illness, they reported having difficulty to control the progression of disease, adapt their emotional response to illness, and identify symptom-related to liver cirrhosis that interfere their life (Lau-Walker, Presky, Webzell, Murrells, & Heaton, 2016). Patients who believes that their illness is a chronic condition, which could not be cured and controlled will not attend hepatological screening, and no adherence to manage their health conditions (Diefenbach & Leventhal, 1996). Furthermore, Lau-Walker et al. (2016) noted that persons with alcohol-related liver disease had negative perceived regarding their illness.

Persons with liver cirrhosis perceived that symptoms such fatigue was one of the consequences of disease deterioration (Lau-Walker et al. (2016). Blackburn et al., (2007) concluded that the more concern about progression of disease, the higher level of fatigue that persons with chronic liver disease have to deal with, which in turn the more reduce their capability to maintain daily activities. Consequently, they ignore to cope with symptoms and side effect of treatment, which cause poor daily functioning (Leventhal, Phillips, & Burns, 2016). In this study, it can be hypothesized that illness perception has a negative direct effect on functional status and an indirect effect on functional status through fatigue.

Fatigue is one of the most distressful and often disabling symptom that interfere functional status in persons with liver cirrhosis (Amornchevanun et al., 2015; Wu et al., 2011). Cirrhotic patients who reported high level of fatigue usually have a lower level of functional status. Several studies have reported that fatigue was strongly associated with functional status, physical activity, and activities of daily living (Amornchevanun et al., 2015; Swain, 2006; Zalai, Sherman, McShane, Shapiro, & Carney, 2015). For example, Wu et al. (2011) reported that severity of fatigue was

negatively significant associated with physical activity among persons with liver cirrhosis ( $r = -.34$ ,  $p = 0.03$ ). Zalai et al. (2015) indicated that fatigue perceptions were the main predictors of physical functioning ( $\beta = .114$ , 95% CI = .054 - .154). In other words, the greater the interference of fatigue with daily life, the less likely a patient is to engage in physical activity of moderate or higher intensity. Therefore, it is hypothesized that fatigue has a negative direct effect on functional status in persons with liver cirrhosis.

In the hypothesized model, there are some similarity and contradiction between the existing evidence and the theory of unpleasant symptoms (TOUS). First, the interaction between the selected variables in the hypothesized model demonstrates as a unidirectional relationship which valid in only one direction such as social support has a positive correlation with functional status and social support has a negative correlation with alcohol consumption. However, the interaction between the main concepts in the TOUS demonstrate the interaction as bidirectional relationship which valid in both directions. Second, the exogenous variable of this study is social support which identify as the first variable in the hypothesized model. Meanwhile, symptom is the main concept in the TOUS but remains in the hypothesized model as endogenous variable. In this study, fatigue is influenced by other factors including and physical factors (alcohol consumption) and psychological factors (illness perception) accepted physical factors (alcohol consumption) which this contradicts with the interaction that explained by the TOUS. Nevertheless, under the believe that more parsimonious models represent more complete hypotheses having more ways of being tested and possibly being disconfirmed. Therefore, this study intends to present influencing between factors rather than complex interactions between them.

### **Scope of the study**

This cross-sectional correlational study aimed to explore a causal model of functional status among adult persons with liver cirrhosis who attend medical monitoring. Population focus was adult persons with liver cirrhosis who have been diagnosed with stage 1 to stage 4. Persons with liver cirrhosis in sepsis stage or severely condition (stage 5) was excluded because they need critical care and hospitalization. This study was obtained at outpatient departments among public tertiary hospitals in Thailand. The independent variables were alcohol consumption, social support, illness perception, and fatigue. The dependent variable was functional status.

### **Operational definitions**

Functional status refers to the ability of a person with liver cirrhosis to perform basic activities of daily living, level of involvement in activities, psychological performance, work performance, social activity, and quality of interaction in order to fulfill and maintain their well-being. Functional status was measured by the Functional Status Questionnaire (FSQ) (Jette et al., 1986).

Alcohol consumption refers to pattern of alcohol drinking among persons with liver cirrhosis in relation to frequency, quantity, and heavy drinking based on standard drink during the past 30 days. Alcohol consumption was measured by using the Alcohol Use Disorder Identification Test Consumption (AUDIT-C) (Bush, Kivlahan, McDonell, Fihn, & Bradley, 1998).

Social support is defined as the perception of persons with liver cirrhosis that have received taking care from others whom he/she loved and valued such as family members, friends or colleagues and healthcare providers by mean of sharing

informational, emotional, and tangible support. Social support was measured by using the Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet, Powell, Farley, Werkman, & Berkoff, 1990).

Illness perception means the cognitive and emotional process that triggers the formation of representations based on the domains of identity, timeline, consequences, control, cause, illness coherence, and emotional representations among persons with liver cirrhosis. Illness perception was assessed by using the Brief Illness Perception Questionnaire (Brief-IPO) (Broadbent, Petrie, Main, & Weinman, 2006).

Fatigue is defined as the perception of persons with liver cirrhosis toward the subjective, persistent, and overwhelming feeling of tiredness or lack of energy, which is highly severely and negatively interferes with persons' ability to function normally. In this study, fatigue was measured by using the Fatigue Severity Scale (FSS) (Krupp, LaRocca, Muir-Nash, & Steinberg, 1989).

Persons with liver cirrhosis refer to the individual who have been medically diagnosed with liver cirrhosis stage 1 to stage 4, experienced with ascites and/or esophageal varices for at least one month (Chirapongsathorn, 2018).

### **Expected outcomes and benefits of the study**

The current study examined casual relationships among alcohol consumption, illness perception, social support, and fatigue that effect on functional status among persons with liver cirrhosis. The hypothesized model was based on the Theory of Unpleasant Symptoms combined with the empirical evidence. All selected variables were the potentially modifiable. The participants were adults and older who have been diagnosed with liver cirrhosis and visited outpatient department for receiving medical

monitoring. Therefore, this study would provide several benefits to nurses and other healthcare providers as following details.

1. The findings from this study would help nurses and other healthcare providers having a comprehensive picture about the characteristics of functional status among persons with liver cirrhosis which consists of six major dimensions. The findings may help them to be aware of and assess functional status decline in this population carefully.

2. The information obtained in this study would offer basic knowledge about the casual relationships between factors and functional status, especially for Thai nurses, to formulate a personalized patients education plan to support their functional status changes.

3. This study provides a plenty of descriptions about alcohol consumption, illness perception, social support, and fatigue in persons with liver cirrhosis in Thailand. Thus, this valuable information would help nurses and researchers to understand the current situation of those problems.

4. This study has tested psychometric properties of all selected research instruments in Thai persons with liver cirrhosis. Especially, the Functional status Questionnaire (FSQ) was translated into Thai language which reported well valid and reliable. Such the research instruments could be useful resources for researchers and clinician in Thailand. Hence, the availability of internationally standardized instruments in Thailand would facilitate cross-cultural studies in the future.

5. Nurses and other healthcare providers can use the findings from this study which explain the connection between various factors in the same model to



establish the specific intervention following those influencing factors for enhancing functional status of the persons with liver cirrhosis.



## **CHAPTER II**

### **LITERATURE REVIEW**

This chapter presents an integrative review of the theoretical and empirical literature describing interesting concepts and interrelationships among factors affecting functional status among persons with liver cirrhosis. The review covers the following topics:

Overview of persons with liver cirrhosis and nursing care

Functional status among persons with liver cirrhosis

Consequences of functional status decline among persons with liver cirrhosis

The Theory of Unpleasant Symptom

Factors related to functional status among persons with liver cirrhosis

The relationships between alcohol consumption, social support, illness perception, fatigue, and functional status among persons with liver cirrhosis

## **Overview of persons with liver cirrhosis and nursing care**

### **1. Definition and classification of liver cirrhosis**

The term “cirrhosis” was introduced almost two centuries ago and traditionally implies an adverse prognosis related to the complications of portal hypertension, hepatocellular carcinoma, and liver failure typical of advanced stage chronic liver disease. However, with the increasing knowledge about the pathophysiological mechanisms and the advances in clinical management achieved in the past 30–40 years, the use of the name “cirrhosis”, indicating a static and irreversible end-stage condition, appears more and more inappropriate to describe the advanced stage of chronic fibrogenic liver diseases (Keaveny & Cárdenas, 2015).

Liver cirrhosis results from different mechanisms of liver injury that lead to necroinflammation and fibrogenesis. Histologically, it is characterized by diffuse nodular regeneration surrounded by dense fibrotic septa with subsequent parenchymal extinction and collapse of liver structures, together causing pronounced distortion of hepatic vascular architecture. This distortion results in increased resistance to portal blood flow and hence in portal hypertension and in hepatic synthetic dysfunction (Nelson, 2016; Schuppan & Afdhal, 2018). Clinically, cirrhosis has been regarded as an end-stage disease that invariably leads to death, unless liver transplantation is done, and the only preventive strategies have been screening for esophageal varices and hepatocellular carcinoma (Chirapongsathorn, 2018).

Recently, liver cirrhosis is defined as the histological development of regenerative nodules surrounded by fibrous bands in response to chronic liver injury, that leads to portal hypertension and end stage liver disease (Schuppan & Afdhal, 2018). Liver fibrosis results from the perpetuation of the normal wound healing

response resulting in an abnormal continuation of fibrogenesis. Cirrhosis is an advanced stage of liver fibrosis which leads to shunting of the portal and arterial blood supply directly into the hepatic outflow, compromising exchange between hepatic sinusoids and the adjacent liver parenchyma and hepatocytes (Nelson, 2016).

## **2. Prevalence and incidence of liver cirrhosis**

Liver cirrhosis is a chronic disease associated with significant morbidity and mortality globally (Asrani, Devarbhavi, Eaton, & Kamath, 2019). It is considered one of the leading causes of death worldwide (Marcellin & Kutala, 2018; Scaglione et al., 2015) and is the 5<sup>th</sup> leading cause of death in Thailand (Poovorawan et al., 2015). Thailand reported higher prevalence of liver cirrhosis that occurred in up to 75% among adults (Methawasin, Chonmaitree, Wongjitrat, Rattanamongkolgul, & Asawavichienjinda, 2016). It accounts for 26 % of adults' deaths and ranking the 5<sup>th</sup> in mortality rate across the country (Poovorawan et al., 2015). The standardized prevalence rates of liver cirrhosis are 75.3 per 100,000, and more common in male than female especially for alcoholic cirrhosis. The highest risk group was the persons aged 45 to 55 years (Poovorawan et al., 2015), who is in working age.

Global epidemiological data on cirrhosis are very scarce. Though reliable data are limited to few studies, approximately 29 million people in the European Union suffer from chronic liver diseases. Available data suggest that about 0.1 % of the European population is affected by cirrhosis, corresponding to 14 - 26 new cases per 100,000 residents per year or an estimated 170,000 deaths per year (Blachier, Leleu, Peck-Radosavljevic, Valla, & Roudot-Thoraval, 2013). Mortality due to liver cirrhosis is still increasing in Thailand (World Health Organization, WHO (2018) The

total number of deaths due to liver cirrhosis in 2015 was approximately 150,000 cases and in 2016 was approximately 160,000 cases. Most deaths were among those aged 55 to 74; mortality among men was higher than among women (77% versus 23% respectively). The number of deaths rose steadily until age 35-54; then increased sharply until it reached a peak at age 55-74, and then it declined gradually. Although women and men had the same trend, the actual number of deaths is higher among males (World Health Organization, 2018).

Since Thailand is recognized as the highest number of persons who have diagnosed with liver cirrhosis in Asian (Byass, 2014), yet there is limited up-date data about the incidence and prevalence of liver cirrhosis across the country. Early study conducted by Rattanamongkolgul, Wongjitrat, and Puapankitcharoen (2011) reported that the estimated deaths of cirrhosis in Thailand were 9,131 deaths each year with the crude prevalence rate per 100,000 was 86.3 (95% CI: 74.3-98.3). Age standardized prevalence rate was 75.3 (95% CI: 64.8-85.8). Prevalence of alcoholic cirrhosis was 53.6 (95% CI: 44.8-62.5) and 21.7 (95% CI: 16.0-27.4) for non-alcoholic cirrhosis. Age standardized rates of the prevalence male and female were 95.7 (95% CI: 77.9-113.5) and 76.8 (60.7-92.8) respectively with the ratio of male to female of 1.35:1. When classifying by ICD-10, standardized prevalence rates for alcoholic cirrhosis was 53.6 (95% CI: 44.8-62.5) and 21.7 (95% CI: 16.0-27.4) for non-alcoholic cirrhosis with the ratio of the alcoholic to non-alcoholic cirrhosis of 2.4:1. That is the ratio of overall cirrhosis is very similar to alcoholic cirrhosis indicating that cirrhosis in males is 34% higher in male than female while the same rates were found in non-alcoholic cirrhosis (Rattanamongkolgul et al., 2011).

A diagnosis of compensated cirrhosis is associated with a risk of death that is 4.7 times as high as the risk in the general population, and decompensated cirrhosis is associated with a risk that is 9.7 times as high. The average life expectancy of a patient with compensated cirrhosis is 10 to 13 years, and the average life expectancy may be as low as 2 years if there is decompensation (Fleming, Aithal, Card, & West, 2012). Among patients with alcoholic cirrhosis, 65% of the patients who abstain from drinking alcohol are alive at 3 years, as compared with 0% who continue drinking alcohol (Huang et al., 2018). This indicates that the more severe of disease and continue taking alcohol, the more likely to increase rate of mortality among this population.

### **3. Etiology of cirrhosis of liver cirrhosis**

#### International and national causes of liver cirrhosis

Various causes of cirrhosis have been found in worldwide studies include chronic hepatitis B virus (HBV) and hepatitis C virus (HCV) infection, alcoholism, and nonalcoholic steatohepatitis (Asrani et al., 2019). For example, Valery et al. (2017) reported that the most common aetiologies of liver cirrhosis in Australia included the hepatitis C virus (52%), fatty liver disease (22%), alcohol consumption (18%), and had alcohol as a co-factor (14%). Like the United States and European countries, HCV infection and nonalcoholic steatohepatitis are the causes of liver cirrhosis. Owing to the increasing prevalence of nonalcoholic fatty liver disease, cirrhosis related to nonalcoholic steatohepatitis is predicted to surpass HCV-related cirrhosis as the most common indication for orthotopic liver transplantation (Ge & Runyon, 2016).

In Thailand, the common causes of liver cirrhosis have been identified such as alcohol consumption, hepatitis infection, and non-alcoholic steatohepatitis. In a nationwide study conducted by Poovorawan et al. (2015) reported that 73% of persons with liver cirrhosis was caused from alcohol consumption, 14% from chronic hepatitis B virus, 12.6% from chronic hepatitis C virus, and more than 1% from non-alcoholic steatohepatitis. Recently, alcoholic liver disease is still identified as the unique etiology of liver cirrhosis in Thailand (Chirapongsathorn et al., 2018).

#### **4. Clinical evaluation of liver cirrhosis**

Diagnosis of liver cirrhosis is based on clinical investigation, laboratory findings, histology, magnetic resonance imaging, computer tomography, or ultrasound. Diagnostic criteria included firm liver, if palpable or reduced liver span; splenomegaly if present, low serum albumin and elevated serum globulin, with or without elevated bilirubin and transaminases; suggestive ultrasound or scan findings; and histology wherever available. Either histological evidence or a combination of abnormalities in at least two of the three evaluation modalities (clinical, biochemical, and imaging) is necessary to establish a diagnosis (Nelson, 2016).

#### **5. Stages of liver cirrhosis**

Liver cirrhosis are traditionally classified as having compensated and decompensated disease. Compensated cirrhosis refers to the condition of the absence of any complications. Decompensated cirrhosis is defined as the phase the presence the development of complications from portal hypertension, including ascites,

jaundice, variceal hemorrhage, and hepatic encephalopathy (Asrani & Kamath, 2013; Michelli, 2011).

Previously, four stages of cirrhosis had been proposed based on the presence or absence of evidence of features of portal hypertension (D'Amico, Garcia-Tsao, & Pagliaro, 2006).

Stage 1 is defined by the absence of ascites or varices.

Stage 2 is characterized by the absence of ascites and the presence of varices that have never bled.

Stage 3 is defined by the presence of ascites with or without varices that have never bleed.

Stage 4 is characterized by the presence of variceal bleeding in patients with or without the presence of ascites (D'Amico et al., 2006).

In Thailand, there is one study have re-staging liver cirrhosis into five stages (Chirapongsathorn, 2018) as following:

Stage 1: Persons who have diagnosed with compensated stage of liver cirrhosis in the absence of ascites and esophageal varices. The mortality rate for this group is about 1 percent per year.

Stage 2: Persons who have diagnosed with compensated liver cirrhosis in the absence of ascites but reported esophageal varices condition. The mortality rate for this group is about 3 - 4 percent per year. If they have more underlying conditions, the mortality rate would also increase.

Stage 3: Persons who have diagnosed with decompensated liver cirrhosis with ascites and may be with or without esophageal varices. However, they must have



never been experienced with esophageal bleeding. The mortality rate for this group is about 20 percent per year.

Stage 4: Persons with decompensated liver cirrhosis with the condition of esophageal varices and may be with or without ascites. The mortality rate for this group is about 57 percent per year. Half of them may pass away within 6 weeks after having esophageal bleeding.

Stage 5: Persons with decompensated of liver cirrhosis with sepsis condition. This stage is identified from the clinical observation that they are sensitive to any kind of infection as well as lower in immunization system (Rotman & Sanyal, 2017). The mortality rate in this group is about over 60 percent per year.

These five stages are identified from the clinical observation that they are sensitive to any kind of infection as well as lower in immunization system (Rotman & Sanyal, 2017).

## **6. Treatment options for persons with liver cirrhosis**

### **Medical monitoring**

Medical monitoring refers to the period of check-ups or periodic medical testing to screen people at significant risk for disease (Vearrier & Greenberg, 2017). Focusing on liver cirrhosis, the objectives of medical monitoring are to identify progress of disease, detect risky complications of decompensated cirrhosis, follow-up medical adherence and side effects, provide health education, and physical health checks (Nelson, 2016; Saberifiroozi, 2017). The medical monitoring also depends upon the underlying and causative factors of liver cirrhosis. For example, patients who drink alcohol must stop all alcohol consumption to avoiding further liver

damage. Once patients develop complications of cirrhosis the aim of medical treatment is to treat these complications, thus, they recover from the critical condition and their health status is stabilized (Ge & Runyon, 2016). Moreover, cirrhotic patients also experience a lower mental state, thus, they also need psychosocial support to improve their functional status (Zhang, Liu, Zhu, Hu, & Wang, 2018).

### **Liver transplantation**

Liver transplantation is the only available medical intervention for end-stage liver cirrhosis. However, this is impossible for many patients because either there are insufficient resources such as money or an appropriate donor or they are not eligible for this intervention (Nelson, 2016). A great advance in liver transplantation has been the improvement in immunosuppressive regimens so that allograft loss from rejection is now relatively rare (Neuberger, Ferguson, & Newsome, 2014).

## **7. Impacts of liver cirrhosis on individual, social, and healthcare levels**

### **7.1 Individual level**

Liver cirrhosis has important impact on many aspects in individual life living, family members, and healthcare system. Several studies have reported that patients with liver cirrhosis often experience multiple concurrent symptoms with higher severity and involve rapid deterioration of functional status comparing to patients with compensated liver cirrhosis stage as well as other type of cancers (Orman, M. Ghabril, & N. Chalasani, 2016; Parikh-Patel et al., 2002; van Abbema et al., 2017). The major causes of unpleasant symptoms are the pathology of disease and side effect of its treatment (Muir, 2015). Approximately 70% patients with decompensated liver cirrhosis experienced with numerous symptoms including

abdominal pain or discomfort, fatigue, anorexia, mood disorders, weight loss, swelling, jaundice, and nausea (Kim, Oh, & Lee, 2006; Wu et al., 2011). The severity of these symptoms impact causes reduction activities of daily living, individual's ability to function, enjoyment of leisure activities, difficulty to maintain important job, impaired nutritional performance, disrupting their lifestyles and their relationships with others, being dependency, quality of life, and readmission (Chirapongsathorn, Talwalkar, & Kamath, 2016; Kim et al., 2006; Motl et al., 2010; Newton & Jones, 2012). In addition, when liver cirrhosis strikes males in working age, it affects their ability to take care of their family and fulfill other responsibilities in life (Abdi, Daryani, Khorvash, & Yousefi, 2015).

## **7.2 Social level**

A diagnosis of liver cirrhosis is not only affected living life of a person, but also derive negative effects to other people around such as family members, friends, and significant others. Early study conducted by Bajaj et al. (2011) found that diagnosis of liver cirrhosis impacted the family unit and their caregivers in term of financial status, health status, and medical adherence. Spouses were the persons reported higher burden compared with other caregivers. A spouse had a significantly higher disruption of schedule, personal health, and sense of entrapment. Moreover, caregivers reported high level of anxiety and depression, which significantly correlated with perceived caregiver burden (Bajaj et al., 2011). Similarly, Hsu et al. (2019) revealed that the highest burden issues were financial load, daily care hours, and personal health, which significantly associated to poor quality of life among caregivers of persons with liver cirrhosis. This indicates that liver cirrhosis places a tremendous socioeconomic and emotional burden on their caregivers.

### 7.3 Healthcare system level

Healthcare system plays an important role provide the appropriate options for persons living with liver cirrhosis. The impact of liver cirrhosis on the health care system has been studied (Miquel, Clèries, Vergara, & Vela, 2018). Presently, the diagnosis of cirrhosis accounts for close to a half million hospitalizations annually, with more than 50% of those patients succumbing to their illness during that initial admission (Kimbell, 2015). For those individuals requiring an intensive care unit admission, the probability of death during that hospital stay increases to 67% (Alex et al., 2017). Nearly 20% of those that survive the acute inpatient admission will go on to require further hospitalizations within 30 days. Close to 75% of that population will experience continued hospital admissions in the ensuing two years at a rate of twice that of age-matched individuals without cirrhosis (Rakoski et al., 2012).

The overall costs associated with the diagnosis of cirrhosis embodies a significant economic burden, with the national cost of treatment in 2016 ranging from \$14 million to \$2 billion annually, depending on disease etiology (Neff, Duncan, & Schiff, 2011). In addition to formal care, individuals diagnosed with cirrhosis receive more than twice the number of hours of informal care, resulting in an additional cost of approximately \$5,000 per year, per individual (Rakoski et al., 2012). Recent finding reported by Miquel et al. (2018) performed cost analysis using a population-based database including 34,740 patients diagnosed with cirrhosis in Spain. The results revealed that healthcare expenditures on patients with cirrhosis totaled \$159.80 million (\$4,761.37per patient). Comparing to Thailand, the cost of treatment for Thai people with liver cirrhosis who continually admitted per person was \$5,719, \$62,053

for those who readmitted beyond 30 days, and \$73,252 for those who readmission within a 30-day (Chirapongsathorn et al., 2018). Thereby, cirrhosis places a major economic burden on the health care system.

### **8. Nursing care for persons with liver cirrhosis**

Nurses have a significant role in caring for persons with liver cirrhosis. Regarding to the Thailand practice guideline for management of chronic liver disease, nurses provide caring for cirrhotic patients based on difference conditions between compensated and decompensated phase. In compensated cirrhosis phase, persons with liver cirrhosis can often be early detected or managed in out-patient setting (Thai Association for the Study of the Liver, 2018). Nurses also involve in various interventions including medication management, health education, counseling on the complete elimination of alcoholic beverages, nutrition support, bacterial infections prevention, symptom management, recognizing and suppressing risk factors contributing to the deterioration of the disease, enhancing exercise, improving health-related quality of life, and maintaining functional status (Junpen, 2015).

In decompensated cirrhosis phase, patients are subject to invasive procedures for diagnosis and treatment during hospitalization. The objective of nursing care in this phase is participating on management of clinical complications such as ascites, hemorrhage varices, infection, and symptom distress (Thai Association for the Study of the Liver, 2018). Nurses also work within the multidisciplinary team caring for patients with decompensated cirrhosis about disease prevention, screening options for early disease, and treatment options can empower patients and their families in

making decision regarding their treatment and care (Junpen, 2015; Saberifiroozi, 2017).

## **Functional status among persons with liver cirrhosis**

### **1. Definition of functional status**

Multiple terms have been used to describe functional status including functional capacity, functional performance, functional recovery, quality of life, health-related quality of life, activity of daily living, and functional status (Lai et al., 2016; Leidy & Kline, 1999; Wang, 2004). The interchangeable use of these terms has led to various interpretations when discussing outcomes related to functional status. Therefore, this study selected the term functional status to describe the phenomenon of interest, particularly, among persons with liver cirrhosis.

Functional capacity is defined as an individual's maximum potential to perform activities to meet basic needs, fulfill usual roles, and maintain health and well-being, which may include the cognitive and psychosocial components (Leidy, 1994). Functional capacity in the adult population is measured by the ability to independently participate in activities of daily living (ADLs) (Wang, 2004).

In contrast to functional capacity, functional performance refers to what an individual does in real situations (Wang, 2004). Leidy (1994) also defined functional performance as the physical, psychological, social, occupational, and spiritual activities that individuals usually perform to meet basic needs. Therefore, functional performance is the outcome of deliberate actions by the individual. Functional performance can capture subtle changes in physical function that may present prior to

personal awareness of such changes (Mullen, McAuley, Satariano, Kealey, & Prohaska, 2012).

Functional recovery can be described as an individual's returning to performing ADLs independently. Ganz, Peterson, Russo, and Guccione (2007) measured functional recovery after hip fracture in the sub-acute setting using performance-based measures. In this study, the definition of functional recovery was congruent with the definitions that focused primarily on individual performance. Lin and Chang (2004) examined factors affecting recovery of ADLs one year after hip fracture in older adults to understand the factors that affect functional recovery in this population. Patients who had poorer ability to walk outdoors experienced delayed recovery in ADLs (Lin & Chang, 2004). This study supported a focus on overall performance of the individual when defining functional status.

Functional status decline is defined as a deterioration of performance in self-care skills or a new loss of ability in self-care activities (Hoogerduijn, Schuurmans, Korevaar, Buurman, & de Rooij, 2010). Age is often connected with functional decline or loss of ability. The issue of functional decline in the adult has become the focus of many studies. Hoogerduijn et al. (2006) conducted a systematic review to determine predictors of functional decline among hospitalized patients. They identified the following predictors of functional decline: (a) age upon admission into the hospital; (b) lower functional status; (c) cognitive impairment; (d) preadmission disability of IADLs; (e) length of stay; and (f) depression (Hoogerduijn et al., 2006). Christensen, Stovring, Schultz-Larsen, Schroll, and Avlund (2006) studied the effect of physical inactivity among adults and older adults. The results indicated a strong relationship between physical inactivity and functional decline in adults. It was found

that physical inactivity was indeed a risk factor for functional decline in the adult population. Therefore, functional status decline is usually measured in relation to the completion of ADLs.

The dimensions of functional status are identified in various components based on the objectives of each researcher. For example, Brink (1988) divided the dimensions of functional status among advanced cancer patients into five components including: physical activities, self-maintenance, role activities, social activities, and emotional status. Tulman, Fawcett, and McEvoy (1991) indicated four dimensions to explain functional status among patients with breast cancer including: household and family activities, social and community activities, personal care activities, and occupational activities. Later, Cella et al. (1993) noted that functional status consists of four dimensions including: physical well-being, social/family well-being, emotional well-being, and functional well-being. Leidy (1994) viewed functional status as an individual's ability to perform normal daily activities, thus, its dimensions consist of functional capacity, performance capacity, reserve capacity, and capacity utilization. Wilson and Cleary (1995) demonstrated that functional status is the ability of the individual to perform defined tasks. Thus, this concept has four dimensions: physical function, social function, role function, and psychological function. In a concept analyzes study conducted by Wang (2004) proposed that functional status is activities performed by an individual to realize needs of daily living. Therefore, it has six dimensions including: physical, psychological, social, spiritual, intellectual, and roles performance.

In summary, functional status is an individuals' perceptions of their performance. Functional status can be defined as the ability of the individual to



perform defined tasks which response to basic activities of daily living, level of involvement in activities, psychological performance, work performance, social activity, and quality of interaction in order to fulfill and maintain their well-being. In context of liver cirrhosis, functional status in persons with liver cirrhosis could be defined as the ability of persons with liver cirrhosis to perform activities of daily living or the level of involvement in activities in multiple domains including physical, psychological, social and role performance in order to fulfill and maintain their well-being.

## **2. Functional status among persons with liver cirrhosis**

Functional status has long been recognized as an important outcome, especially for chronic liver diseases that comprise an increasing portion of the disease burden such liver cirrhosis (Galant, Forgiarini Junior, Dias, & Marroni, 2012; E. S. Orman, M. Ghabril, & N. Chalasani, 2016a). The ultimate goal for a number of persons with liver cirrhosis who receiving medical treatment is to have the ability to maintain functional status independently (Saberifiroozi, 2017). The basic functional status of the persons with liver cirrhosis consists of the ability to perform feeding, grooming, transferring, toilet use, mobility, dressing, climbing stairs, bathing, shopping, continue regular working, maintain good mood, and look after family members by themselves (Valery et al., 2015a). If persons with liver cirrhosis can do these activities independently, it means that they have ability to extend life longer (Valery et al., 2015b). In other words, the persons with liver cirrhosis who are faced with difficulties in performing the normal course of their lives may also have difficulty to meet the basic needs, fulfill usual roles, and maintain their health and well-being, called the functional status as per Leidy (1994). These activities usually

support the persons with liver cirrhosis by giving them the independent living. If the ability to maintain or enhance the functional status could not fulfill the social roles of the person, then the psychosocial health of the person could be realized (Wang, 2004).

According to the literature review, a number of studies point out that persons with liver cirrhosis have reported moderate to severe functional status decline (Neff, Duncan, & Schiff, 2011; Rakoski et al., 2012). Prior studies reported that over 80% of them suffered with the decline to performing daily activities such as dressing, grocery shopping sitting, and sleeping (E. S. Orman, M. Ghabril, & N. Chalasani, 2016b; Parikh-Patel et al., 2002; Rakoski et al., 2012). Moreover, they do not perform, or spend less time in performing, such specific advance activities as exercise, housework, sexual activity, and social and role functioning (Abdi et al., 2015; Bajaj et al., 2011; Fagerström & Frisman, 2017), doing rarely exercise (Aamann, Dam, Rinnov, Vilstrup, & Gluud, 2018), and less interested of sexual activity for an average of 3-6 months (Tapper et al., 2018). Additionally, the suffering involved in liver cirrhosis affected the return to work in those previously working. That is, 33% did not return to work at all and 15% went back to work with difficulty (Valery et al., 2015a).

### **3. Measurement of functional status**

Many existing instruments have been developed to measuring functional status. Found instruments could be categorized into two groups including self-reported instrument and performance-based instrument. Although the performance-based instrument is more objective than the self-reported instrument (Dunn et al., 2016), yet most of them do not refer to the definition of functional status in this study which covers a wider range of its dimensions. Particularly, they could not provide important information indicating whether the persons with liver cirrhosis conduct the

activities of daily living independently or dependently. Hence these measurement tools are not suitable for the assessment of the functional status in this study.

For self-reported instruments, they are suitable for assessing the functional status in this study due to most of them are developed based on the concept that defined functional status as the ability to conduct activities of daily living. Second, self-report measures are simple, convenient, and inexpensive. Furthermore, self-reported scales can provide significant information indicating the ability of persons with liver cirrhosis to perform activities of daily living. The descriptions of self-reported instruments that measure functional status are presented hereunder.

1) The Functional Status Questionnaire (FSQ) is a 34-item scale, designed to screen for disability and to monitor clinically meaningful change in function in terms of efficient assessment of basic activities of daily living, intermediate activity of daily living, mental health, work performance, social activity, and quality of interaction in past 30-day (Jette et al., 1986). This scale is widely used, and present good internal consistency reliabilities scores ranged from 0.64 to 0.82 (Gallanagh, Castagno, Wilson, Erdmann, & Zannad, 2011).

2) The SF-36 Health Survey consists of 36 items. It measures 8 dimensions of general health including: physical function, role limitations, bodily pain, social functioning, general mental health covering psychological distress and well-being, role limitations due to emotional problems, vitality, and general health perceptions. The scale has good psychometric properties (Ware, 2000).

3) The Karnofsky Performance Status Scale (KPS) is a 100 - point scale with verbal descriptors that are rated from 100 (fully active, capable of carrying out all

predecease performance without restriction) to 0 (dead) (Mor, Laliberte, Morris, & Wiemann, 1984). Normally, the KPS is widely used for screening purposes only.

4) The Barthel Index (Mahoney & Barthel, 1965) is an ordinal scale that measures functional independence in the domain of personal care and mobility. It was designed to monitor functional performance in chronic patients and long-term hospital patients with a paralytic condition. The ten activities cover personal care and mobility, omitting everyday tasks essential for life in the community (e.g. cooking and shopping). Each item is rated in terms of whether the patient can perform the task independently, with some assistance or is dependent on help. This scale is restricted in that low level of disability reflecting its origins as a measure for severely ill patients. It may require some intermediate activities of daily living (IADL) which is not included in Barthel Index.

5) mini-DUHP is a 10-item scale adapted by Blake and Vandiver (1986) from the original one called The DukeUNC Health Profile (DUHP), which is a 63-item instrument that assessed 4 dimensions of functional status: symptom experiences, physical function, social function, and emotional function. The mini-DUHP scores showed highly correlated with composite DUHP scores ( $r = 0.81$ ;  $r = 0.84$ ) and moderately correlated with each of the 4 functional dimension scores (Blake and Vandiver 1986).

6) Late-Life Function and Disability Instrument (LLFDI): The LLFDI is a self-reported questionnaire made up of a 32-question Function component and two-part Disability component with 16 questions each on frequency and limitation (Jette, Haley et al. 2002). The higher the Function score, the more functionally able/active one is in performing routine physical activities. The higher the Disability scores, the

less disabled one is in social life tasks (Murrock and Zauszniewski 2011). This tool has standardized instructions for subjects to answer all 48 questions using a 0 to 5 Likert scale. Each question carries a different weight. therefore, raw scores must be transformed to 0-100 scaled scores using the LLFDI computer program (Lapier and Mizner 2009).

The analysis of instruments for measuring functional status gives a favor to the FSQ. This scale is relevant to the operational definition of functional status. It has good psychometric properties, reasonable length, and has been using widely in chronic diseases. For example, Meemajam, Somrarnyart, and Tachaudomdach (2018) used the FSQ to measure functional status among persons with automatic implantable cardioverter defibrillator and reported the Cronbach's alpha coefficient of each dimensions ranged from .72 to .94.

### **Consequences of functional status decline among persons with liver cirrhosis**

Functional status decline is a frequent problem reported by persons with liver cirrhosis. It is an important health outcome for persons with liver cirrhosis to have ability to conduct activities of daily living independently (Saberifiroozi, 2017). Prior studies reported that 60% to 80% of them faced with functional status decline that caused them in difficulties to maintain usual activities of daily living (de Lima et al., 2015; Dhar et al., 2019; Orman, Ghabril, & Chalasani, 2016). For physical functioning, they had difficulty to maintain the ability to perform usual activities such as exercise, housework, dressing, grocery shopping, driving, and sleeping (Orman et al., 2016; Wu, Wu, Lien, Chen, & Tsai, 2011; Zenith et al., 2014). For psychological functioning, Fagerström and Frisman (2017) revealed that persons with liver cirrhosis

felt uncertain that their illness cannot be controlled by themselves and it created many changes in their daily life. For social and role functioning, Jijomon, Lobo, and Castelino (2017) found that 35,7% of them was classified as moderate dependence status which significantly decreased ability to perform normal role and social functioning such as having difficulty to participate in activities they enjoyed, and share time with family and friends, which made them isolated and lonely.

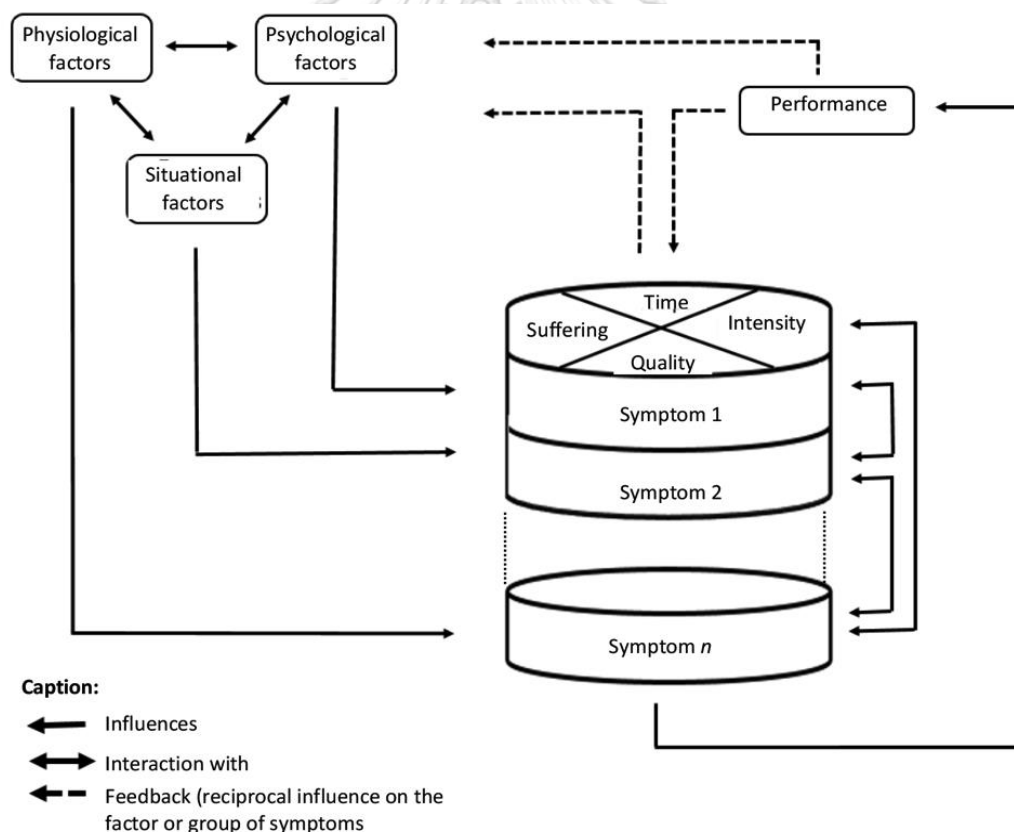
Persistent functional status declines among this population cause disease deterioration, unemployment, frequent hospitalization, poor quality of life, and risk of death (Bajaj et al., 2011; Galant, Junior, Luiz, 2012; McCabe and Wong, 2018). In worldwide, this problem also places a large burden on short-and long-term healthcare system such as healthcare services utilization and cost of medical expenditure (Chirapongsathorn et al., 2016; Serper et al., 2018).

In sum, functional status decline is a major cause of having difficulty to maintain physical, psychological, social, and family functioning among persons with liver cirrhosis. Furthermore, this problem also impacts on healthcare system. Hence, declining of functional status in this population becomes a serious aspect.

### **The Theory of Unpleasant Symptom (TOUS)**

The Theory of Unpleasant Symptom (TOUS) was developed by Elizabeth Lenz and colleagues (Lenz & Pugh, 2008; Lenz et al., 1997; Lenz, Suppe, Gift, Pugh, & Milligan, 1995), and integrated existing knowledge about a single or variety of symptoms and its influencing factors that impact on individual's performance (Lenz, 2018; Lenz et al., 2014). The TOUS has three major related parts including the symptom(s), factors that influence the symptom (influencing factors), and

performance outcome. Symptom is the central concept. Three influencing factors are physiological, psychological, and situational factors. The three influencing factors interact with and influence each other. These influencing factors influence the symptom experience, which in turn, influences them. The symptom experience impacts the performance. The symptom experience mediates and moderates the influence of the influencing factors on performance. Finally, performance influences both the symptom experience and the influencing constructs. The complex relationship among concepts of the TUOS are conceptualized to be dynamic, interactive, and reciprocal in nature (Figure 2.1).



**Figure 2.1** Schematic of the Theory of Unpleasant Symptoms  
(Lenz et al., 2014)

### **Symptom(s)**

The theory defines symptoms subjectively, as perceived by the patient. Symptom(s) is/are proposed to vary in intensity, timing (e.g., time of onset, duration), the distress that the patient experiences, and quality (how they feel). Two or more occurring together can be identified as symptom cluster which may have the same or different causes and can have multiplicative effects.

### **Influencing factors**

Three categories of factors that influence symptom experience are physiological, psychological, and situational factors (Lenz et al., 2014).

Physiological factors consist of variables that related to the internal of individual as well as lifestyle behaviors including the genetic, anatomical, disease-related, treatment-related variables, and lifestyle behaviors. Examples of variables in this category include the existence of pathology or disease states, comorbidities, stage and duration of illness, inflammation due to infection or trauma, level of consciousness, age, developmental stage, type and duration of treatment, and lifestyle behaviors such as diet, exercise, smoking, and alcohol consumption.

Psychological factors include both affective and cognitive variables. The individual's affective state or mood (e.g., level of anxiety, depression, or anger) during the time of the symptom experience-even if unrelated to the symptom-and the emotional response to the illness or the symptom itself can serve to intensify the symptom. Cognitive variables that may impact the symptom experience include the degree of uncertainty, individual's level of knowledge about the illness, meaning of



symptom experience, his or her repertoire of cognitive coping skills and perceived availability of coping resources, and individual perception regarding to disease.

Situational factors consist of contextual variables external to the individual and consist of the individual's social and physical environment. Examples of situational variables are the individual's culture, experiential background, social support, marital status, occupation, and characteristics of healthcare setting. The example of the physical environment includes altitude, temperature, humidity, and presence of pollutants.

### **Performance**

The outcome concept in the TOUS is performance. It represents the consequences of the symptom experience. Simply stated, the theory asserts that the experience of symptoms can have an impact on the individual's ability to function or perform physically, cognitively, and in socially defined roles.

### **The utilization of the TOUS in nursing research**

The TOUS has been widely used in nursing research as a theoretical framework in a variety of clinical populations. While the vast majority of this work will conduct in liver cirrhosis populations, the TOUS has been used as a theoretical framework to guide research in individuals with chronic obstructive pulmonary disease (COPD) (Lee et al., 2018), heart failure (Yang & Kang, 2018), renal failure (Li, Xie, Yang, & Pang, 2018), and pancreatic cancer (Tang et al., 2018). For example, Lee et al. (2018) used the TOUS as a conceptual framework to examine the interrelationships among dyspnea, anxiety, depressive symptoms, fatigue, and functional status among patients with COPD. The finding provided evidence of

symptoms had direct effects on functional status. Higher levels of dyspnea were significantly associated with impaired functional status ( $\beta = .44, p < .001$ ).

In liver cirrhosis study, Kim and Seo (2015) explored the convergence between the TOUS and factors affecting quality of life among 198 liver cirrhosis patients. The findings revealed that variables such as duration of liver cirrhosis, symptom experience (e.g., intensity, frequency, distress), physical factors (e.g., duration of disease, severity of disease), psychological factors (e.g., anxiety and depression), and situational factors (e.g., family, friend, medical member support) explained 51.8% of variance in quality of life among this population.

In summary, the TOUS is a middle-range theory and chosen as the theoretical framework in this study for many reasons. First, this theory is applicable in nursing practice and research in order to assess an isolation or multiple symptoms occur among persons with liver cirrhosis. Second, the TOUS may assist nurses to investigate the linkage between symptom experience, its influencing factors, and performance. Third, the TOUS is helpful in providing clear boundaries for research or clinical practice that can improve different dimensions of functional status. Finally, although the theory is beneficial to predict the causal pathway associations between the influencing factors, symptom experience, and performance, but the arrows in the model do not prevent reciprocal relationships between the concepts (Lenz et al., 2014). Thus, the TOUS is appropriated for guiding this study as it is a cross-sectional study to investigate the relationships between influencing factors, symptom experience, and functional status with specifying the cause and effect between these variables.

## **Factors related to functional status among persons with liver cirrhosis**

Previous studies have indicated factors related to functional status among persons with chronic liver diseases. These found factors can be divided into four groups as physiological, psychological, and situational factors, and symptom experience.

### **1. Physiological factors**

In the literature, several non-modifiable factors associate with functional status. For instance, severity of disease is found to be associated with functional status. Bajaj et al. (2011) conducted a cross-sectional study at inpatient department among 104 patients with liver cirrhosis. They reported that severity of liver cirrhosis was significantly associated with personal daily schedule ( $r = 0.35$ ,  $p = 0.001$ ), entrapment ( $r = 0.25$ ,  $p = 0.017$ ), and overall functional status ( $r = 0.27$ ,  $p = 0.008$ ). Dhar et al. (2019) reported that severity of disease was significantly associated with functional status decline among persons with liver cirrhosis ( $r = 0.28$ ,  $p < 0.05$ ). Age and gender were associated with functional status among persons with liver cirrhosis (Kotarska et al., 2014; Parikh-Patel et al., 2002). In early case-control study by Parikh-Patel et al. (2002) showed that age was significantly associated with functional status (OR = 2.0, 95%CI = 1.0-3.0,  $p = 0.04$ ). For gender, Bianco et al. (2013) noted that females have significantly lower scores on physical role functioning, physical activity, and psychological functioning than male. Consequently, Les et al. (2010) have reported that female was significantly correlated with physical functioning ( $r = -0.42$ ,  $p = 0.02$ ).

In terms of the physiological and illness-related factors, a study conducted by de Lima et al. (2015) found that cardiac workload index and nutritional status were

significantly associated with functional status (gait speed) among end-stage of liver disease ( $r = 0.60$ ,  $p < 0.05$ , and  $r = 0.65$ ,  $p < 0.05$ ) respectively. Les et al. (2010) addressed that level of hemoglobin was significantly associated with physical functioning ( $\beta = 1.42$ ,  $p < 0.0001$ ). They also found that cirrhotic patients with comorbid conditions were significantly associated with functional status decline.

For the illness behaviors-related liver disease, alcohol consumption is evident that impacts on functional status. Vasiliadis et al. (2019) reported that alcohol consumption was significantly associated with functional status decline ( $p < 0.0001$ ). Rattawitton and Perngarn (2017) noted that alcohol consumption was negatively correlated with the limitation of physical and social functioning ( $r = -0.58$ ,  $p < 0.001$ ).

The concept of alcohol consumption is selected as the independent variable in this study due to some reasons. First, it is believed that consistent alcohol drinking may develop functional status decline. Second, alcohol use disorder is one of the most common co-occurring disorders among individuals diagnosed with liver cirrhosis. In the study of Andersen, Borre, Jakobsen, Andersen, and Vilstrup (1998) found that consistent alcohol drinking among persons with liver cirrhosis was the main cause of muscle wasting and motor dysfunction. Third, relation between alcohol consumption and functional status among persons with liver cirrhosis has not been established.

## **2. Psychological factors**

Anxiety and/or depression is the most common affective psychological distress and associated with functional status decline among patients with liver cirrhosis. For instance, Weng et al. (2014) found that depression was significantly associated with work ability ( $r = 0.57$ ,  $p < 0.01$ ). Nardelli et al. (2013) noted that anxiety was significantly associated with physical performance in patients with

cirrhosis compared to patients without symptoms of anxiety ( $\beta = -0.77, p = 0.002$ ). For cognitive factors, Langston et al. (2017) found that illness perception components independently account for 33% of the variance in physical health score ( $R = 0.58, F(8, 117) = 7.34, p < 0.001$ ). Further, illness identity made a significant contribution to the prediction of physical functioning ( $\beta = -0.31, t = -3.41, p = 0.001$ ). This indicates that those who reported greater illness identity tended to report poorer physical functioning.

This study selects the concept of illness perception to be studied instead of anxiety or depression based on some reasons. First, the higher level of correlation and prediction found in previous studies may imply causation between illness perception and functional status. Second, illness perception may be useful to further understanding of why individuals who have been diagnosed with liver cirrhosis continue to drink alcohol. Finally, the dimensions remain in this concept may be useful for developing intervention to enhance functional status among persons with liver cirrhosis in further study.

### 3. Situational factors

The situational factors including educational level, income, and social support are found association to functional status. For example, education level was significantly associated with functional status in patients with liver cirrhosis ( $OR = 3, 95\%CI = 2.0-4.0, p < 0.001$ ) (Parikh-Patel et al., 2002). A monthly income lower than \$2,000 was a significant predictor of low diversity of leisure participation ( $OR = 0.36, p = 0.02$ ) (Weng et al., 2014). Furthermore, Youssef (2013) addressed that there was a significantly positive association between the perception of social support and

physical functional ( $r = 0.21$ ,  $p = 0.0005$ ). This indicates that when social support decreases the physical functioning also decreases or and vice versa.

#### 4. Symptoms

For symptom experience, Amornchevanun et al. (2015) found that persons with liver cirrhosis have suffered with many unpleasant symptoms including fatigue, muscle cramps, anxiety, insomnia, and lack of appetite. They also reported that the symptom in which mostly interfere daily functioning was fatigue. In similar to early study by Goldblatt, James, and Jones (2001) found that persons with liver cirrhosis significantly reported fatigue score higher than healthy persons ( $p = 0.05$ ). Moreover, fatigue was negatively significant associated with functional status ( $r = -0.70$ ,  $p < 0.001$ ). Kim and Seo (2015) reported that symptom experience was negatively significant associated with functional status ( $r = -0.49$ ,  $p < 0.001$ ). Specifically, to a symptom, fatigue was negatively associated with physical activity ( $r = -0.34$ ,  $p = 0.03$ ) (Wu et al., 2012). In addition, fatigue accounted for 11.4% of variance in negative effect on functional status (Zalai et al., 2015).

According to the found factors in the literature, conceptualizing factors as modifiable and non-modifiable is important from a clinical and intervention perspective, because modifiable influencing factors are amenable to interventions (Nindrea, Aryandono, & Lazuardi, 2017). If modifiable variables demonstrate a causal relationship for functional status are known, interventions could target these to improve the functional status of the persons with liver cirrhosis, and indirectly the lives with this disease comfortably (Nindrea et al., 2017). Although non-modifiable factors may not be directly useful as targets for nursing interventions, these variables are important in order to identify clinical conditions among this population. Nurses

could utilize the non-modifiable factors as basic data to support nursing practice. In addition, those variables should have a moderate to a high level of correlation (Burns & Grove, 2012).

In summary, the selected modifiable variables to explain a causal model of functional status among persons with liver cirrhosis in this study are alcohol consumption, illness perception, social support, and fatigue.

### **The relationships between alcohol consumption, illness perception, social support, fatigue, and functional status among persons with liver cirrhosis**

Based on the theory of unpleasant symptoms (TOUS) and empirical literature, the selected independent variables were alcohol consumption, illness perception, social support, and fatigue. The dependent variable was functional status. The details of each variable and their relationship are described as follows:

#### **1. Alcohol consumption**

##### **1.1 Definition of alcohol consumption**

Previously, Suktrakul, Yunibhand, and Chaiyawat (2009) defined alcohol consumption as the number of the standard drink in a week which include type of alcohol used, frequency, and quantity of alcohol intake. Later, Tsunoda, Kai, Uchida, Kuchiki, and Nagamatsu (2014) defined alcohol consumption as the frequency of alcohol intake and the quantity of each type of alcoholic beverage consumed based on the standard drink during period of a week. In addition, alcohol consumption can be defined the average volume of consumption, patterns of drinking on some occasions, and the quality of the alcohol consumed within a week (Monteiro,

Rehm, Shield, & Stockwell, 2017). Presently, Oh, Kim, Han, Park, and Jang (2018) conceptualized alcohol consumption as the frequency and average alcohol intake per drinking session. In conclusion, alcohol consumption is defined as the summarized current drinking pattern regarding to the frequency of alcohol intake and the quantity of alcohol consumed based on the standard drink.

### **1.2 Measurement of alcohol consumption**

Based on the definitions of alcohol consumption have summarized above and the nature of nursing practice, this study focused on the subjective measures (self-reports) rather than objective measure (biochemical measures such as blood alcohol concentration and other biological markers). Moreover, self-report methods have been widely used for estimating alcohol consumption because of their flexibility, simplicity, and inexpensiveness. Some subjective instruments aim to measure alcohol consumption are described hereunder.

- The Alcohol Use Disorders Identification Test Consumption (AUDIT-C) (Bradley et al., 2007) consists of the first three questions of the AUDIT: the quantity, frequency, and heavy of alcohol intake. All 3 questions are scored from 0 to 4, thus yielding a maximum score of 12. Researchers had tested the effectiveness of this instrument and the results showed an excellent screening for alcohol consumption related to alcohol use disorder (Hagström, Hemmingsson, Discacciati, & Andreasson, 2018). The overall Cronbach's alpha coefficient for AUDIT-C was ranged from 0.68 to 0.89, which indicates that the internal consistency level was good (Kawada, Inagaki, & Kuratomi, 2011; Samai, Karl, Wirat, & Chalernpol, 2017).

- The Quantity-Frequency measure (QF) is proposed by Stahre, Naimi, Brewer, and Holt (2006). With this method, respondents will be asked how frequently



(i.e. how many days) they consumed alcohol and how much alcohol they consumed during the days they drank (i.e. typical quantity) during the past 30 days. To determine average daily alcohol consumption the number of drinking days is multiplied by the usual number of drinks, and the total is divided by the number of 30 days. This scale may cause difficulty for respondents to recall previous memory about alcohol drinking as well as incorrect interpretation of drinking.

- The Timeline Follow-Back (TLFB) is developed by Sobell and Sobell (1992). It can be used when researcher want to know precision of drinking (e.g., percentage of days drinking at certain levels, weekend/weekday pattern changes), or the reflection of risk days. The total amount of alcohol used is calculated to evaluate specific changes in drinking before and after treatment or get a picture of heavy and light drinking days. Thus, this measure is suitable for comparing total dose of alcohol consumed in experimental study. Previous study reported good psychometric characteristics with a variety of drinker's groups (Dwivedi, Chatterjee, & Singh, 2017).

- Life-Time Alcohol Consumption (LTAC) is developed by Tockwell, Murphy, & Hodgson (1983). It is a detailed retrospective diary, where the participant was asked to describe the circumstances and level of consumption of each drinking occasion during a specific timeframe. However, this can be relatively time consuming to deliver and mostly appropriate for before and after treatments. The alcohol consumption questions contained the amount (milliliters per time) and the frequency of each type of alcohol consumption from the previous 12 months (times per day). Frequency categories are 5–6 times per week, 3–4 times per week, 1–2 times per week, 2–3 times per month, and 1 time per month (Uraiporn, Alongkote, Narisa, &

Piyapong, 2019). Calculation of alcohol consumption, average daily alcohol consumption (grams of ethanol per day) is calculated by the amount of alcohol consumption (milliliters per day) multiplied by the alcohol percentage in each type and the specific strength of the alcohol (0.79). Average daily alcohol consumption is calculated from the average amount of ethanol consumption per day for all types. All subjects are classified into four groups: non-drinkers; light drinkers: < 22 g ethanol/day; heavy drinkers:  $\geq 22$  and < 44 g ethanol/day; and very heavy drinkers:  $\geq 44$  g ethanol/day.

In this study, the AUDIT-C was selected to measure alcohol consumption for many reasons. First, alcohol consumption among persons with liver cirrhosis mostly found in terms of frequency and quantity of drinking. Second, this scale was an effective instrument to detecting alcohol problems among people who meet the criteria for at-risk consuming such liver cirrhosis. Third, it can improve the accuracy of usual drinking among persons with liver cirrhosis. Fourth, the number of questions is not too much, thus, it might not burden the participants to complete it. Finally, it was useful for the detection of alcohol-related problems such functional status.

### **1.3 The relationships between alcohol consumption and functional status**

There is evident about the association between alcohol consumption and functional status among persons with liver cirrhosis. Prior work has shown that chronic heavy alcohol consumption alters brain structure and circuitry (Jacobus & Tapert, 2013), particularly in frontocerebellar circuits underlying working memory, visuospatial, and physical functioning (Brumback et al., 2017). In Thailand, Rattawitton and Perngparn (2017) conducted a cross-sectional study to identify and

characterize the situation of alcohol consumption among 3,586 people who were at risk for and being diagnosed with liver cirrhosis in Nan province and their health problems. The results revealed that alcohol consumption was negatively correlated with health problems in term of limitation of physical, mental, and social functioning ( $r = -0.58, p < 0.001$ ). Types and frequency of drinking were associated with functional limitation ( $X^2 = 10.716, p \leq 0.004$ , and  $X^2 = 25.676, p \leq 0.001$ ).

In summary, a few studies have examined the association between alcohol consumption and functional status among persons with liver cirrhosis. Those findings are difficult to generalize into nursing practice due to the limitation of specific setting and mixed of chronic liver diseases. This indicates the need for further investigation the among these two variables in Thailand as well as in specific group of persons with liver cirrhosis. Therefore, alcohol consumption is included in the model.

## **2. Illness perception**

### **2.1 Definition of illness perception**

Diefenbach and Leventhal (1996) defined illness perception as the organized beliefs patients construct about the characteristics of their illness. Individuals' beliefs tend to fall along four critical attributes including identity, cause, timeline, consequences. Broadbent et al. (2006) conceptualized illness perception as the process by which individuals respond to a perceived health threat. They also identified eight dimensions including consequences, timeline, personal control, treatment control, identity, concerns, illness comprehension, and emotions. In addition, illness perception can be viewed as a person's experience of illness has central importance, and the greatest importance is given to the model which patients

form themselves of their condition. Patients evaluate information on illness in five categories: identity, duration, reason, serious consequences, and the possibility of treatment or control (Nehir, Tavşanlı, Özdemir, & Akyol, 2017).

It can be summarized that illness perception is an individual's beliefs about their illness which that belief pertains to the way patient responses and makes sense of their disease. The components of illness perception include beliefs about the identity, timeline, possible causes, consequences, personal control, treatment control, coherence, and emotional representation of illness.

## **2.2 Measurement of illness perception**

Three instruments have been used to measure illness perception in the literature as described here below.

- The Illness Perception Questionnaire (IPQ) is a 39-item scale. It comprises five scales assessing the five dimensions underlying patients' models of illness including identity, timeline, cause, and cure control on a five-point Likert scale. The IPQ has proven validity and reliability across a range of illness groups (Weinman, Petrie, Moss-Morris, & Horne, 1996).

- The Illness Perception Questionnaire-Revised (IPQ-R): It is extended the original scale by adding more items (Moss-Morris et al., 2002). The IPQ-R has 80 items. The IPQ-R also provides information on cyclical timeline beliefs as well as more sensitive to changes in illness perceptions due to the larger score range of the subscales, but it burdens some on research participants, and in some situations such a long questionnaire is prohibitive. This is particularly the case when patients are very ill or when there is limited time available for assessment.

- The Brief Illness Perception Questionnaire (Brief-IPQ) (Broadbent et al., 2006). The Brief-IPQ has eight items plus part of the causal scale. All items except the causal question are rated using a 0-to-10 response scale. Five of the items assess cognitive illness representations: consequences, timeline, personal control, treatment control, and identity. Two items assess emotional representations: concern and emotions. One item assesses illness comprehensibility. Assessment of the causal representation is by an open-ended response item. This scale demonstrates good psychometric properties testing in samples from several illness groups (Kaptein et al., 2011; Kaptein et al., 2013). It is a shorter questionnaire which may be more suitable for patients who are very ill or elderly because it would be much quicker to complete.

Finally, this study employed the Brief-IPQ to measure illness perception due to it reflected the definition of illness perception among persons with liver cirrhosis. Moreover, several studies have utilized these scales in their studies and reported advantages in terms of brevity and lower participant burden, especially in clinical settings and where repeated follow-up assessments were needed.

### **2.3 The relationships between illness perception and functional status**

It has been documented that illness perception has an important role in the prevention of functional status decline resulting from diagnosed with liver cirrhosis (Ney et al., 2017). Prior studies indicated that functional status decline was high prevalent in persons who have negative perception about illness (Langston et al., 2018; Zelber-Sagi et al., 2017). Approximately 45% of person with liver cirrhosis reported having negative illness perception about disease suffered with physical limitation in order to perform activities of daily living. Langston et al. (2017) investigated the relationship between illness perception and functional status among

persons with chronic liver diseases including liver cirrhosis. They found that increased negative illness perception was associated with lower functional status scores ( $r = -.47, p < .001$ ). Moreover, illness perception was positively associated with functional status. The explanation is given that illness perception may encourage the feeling of individual to perceive whether the illness would interfere their activities of daily living. In summary, existing literature have highlighted that illness perception has a negative direct effect on functional status in persons with liver cirrhosis.

### **3. Social support**

#### **3.1 Definition of social support**

According to theory of social support by Shumaker and Brownell (1984), social support is an exchange of resources between two individuals perceived by the provider or the recipient to be intended to enhance the wellbeing of the recipient. Hlebec, Mrzel, and Kogovšek (2009) view social support as a subjective evaluative assessment of support resources and behaviors and state. Different sources of support have been found related to health outcomes including primary relationship and professional relationship (Halbesleben, 2006). There are many different components of social support. House, Umberson, and Landis (1988) has described four main components of social support including emotional, appraisal, informational, and instrumental support. Emotional support generally comes from family and friends and is the most important type of support for improving psychosocial adjustment. In sum, social support refers to the individual's perception about emotional, instrumental, informational, and appraisal support that persons with liver cirrhosis receive from family, friends, and others significant person adequacy.

### 3.2 Measurement of social support

Social support can be assessed by two different methods; perceived support and received support. Perceived support is examined by asking individuals to what extent they perceive the people surrounding them are available to support them (Hlebec et al., 2009). While received support is assessed by examining whether the people surrounding them are available and do provide the individual with the required support and coping skills. Although both perceived and received support are measured through an individual's perception, the received support may be confused with the individual's needs and cannot reflect exactly the available amount of support. For that reason, the perceived availability of support is considered the most important aspect of measuring the adequacy of functional support (Cohen, 2000). Also, assessing perceived support may be more feasible in research studies, which provide more details as following.

- The Social Support Appraisals (SS-A): It is developed by Vaux et al. (1986) and designed to tap perceptions of support from family and friends. This scale consists of 23-item. Reliability and validity of the SS-A is good.

- The Multidimensional Scale of Perceived Social Support (MSPSS) was developed by Zimet et al. (1990). The MSPSS is a 12-item, 7-point rating scale, in which intend to measure an individual perceives social support from three sources: family, friend, and significant others. This instrument is translated into Thai language by Wongpakaran, Wongpakaran, and Ruktrakul (2011).

This study placed a favor to the MSPSS due to it helped to assess the individuals' subjective perceptions of the adequacy of social support from the main

source of support. It was the shortest and simplest tool which would not burden the participants to complete it.

### **3.3 The relationships between social support and functional status**

A few studies investigating social support in liver disease patients were found. For example, Youssef (2013) explored how 401 cirrhotic patients in Egypt perceive social support from spouse, family and friends and identified the factors associated with perceived social support. The results revealed that there was a significantly positive association between the perception of social support and general health perception in terms of physical psychological, and social functioning ( $r = 0.21$ ,  $p = 0.0005$ ). Stepwise regression analysis showed that the regression model could significantly explain 11 % of the variation in social support ( $R^2 = 0.11$ ,  $R^{2adj} = 0.100$ ,  $p = 0.0005$ ). This suggests that when social support decreases, functional status also decreases or and vice versa.

## **4. Fatigue**

### **4.1 Definition of fatigue**

Fatigue was conceptualized by Ream and Richardson (1996) as a subjective, unpleasant symptom which incorporates total body feelings ranging from tiredness to exhaustion creating an unrelenting overall condition which interferes with individuals' ability to function to their normal capacity. Later, Jacobs and Piper (1996) defined fatigue as the subjective feeling of tiredness which can vary in unpleasantness, intensity, and duration. Recently, fatigue is defined as an overwhelming, debilitating, and sustained sense of exhaustion that decreases the ability to function and carry out daily activities (Matura et al., 2018). In sum, fatigue



is defined as the subjective feeling, unpleasant symptom which incorporates total body feelings ranging from tiredness to severe exhaustion creating an unrelenting overall condition which interferes with individuals' ability to function to their normal capacity.

#### **4.2 Measurement of fatigue**

From the literature review, four instruments have been used to measure fatigue in chronic liver disease including liver cirrhosis. A brief detail for each instrument is presented as following.

- The Fatigue subscale of EORTC-QLQ-C30 (Fayers & Bottomley, 2002) is a 30-item quality-of-life questionnaire. The 3-item fatigue subscale has been independently validated as a separate fatigue measure. It has been noted to have a ceiling effect in advanced cancer patients and is not recommended as a single measure in this group. This scale is burden to the respondents, especially advanced cancer, due to its length (30 items).

- Brief Fatigue Inventory (BFI) (Mendoza et al., 1999) is a 9-item scale, rating on visual analog scale. It has reasonable psychometric properties but has had limited ongoing use. Moreover, the scale has cut-off scores to differentiate between mild, medium, and severe fatigue but these have not been validated and are likely to be of use for screening purposes only.

- The Fatigue Severity Scale (FSS) (Krupp et al., 1989) is also taken in the selection because of its close association with the operation definition in this reviewing. It is a 9-item scale that was originally validated in a chronic illness population and while it has been extensively used in neurological disease and chronic

fatigue. It has been used and validated in patients with chronic liver disease (Kleinman et al., 2000; Rossi et al., 2017).

- Revised Piper Fatigue Scale (PFS) (Piper et al., 1998) is a 27-item. This instrument assesses behavioral, affect meaning, sensory, and cognition aspects of fatigue. The PFS has good psychometric properties (Annunziata et al., 2010). The scale has some redundancy among items, difficult wording, and is somehow long.

In the current study, the analysis of the selection a measurement to measure fatigue among persons with liver cirrhosis gave a favor to the FSS (Krupp et al., 1989) for many reasons. First, this instrument was correlating with the social aspects of the individual, quantifying, through a score, the intensity of fatigue. Second, this instrument was tested in different populations such as hepatitis C virus (Kleinman et al., 2000), multiple sclerosis patients (Moreira et al., 2008), patients with liver cirrhosis in Brazil (Rossi et al., 2017), demonstrating good psychometric properties, but has not yet been tested in Thai persons with liver cirrhosis. Third, the psychometric properties of FSS were evident as good (Rossi et al., 2017).

#### **4.3 The relationships between fatigue and functional status**

Several studies reported that fatigue was strongly associated with functional status (Matura et al., 2018). For instance, Zalai et al. (2015) indicated that fatigue perceptions were the main predictors of physical functioning ( $B = .114$ , 95%CI = .054-.154). Wu et al. (2012) reported that a significant negative correlation was found between interfere of fatigue physical activity of moderate or higher intensity ( $r = -0.34$ ,  $p = 0.03$ ). In other words, the greater the interference of fatigue with daily life, the less likely a patient was to engage in physical activity of moderate or higher intensity. Moreover, significant negative correlations were found between interference

of fatigue and the average level of moderate - intensity ( $r = -0.31$ ,  $p = 0.04$ ), moderate- to high-intensity ( $r = -0.40$ ,  $p = 0.01$ ) and very high-intensity physical activities ( $r = -0.32$ ,  $p = 0.04$ ). The results of this study may imply that fatigue is associated with general daily life, as called functional status.

### **Summary**

Liver cirrhosis is a major health problem in Thailand. Persons with liver cirrhosis encountered with many problems that can deteriorate functional status. The overall goal of liver cirrhosis care is to maintain or improve the functional status. However, few studies have been conducted to investigate specifically functional status in persons with liver cirrhosis. In other words, there is little information regarding factors influencing functional status among persons with liver cirrhosis. From literature review in various types of cirrhotic patients, there are many factors that influence functional status. Based on TOUS and a significant amount of literature, the current study selected the factors that could be modified by nursing intervention including alcohol consumption, illness perception, social support, and fatigue to describe and predict functional status among persons with liver cirrhosis. Although these factors have had a strong correlation with functional status in various chronic liver diseases, no study has investigated completely interrelationships among these factors. The interrelationships among these factors that affect functional status are complex. Thus, the studies have focused on direct effects. Hence it is not sufficient to explain the reality of the relationships. Most of the previous studies investigated direct effects of these factors on functional status, while only a limited number of studies have focused on their indirect effects. Some interrelationships are

inconsistency because of the use of different instruments to assess and gather data or conduct in different settings and population.

Understanding the factors affecting functional status among persons with liver cirrhosis is necessary in the development of a nursing intervention to maintain or improve the functional status. No study has explained whether the interrelationships among these factors and functional status exist in persons with liver cirrhosis. Liver cirrhosis has a unique characteristic; therefore, it might be inappropriate to make a generalization based on the existing knowledge from persons with various chronic liver conditions into the context of persons living with liver cirrhosis. However, previous studies help to provide a hypothesize model for explaining functional status among persons with liver cirrhosis. Therefore, in the present study, a casual model was conducted to test and explain the influence of alcohol consumption, illness perception, social support, and fatigue on functional status among persons with liver cirrhosis.

## **CHAPTER III**

### **METHODOLOGY**

This chapter describes the research design and methods used in the present study. The research design, population, sampling technique and sample selection, instrumentation, protection of human subjects, data collection, and data analysis procedure are detailed in the following sections.

#### **Research design**

In the present study, a cross-sectional correlational design was utilized to test a proposed model of the factors contributing to functional status among persons with liver cirrhosis in Thailand, and to investigate relationships among variables including alcohol consumption, illness perception, social support, fatigue, and functional status. These potential factors were selected based on the literature review and used the Theory of Unpleasant Symptoms (TOUS) (Lenz et al., 2014) as the theoretical underpinning to identify the linkage of each selected variable and the theory. Polit and Beck (2017) suggest that a descriptive cross-sectional research design has several advantages. First, it helped to explore the relationships among variables in natural occurring situations without any artificial manipulation. Second, it allowed the investigator to collect a large amount of data in an economic way. Although a cross-sectional design did not explain the causal relationships between study variables, yet the causal relationships in the hypothesized model in this study were based on the TOUS. The TOUS demonstrated the causal relationships among antecedents of fatigue, social support and alcohol consumption, illness perception and fatigue, and

performance outcome. Hence, a cross-sectional study design was deemed appropriate and therefore used in this study.

## **Population and sample**

### **Population**

The target population in this study was all adults and older with liver cirrhosis in Thailand who have been receiving medical monitoring at out-patients department. Since it was impossible to recruit all people with liver cirrhosis from across Thailand, thus, a study population was considered. The study population was a subset of the target population from whom an accessible sample was taken over the period of data collection based on specific inclusion criteria. Therefore, the population in this study was Thai adult persons with liver cirrhosis aged 40 years old and older. These persons were originally scheduled for a clinic visit at out-patient department at the public tertiary hospitals.

This population was studied because most of persons with liver cirrhosis living with chronic illness conditions and having continue treatment. Persons with liver cirrhosis who received services from three public general hospitals from the Northern, Northeastern, and Central regions of Thailand were included for this study. Due to the number of the study population cannot reach the minimum of requirement, one more hospital was randomly selected from one province of these three regions. Generally, most persons who have been suffering with signs and symptoms related to liver cirrhosis would be referred from sub-district hospitals in sub-district general hospitals to the general, tertiary, or university hospitals due to the availability of specialists such as hepatologists, surgeons, radiologists, and pathologists, required in the

diagnosis and treatment of liver cirrhosis. Therefore, the public general or tertiary hospitals in these three regions provided samples from a broad geographical characteristic of the country.

### **Sample**

The sample in this study was the persons who had been diagnosed with liver cirrhosis for at least one month. These persons were confirmed their diagnosis by the physician using imaging studies or verified histopathology. All potential participants from the selected clinical settings who met the inclusion criteria were approached and requested to participate into the study in a consecutive sampling. In addition to the diagnosis of liver cirrhosis, the inclusion criteria were as follows:

- 1) They were persons who had perceived their diagnosis.
- 2) They were 40 years of age or older.
- 3) They had been diagnosed with stage 1 to stage 4 of liver cirrhosis at least 1 month.
- 4) They were scheduled for visiting doctor at outpatient department.
- 5) They were able to communicate in Thai language.
- 6) They were willing to participate in this study.

The participants were excluded when they had these following conditions.

- 1) They had a history of disease which impact on cognitive ability such as severe psychotic disorder.
- 2) They had been treated with active esophageal bleeding, hepatic encephalopathy, and sepsis conditions (stage 5 of liver cirrhosis).
- 3) They had medical record or diagnosed with post liver transplantation, hepatic carcinoma, and neurological problems.

### **Sample size**

To date, there is no standard rule for calculating the sample size that applies to all situation when conducting the structural equation modeling (SEM). The sample size needed for a study of SEM depends on many factors, including the size of model, distribution of the variables, amount of missing data, reliability of variables, and strength of the relations among the variables (Kline, 2015). Considering the maximum likelihood with multivariate normal data, Anderson and Gerbing (1984) suggested sample size larger than 100 cases in a study. Jackson (2001) recommended that using 200 – 400 cases was large enough to achieve sufficient power for significance tests. In addition, several rules of thumb have been proposed over the years. For example, Tanaka (1987) stated that a minimum ratio of cases to free parameters is 5:1. While Bentler and Chou (1987) suggested that 10 observations per parameter. Concerning about the relation between sample size and model complexity, Jackson (2003) supported that the sample size-to-parameters ratio is 20:1. For example, if there were 40 free parameters remained in the hypothesized model, therefore there sample size in that study would be 800. Presently, Soper (2019) introduced a software to calculate a sample size for SEM by considering the minimum absolute anticipated effect size, desired statistical power level, number of latent variables, number of observed variables, and probability level. Based on this information, the possible number of the participants in SEM study, therefore, can be ranged from 100 – 800.

### **Sample size of the main study**

This study calculated the sample size by using a-priori sample size calculator for structural equation models software which recommended by Soper (2019). This study considered the minimum absolute anticipated effect size as



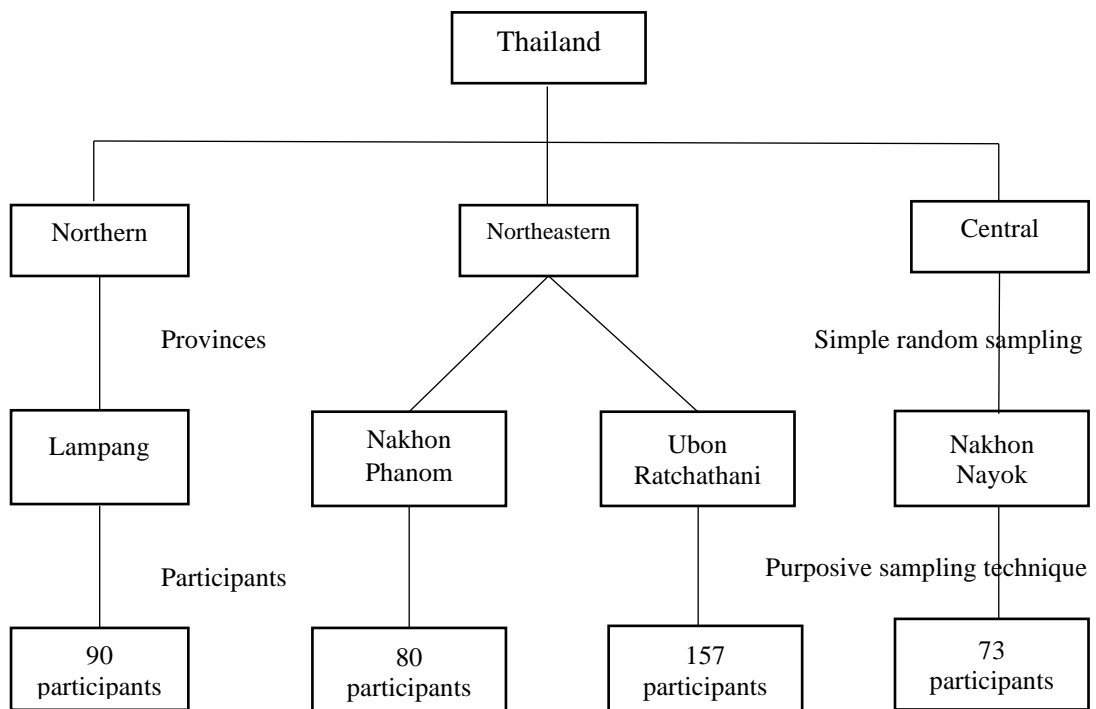
medium value as 0.2, desired statistical power level as 0.8, number of latent variables as 5, number of observed variables as 21, and probability level as 0.05. As the result, the recommended minimum sample size was 386. Eventually, the entire sample size of this study was 400.

### **Sample size for the field test of the instruments**

Before the main data collection taken place, a field test of the instruments was conducted to examine the psychometric properties of the instruments. Confirmatory factor analysis (CFA) was employed to evaluate the construct validity of measurements. Therefore, sample size of the field test of the instruments was estimated to satisfy the use of CFA. Anderson and Gerbing (1984) suggested sample size larger than 100 cases in a study. The suggested number of participants per one item of the instruments varies from 2 (Kline, 1998), to from 5 to 10 (DeVellis, 2016). Among all selected instruments, the Functional Status Questionnaire was the longest one (28 items). Based on using rule of thumb that have mentioned above, thus, the sample size for conducting CFA in this field test can be ranged from 56 – 280. Eventually, the final sample of the field test of the instruments consisted of 100 persons who met the same criteria as in the main study.

### **Sampling technique**

In order to meet the general statistical assumption of the structural equation modeling (SEM) which was a normal distribution of the sample (Kline, 2015), a stratified three – stage random sampling was used to yield a probability sample of Thai persons with liver cirrhosis as shown in Figure 3.1.



**Figure 3.1** Stratified three – stage random sampling

A six-region system was used to divided geographical area of Thailand. It divided the country into the following regions: Northern, Eastern, Northeastern, Southern, Western, and Central regions. Each region consists of 2 to 21 provinces which have similar population characteristics. Each province had a general hospital which was classified under the Ministry of Public Health, where provided healthcare services to local people. In general, many persons with liver cirrhosis from other hospitals around the country were referred to this regional hospital because of the availability of specialists such as hepatologists, surgeons, and pathologists required in the diagnosis and treatment of liver cirrhosis. Thus, these hospitals can provide samples from a broad geographical region of Thailand. To increase external validity, the simple random sampling was used to select the hospitals into this study.

**Stage 1:** Three regions were randomly selected from the six-regions system. As a result, three regions were selected as the main settings in this study including Northern, Northeastern, and Central regions.

**Stage 2:** One province was randomly selected from each selected region. Three of selected provinces were (1) Lampang province in Northern part, (2) Nakhon Nayok province in Central part, and (3) Ubonratchathani province in Northeastern part of Thailand.

**Stage 3:** One general hospital was randomly selected from each province including (1) Lampang hospital, (2) Sunpasitthiprasong Ubonratchathani hospital, (3) Nakhon Nayok hospital. In addition, one general hospital in these three regions was randomly selected due to considering about number of samples that may not reach the maximum number of requirements. The simple random sampling was performed. As a result, the Nakhon Phanom hospital, in Nakhon Phanom province was selected. These four hospitals were the major settings in this study.

### **Sampling selection**

The probability proportional to size sampling was employed to recruit participants at each setting. This sampling selection technique was utilized due to each selected setting has vary in size of population. When probability proportional sampling was used, a larger sampling unit had a higher probability of being selected into the sample (Cheung, 2014).

In this step, researcher contacted the stakeholders who work in the medical informatics center of each selected setting. Data were requested with permission to use for educational purposes only. Total number of persons with liver cirrhosis who had visited the doctor at out-patient departments were retrieved during previous four

months from July to October 2019. The number of persons with liver cirrhosis received from each selected hospital was calculated to identify the probability proportional to size as recommended by (Lemeshow, Hosmer, Klar, Lwanga, & Organization, 1990). Table 3.1 demonstrates the number of persons with liver cirrhosis found in each setting and entire sample size. The formula used to calculate the sample size was described as follows:

$$\text{Probability number of participants in each setting} = \frac{\text{Required sample size X Number of persons with liver cirrhosis in each setting}}{\text{Total number of persons with liver cirrhosis from all selected settings}}$$

**Table 3.1** Number of persons with liver cirrhosis in each setting and the entire participants in this study

Setting	Persons with liver cirrhosis	Study participants
1. Nakhon Nayok hospital	134	73
2. Nakhon Phanom hospital	145	80
3. Lampang hospital	164	90
4. Sunpasitthiprasong hospital	286	157
<b>Total</b>	<b>729</b>	<b>400</b>

As a result, there were 73 participants from the Nakhon Nayok hospital, 80 participants from the Nakhon Phanom hospital, 90 participants from the Lampang hospital, and 157 participants from the Sunpasitthiprasong Ubonratchathani hospital. Each participant was selected by a purposive sampling method in accordance with the inclusion criteria.

### Instrumentation

Six instruments were utilized to collect data in this study (Appendix A). Five instruments were used to collect data with permission from the original developers and the one that had translated into Thai language versions. One instrument, the Functional Status Questionnaire, was translated into Thai language with permission by researcher. The variables and its instruments are presented in Table 3.2 hereunder.

**Table 3.2** Variables and its instruments in this study

Variable	Instrument
1. Alcohol consumption	1. Alcohol Use Disorders Identification Test Consumption
2. Illness perception	2. Brief Illness Perception Questionnaire
3. Social support	3. Multidimensional Scale of Perceived Social Support
4. Fatigue	4. Fatigue Severity Scale
5. Functional status	5. Functional Status Questionnaire

From Table 3.2, these five research instruments were assessed for their content validity. In the process of assessing content validity, all Thai version of these all instruments were assessed by a panel of experts to evaluate instrument elements and rate them based on their relevance and representativeness to the content domain. Three steps were conducted to assess content validity as recommended by Lynn (1986) including selecting and inviting experts, quantifying content validity, and revising and reconstruction the instrument. The minimum acceptable score for the item - content validity index (I-CVI) in this study was 0.70, but an I-CVI with a score of  $\geq 0.80$  was generally considered to be an excellent content validity (Lynn, 1986).

The researchers selected five experts as recommended by Lynn (1986) and Almasreh, Moles, and Chen (2019) including two physicians, two advanced practice nurses, and one nursing instructor. These experts were selected due to their content expertise, theoretical background, and experience in taking care of persons with liver cirrhosis in order to provide a comprehensive assessment of the instrument. The details of the expert selection for judging content validity are described in Appendix C.

Each of them was invited via email address for requesting the participation. Once the experts have responded to participate, a cover letter, a copy of, a brief description of the instruments and its scoring, and a description of the content validity form were distributed to them. Each of the experts was asked to rate each item of the instruments on its relevance using a 4-point Likert-type format, ranging from “extremely relevant” (score 4), “quite relevant” (score 3), “somewhat relevant” (score 2), to “not relevant” (score 1) as recommended by Lynn (1986). A description of each instrument is presented in the following details.

### **1. Demographic information form**

The demographic information form was developed by researchers. The purpose of this form was to collect information regarding personal, illness-related characteristics, and social background of persons with liver cirrhosis. This form comprised two parts. The first part of this form was a self-administered questionnaire which concerned about personal information including gender, age, marital status, education level, religion, occupation, and income. The second part of this form was investigated by researcher. It was used to assess duration of illness, stage of disease, body mass index, etiology of disease, treatment options, reasons for illness – related

doctor's visit, and comorbidity. The findings of laboratory examination (within 3 months) were retrospectively collected from the medical history of the participants.

## **2. The Alcohol Use Disorders Identification Test Consumption**

The Alcohol Use Disorders Identification Test Consumption (AUDIT-C) was used to assess alcohol consumption among persons with liver cirrhosis, focusing prior one month. This instrument was originally developed by Bush et al. (1998). These researchers suggested that the AUDIT-C perform better than the full AUDIT (0.891 vs 0.881,  $p = .03$ ) for identification of heavy drinkers who might benefit from brief primary care intervention (Bush et al., 1998). The AUDIT-C has been used widely in research and variety of population such as adolescent, adult patients with hepatitis B virus, or heavy drinker (Bradley et al., 2007; Bush et al., 1998). The current study employed the Thai version of the AUDIT-C which was translated into Thai language by Silpakit and Kittirattanapaiboon (2009).

### **Scoring and interpretation**

The AUDIT-C was a 3-item instrument. Each item assessed frequency of drinking, quantity consumed at typical occasion, and frequency of heavy episodic drinking. Responding rate was using a Likert scale valued from 0 to 4. The total score was calculated by summing all 3 items. Possible scores ranged from 0 to 12. In men, a score of 4 or more was considered as a hazardous drinker. In women, a score of 3 or more was considered as an alcohol dependence person. In total score, the corresponding optimal cut-off value for the AUDIT-C was  $\geq 3$  in detecting alcohol problem use (Liskola et al., 2018).

The higher the AUDIT-C score indicated the more increasing associated – health risk alcohol drinking. The level alcohol consumption was categorized into four

levels in order to identify risk drinking in adults and older as recommended by Khadjesari et al. (2017).

Total score of AUDIT-C		Interpretation
Men	Women	
0 - 3	0 – 3	Low-risk drinker
5 - 6	4 – 5	Moderate-risk drinker
7 - 8	6 – 7	High-risk drinker
9 - 12	8 – 12	Severe-risk drinker

### Psychometric properties testing

#### Validity testing

Several types of validity testing have been done. For example, concurrent validity of the AUDIT-C was assessed between the continuous measure of Breath Alcohol Consumption which found statistically significant (Barry, Chaney, Stelfson, & Dodd, 2015). This indicated that the items demonstrated strong concurrent validity with an objective measure of drinking. It led to further credit to the scale's ability to accurately measure alcohol-use behaviors.

In the current study, the total - CVI of the AUDIT-C was 0.95 and item-CVI ranged from 0.75 to 1.00, which indicated excellent content validity. No item was removed or revised. In the field test of the instruments, confirmatory factor analysis (CFA) was used to test construct validity and found that 3 items formed 3 factors ( $\chi^2 = 3.734$ , df. = 1,  $p > .05$ ;  $\chi^2/df = 3.734$ , RMSEA = .083; CFI = .997; TLI = .990; SRMR = .008).



### **Reliability testing**

Reliability of the AUDIT-C was assessed in various population such as undergraduate students and patients with chronic diseases. Barry et al. (2015) reported Cronbach's alpha of the AUDIT-C as 0.76. Furthermore, this investigator also tested stability of the AUDIT-C using test – retest reliability assessment and found strong positive correlations between halves of the sample. One study found that one-week test-retest reliability of the mean AUDITC score was 0.91 (95% CI = 0.79–0.96) and between 0.78 and 0.91 for each item. The total score of AUDIT-C was positively correlated with the subtotal scores of the remaining 7 AUDIT items ( $r = 0.59$ ,  $p < .001$ ) and the CAGE score ( $r = 0.31$ ,  $p < .001$ ) (Jeong et al., 2017). This indicated that the AUDIT-C demonstrated good test-retest reliability and satisfactory convergent validity (Jeong et al., 2017). A study in China, the overall Cronbach's alpha coefficient for AUDIT-C was 0.648, which indicates that the internal consistency level of the AUDIT was good (Huang et al., 2018).

In the current study, the Cronbach's alpha coefficient of AUDIT-C was tested in the field test of the instrument and found as 0.82.

### **3. The Brief Illness Perception Questionnaire**

The Brief Illness Perception Questionnaire (Brief-IPQ) was developed by Broadbent et al. (2006). The purpose of using the Brief-IPQ was to assess illness perception of persons with liver cirrhosis. Researchers received the permission to use this instrument from Broadbent et al. (2006). The Brief-IPQ was a 8-item scale, each item assessed one dimension of illness perceptions including consequences, timeline, personal control, treatment control, identity, concerns, illness comprehension, and emotions. These eight items were rated on a response scale ranging from 0 (e.g. does

not affect at all) to 10 (e.g. severely affects my life). The last item was a causal open-response item, adapted from the IPQ-R (Moss-Morris et al., 2002), which asks patients to list the three main causal factors in their illness (Item 9). Characteristics of each item are described as follow:

- 1) Cognitive representations were assessed in these five following items.

Item 1: Consequences

Item 2: Timeline

Item 3: Personal control

Item 4: Treatment control

Item 5: Identity

- 2) Emotional representation was assessed in these two following items

Item 6: Concern

Item 8: Emotions

- 3) Illness comprehensibility was assessed in one item.

Item 7: Illness comprehensibility

Based on these eight items, there were five items that had a positive direction including item 1, 2, 5, 6, and 8. On the other hand, three items were remained in a negative direction including item 3, 4, and 7.

### **Scoring and interpretation**

The Brief-IPQ was a single – item scale approach to assess perceptions on a continuous linear scale. Before summing the total score, the scores from item 3, 4, and 7 must be conversed. The possible total scores of the scale ranged from 0 to 80 points. The higher scores on the illness consequences, timeline, identity, concern, and emotions indicated greater perceived threat of illness. Whereas higher scores on the

personal control, treatment control, and illness understanding questions indicated the lower perceived threat of illness. Responses to the causal item were grouped into different categories allowing a subsequent categorical analysis. Higher scores indicated more threatening illness perceptions. To interpret level of illness perception, this study categorized the levels of illness perception into three levels (low, moderate, and high) by employing the range between the minimum and maximum total scores of Brief-IPQ and dividing it by three.

<b>Total scores of Brief-IPQ</b>	<b>Interpretation</b>
0 – 26.6	Low threatening illness perceptions
26.7 – 53.3	Moderate threatening illness perceptions
53.4 – 80.0	High threatening illness perceptions

### **Psychometric properties testing**

#### **Validity testing**

Several types of validity testing have been investigated. For example, Bazzazian and Besharat (2010) assessed the cross-culture validity of the Farsi version of the Brief-IPQ using a confirmatory factors analysis. They found a goodness of fit indexes which indicated a good fit between the hypothesized model and the observe data. Moreover, the same investigators also tested the concurrent validity of the Brief-IPQ by examining the correlations of the Brief – IPQ with Psychological Well-being subscale of the Mental Health Inventory, and HbA<sub>1c</sub>. They reported that consequences, identity, concern, and emotional response subscales were negatively correlated with psychological well-being and positively correlated with HbA<sub>1c</sub>. In addition, personal control and illness comprehensibility and positive correlation with psychological

well-being and had negative correlation with HbA<sub>1c</sub>. Furthermore, discriminant validity was supported by the fact that the Brief-IPQ enables patients with various conditions to be differentiated (Nowicka-Sauer et al., 2016). The concurrent validity of this scale also was assessed by analyzing the correlations between the Brief-IPQ and the Hospital Anxiety and Depression Scale (Nowicka-Sauer et al., 2016). These researchers found that total Brief-IPQ, concern, and emotions response score correlated with depression and anxiety.

In this study, total CVI of the Brief-IPQ was 1.00 and item-CVI ranged from 0.95 to 1.00, which indicated excellent content validity. No item was removed or revised. Construct validity of the Brief-IPQ was evaluated using CFA. In the field test of the instruments, CFA was used to test construct validity and found that each item (8 items) formed a single factor ( $\chi^2(df = 51) = 80.984, p < 0.05$  ( $\chi^2/df = 2.454$ ), CFI = 0.995, TLI = 0.989, RMSEA = 0.060, and SRMR = 0.028).

### **Reliability testing**

Reliability of the Brief-IPQ, Broadbent et al. (2006) noted that the Brief-IPQ has shown good test – retest reliability. Bazzazian and Besharat (2010) have examined the reliability of the Brief-IPQ using test-retest reliability and internal consistency of the scale in 70 patients with type I diabetes in Iran. Results of Pearson correlation revealed that the items have good test-retest reliability over 4 weeks ( $r = .50$  to  $.75, p < .01$ ). Nowicka-Sauer et al. (2016) investigated the internal consistency of the Polish Brief-IPQ through 276 patients with chronic conditions and found that Cronbach's alpha coefficient for the total score as  $.74$ . The value of Cronbach's alpha coefficient for the Brief-IPQ subscales were in an acceptable range between  $.67$  to  $.74$  (Nowicka-Sauer et al., 2016). In Thailand, the Cronbach's alpha

coefficient of Brief-IPQ was reported at .97 in persons with chronic hepatitis B virus (Ben, Puwarawuttipanit, & Thosingha, 2017) and .75 in persons with chronic obstructive pulmonary disease (Mhoryadee, Kanogsunthornra, & Panpakdee, 2018).

In the present study, the Cronbach's alpha coefficient of Brief-IPQ was tested in the field test of the instrument and found as 0.93.

#### **4. The Multidimensional Scale of Perceived Social Support**

The Multidimensional Scale of Perceived Social Support (MSPSS) was developed by Zimet et al. (1990) to measure individuals subjective evaluation of the amount of social support present in their life. The scale consisted of 12 items that asked respondents to indicate how much they agree with statements concerning social support received from three domains including family, friends, and significant other. Each subscale was assessed in four questions each. The family's subscale was assessed in items number three, four, eight, and eleven. The friend's subscale was assessed in the items number six, seven, nine, and twelve. The significant other's subscale was assessed in the items number one, two, five, and ten. In this study, researcher have contacted Zimet, Dahlem, Zimet, and Farley (1988) for permission to use the questionnaire.

##### **Scoring and interpretation**

These 12 items were rated on a seven-point Likert scale. Each item was rated from 1 point (very strongly disagree), 2 points (strongly disagree), 3 points (mildly disagree), 4 points (neutral), 5 points (mildly agree), 6 points (strongly agree), to 7 points (very strongly agree). An overall total social support score was calculated by summing the average of the score of each item. Possible total scores ranged from

12 to 84. Higher scores indicated a higher level of perceived social support. To interpret the levels of perceived support, the levels of social support were categorized into three levels (low, moderate, and high) by employing the range between the minimum and the maximum total scores of the MSPSS and dividing it by three.

<b>Total scores of MSPSS</b>	<b>Interpretation</b>
12.00 – 36.00	Low
36.01 – 60.00	Moderate
60.01 – 84.00	High

### **Psychometric properties testing**

#### **Validity testing**

The MSPSS was found to have good validity and reliability. At the beginning development of this instrument, Zimet et al. (1990) have tested the psychometric properties of the MSPSS. The purpose of the study was to evaluate the validity, reliability, and factor structure of the MSPSS in a nonclinical sample of urban adolescents. The results of the study confirmed that the MSPSS was a valid and reliable instrument. The MSPSS demonstrated excellent internal consistency overall and across race and gender subgroups. With regard to concurrent validity, the MSPSS was found as correlated with the Satisfaction With Life Scale (Fabio & Kenny, 2012). The study conducted on a sample of 446 implantable cardioverter defibrillator patients (Pedersen et al., 2009), which used principal component analysis with varimax rotation, showed the same original three-factor structure with the factors of Family, Friends and Significant Others. For Thai version of the MSPSS, factor analysis produced three-factor model, and the model demonstrated adequate fit

indices. Moreover, the Thai version of the MSPSS was also tested for construct validity using CFA which found an acceptable three-factor model fit with the empirical data (Wongpakaran et al., 2011).

In this study, the MSPSS was sent to five experts to evaluating content validity. Most experts rated each item of the MSPSS as 3 and 4. The total CVI of the MSPSS was 1.00 which indicated excellent content validity. Item-CVI for all the items ranged from 0.98 to 1.00. Construct validity of the MSPSS was tested using CFA. In the field test of the instruments, the findings from conducting CFA showed that 12 items formed 3 factors ( $\chi^2(df = 51) = 80.984, p < 0.05$  ( $\chi^2/df = 2.454$ ), CFI = 0.995, TLI = 0.989, RMSEA = 0.060, and SRMR = 0.028).

### **Reliability testing**

Previously, Zimet et al. (1988) reported Cronbach's alpha coefficient for the total scale as .88. Test-retest reliability over three months was .85. Moreover, Cronbach's alpha coefficients in previous studied which ranged from .95 to .98 (Chung, Moser, Lennie, & Frazier, 2013; Li, Yang, Liu, & Wang, 2016). This study utilized the Thai version of the MSPSS with permission from both the original English developers as well as the one who translated it into Thai language. The Thai version of the MSPSS was translated into Thai version by Wongpakaran et al. (2011). The Thai version of MSPSS showed Cronbach alpha's ranged from .74 to .95 (Chaniang, Meuangkhwa, & Klongdee, 2019; Wongpakaran, Wongpakaran, & Ruktrakul, 2011).

In current study, the Cronbach's alpha coefficient of the MSPSS was tested in the field test of the instrument and found as 0.91.

## 5. The Fatigue Severity Scale

The Fatigue Severity Scale (FSS) was developed by Krupp et al. (1989) to assess the severity of fatigue. It consisted of 9 items that ask respondents to indicate how much they agree with statements concerning severity of fatigue. The time frame assessed was previous seven days. Each item was rated from 1 point (very strongly disagree), 2 points (strongly disagree), 3 points (mildly disagree), 4 points (neutral), 5 points (mildly agree), 6 points (strongly agree), to 7 points (very strongly agree).

### Scoring and interpretation

Each statement was scored on a 7-point Likert scale, one being “strongly disagree” and seven “strongly agree”, depending on the level of agreement to the statement. Originally, the cutoff for severe fatigue was set at an FSS score  $\geq 4$  (Krupp et al., 1989). This cutoff was still used in some studies, e.g., in several studies of fatigue in people with stroke (Tang et al., 2010; van de Port, Kwakkel, Schepers, Heinemans, & Lindeman, 2007). However, more recent studies of people with multiple sclerosis mainly used a cutoff of  $\geq 5$  for categorizing severe fatigue (Johansson, Ytterberg, Hillert, Widen, & von Koch, 2008; Tellez et al., 2005). The different cutoff values have not been validated clinically. Some studies have also categorized the FSS score into three groups: low fatigue (FSS score  $< 4$ ), medium or borderline fatigue (FSS score  $\geq 4$  and  $< 5$ ), and high or severe fatigue (FSS score  $\geq 5$ ). Nevertheless, an overall total severity of fatigue score was calculated by summing the average of the score of each item. Possible total scores ranged from 9 to 63. To interpret the level of fatigue, this study categorized total fatigue score into three levels (low, moderate, and high) by employing the range between the minimum and the maximum total scores of the FSS and dividing it by three.



<b>Total scores of FSS</b>	<b>Interpretation</b>
9.00 – 27.00	Low
27.01 – 45.00	Moderate
45.01 – 63.00	High

### **Psychometric properties testing**

#### **Validity testing**

Previous studies have been reported the results of validity testing of the FSS. For example, factor analyses of the FSS have verified one factor (Lerdal et al., 2005; Kleinman et al., 2000). Convergent validity was tested and found that The FSS correlates strongly with other fatigue scales ( $r = .41$  to  $.94$ ) (Krupp et al., 1989; Kleinman et al., 2000; Gencay-Can & Can, 2012) and in a clinical study has also been shown to be sensitive to change in levels of fatigue (Zifko, Rupp, Schwarz, Zipko, & Maida, 2002). Furthermore, the FSS has shown medium to strong relationships with other health-related quality of life domains (Mattsson et al., 2008). For discriminant validity testing, the FSS has demonstrated the ability to discriminate between healthy and chronically ill individuals (Lerdal et al., 2005; Valko et al., 2008). Furthermore, the FSS differentiated scores from different groups ( $p = 0.009$ ) and presented a correlation with the Modified Fatigue Impact Scale ( $r = 0.606$ ,  $p = 0.002$ ) (Rossi, Galant, & Marroni, 2017).

In this study, the total CVI of the FSS was 1.00 which indicated excellent content validity. Item-CVI for all the items ranged from 0.95 to 1.00. Construct validity of the FSS was tested using CFA. In the field test of the instruments, the findings of CFA showed that 9 items remained in the FSS formed a

single factor indices ( $\chi^2(df = 10) = 16.841$ , ( $\chi^2/df = 1.684$ ), CFI = 0.999, TLI = 0.996, RMSEA = 0.041, and SRMR = 0.005.

### **Reliability testing**

Many studies have documented high internal consistency as analyzed with Cronbach's alpha ranging from 0.81 to 0.94 (Krupp et al., 1989; Kleinman et al., 2000; Mattsson, Moller, Lundberg, Gard, & Bostrom, 2008). In addition, Rossi et al. (2017) reported that the FSS showed good psychometric performance. They found that the Cronbach's alpha was 0.93, and the Intraclass Correlation Coefficient was 0.905 (95% CI: 0.813-0.952).

In this study, the Cronbach's alpha coefficient of the FSS was tested in the field test of the instrument and found as .93.

## **6. The Functional Status Questionnaire**

The Functional Status Questionnaire (FSQ) was developed by Jette et al. (1986), and a short self-administered tool concerning the one month period prior to completion. The first part of the FSQ consisted of 28 items which assessed physical function: basic activities of daily living (3 items) and intermediate activities of daily living (5 items). Mental health function was assessed by 5 items and social or role function was assessed by 6 items of work performance (if patient was in employment), social activity (3 items) and quality of social interaction (5 items). The second part of the FSQ contained 6 single items which asked questions about work status, days spent in bed due to illness, days where the patient had to curtail his/her routine activities because of illness, satisfaction with sexual activities, frequency of social interaction and a question about overall health satisfaction (Jette et al., 1986).

### Scoring and interpretation

In terms of scoring, using a simple algorithm, the FSQ's 34 core items were scored by computer to produce six summary scale scores and six single-item scores (Jette et al., 1986). Each scale score was derived as follows:

$$SS = \frac{\sum_{i=1}^n y_i - n}{n} \times 100$$

Where SS = transformed FSQ scale score

$y_i$  = individual questionnaire response score

$n$  = number of questions in the scale for which valid information is available

The transformed scale values ranged from 0 to 100, which a score of 100 indicating maximum functional ability. A summary report was produced which displays each score on a scale and the answer to each of the single item questions. For example, the patient who answered to the questionnaire and achieved a score of 56 on performance of basic activities of daily living (BADL). This score was derived from the following combination of questionnaire responses: reported some difficulty taking care of self (3); some difficulty moving in and out of bed (3); and much difficulty walking indoors (2).

$$BADL = \frac{(3 + 3 + 2) - 3}{3} = 1.66 \times \frac{100}{3} = 56$$

This score, within the warning zone, represented a problem in physical functioning.

The interpretation of the range of scores were divided into two groups including warning zone and good functioning. The warning zone functioning referred

to a patient had a problem with functional status and required for clinical attention or investigation. Scale scores that fallen within the warning zone represented important functional disabilities. On the other hand, good functioning referred to an individual had proper ability to perform usual tasks in daily life (Jette et al., 1986). The subscales remained in the FSQ, scores, and interpretation are described below.

Subscales of the FSQ	Total score of the FSQ and interpretation	
	Warning zone	Good
Basic activity of daily living	0 – 87	88 - 100
Intermediate activity of daily living	0 – 77	78 – 100
Mental health	0 – 70	71 - 100
Work performance	0 – 78	79 - 100
Social activity	0 – 78	79 - 100
Quality of interactions	0 – 69	70 - 100

#### **Instrument translation of the FSQ**

Permission for translation, adaptation, and utilization of the FSQ was obtained from the instruments' developer, Professor Alan Jette. The original FSQ was translated into Thai language using forward and backward translation method in cooperation between researchers and the translator at the translation center, faculty of arts, Chulalongkorn university. In addition, this study also tested the comparability and interpretability of both the original and translated versions. The comparability/interpretability questionnaire recommended by Sperber, Devellis, and Boehlecke (1994) was used to ensure the equivalency between two versions of the FSQ. This questionnaire was the Likert scale ranging from 1 (extremely comparable/ extremely

similar) to 7 (not at all comparable/ not at all similar). Comparability of language referred to the formal similarity of words, phrases, and sentences. If the questions were judged to be identical or extremely comparable in language, they were scored 1. Similarity of interpretability referred to the degree to which the two version engender the same response even if the wording was not the same. Any mean score  $> 3$  (7 was worse agreement; 1 was best agreement) necessitates a formal review of the translation. Any mean score between 2.5 and 3 in the interpretability column was also considered problematic and was reviewed for possible correction. Any mean score lower than 2.5 was considered as good (Sperber, 2004).

Each item in two versions was ranked in terms of comparability of language and similarity of interpretability. Thirty bilingual participants (16 PhD students, 7 master students, and 7 undergraduate students at Chulalongkorn university) were invited to rate the questionnaire. All of them have passed English examination carrying IELTS score  $\geq 5.0$ , TOEFL score  $\geq 500$ , and CU-TEP score  $\geq 60$ . Next, the discrepancies between two versions of the FSQ were highlighted. Finally, the findings revealed that the FSQ–Thai version demonstrated to have cross – cultural conceptual, semantic, and content equivalence with the original FSQ, with some minor adaptations. The comparability and interpretability of language between the original and back translated version (two English versions) were validated.

### **Validity testing**

The FSQ has been evaluated for the validity in previous studies. For example, the original version of the FSQ produced the internal consistency reliabilities for all scale ranged from 0.64 to 0.82 (Jette et al., 1986). Construct and criterion validity were test with acceptable results when comparing the other

instruments such as the General Perceived Health, angina and dyspnea, Specific Activity Scale (Cleary & Jette, 2000). In addition, Cleary and Jette (2000) also tested the criterion validity of the FSQ and found that the subscales of the FSQ had correlation with mortality. Especially, the scale with the highest correlation with subsequent death was the social activities scale. These can be emphasized that the FSQ was a reliable sub-scale with construct validity.

In this study, content validity testing of the FSQ was conducted. The total CVI of the FSQ was 0.95 which indicated excellent content validity. Item-CVI for all the items ranged from 0.75 to 1.00. No item was removed or revised. Construct validity was tested using CFA. In the field test of the instruments, the findings of CFA illustrated that 28 items remained in the FSQ formed 6 factors ( $\chi^2$  (df = 5) = 9.077,  $p > .05$ ;  $\chi^2/df = 1.815$ , RMSEA = .045, CFI = .999, TLI = .997, SRMR = .003).

### **Reliability testing**

For reliability, the internal consistency reliabilities of the FSQ ranged from 0.64 to 0.82 (Jette et al., 1986). Cleary and Jette (2000) conducted a study aimed to test reliability of the FSQ in ambulation patients. They found that the Cronbach's alpha coefficient of the FSQ subscales ranged from .64 to .82.

In this study, the Cronbach's alpha coefficient of the FSQ was tested in the field test of the instrument and found as .83. Considering for each subscale, Cronbach's alpha coefficient values for basic activity of daily living, intermediate activity of daily living, mental health, work performance, social activity, and quality of interactions factors were 0.80, 0.88, 0.78, 0.97, 0.89, and 0.85 respectively.

The summary of all instruments and psychometric properties testing in the field test of the instrument are presented in Table 3.3.

**Table 3.3** Psychometric properties of the instruments used in the field test (N=100)

<b>Instrument</b>	<b>Items</b>	<b>Cronbach's alpha coefficient</b>
<b>Alcohol use disorders identification test</b>	<b>3</b>	<b>.82</b>
<b>consumption</b>		
- Frequency	1	.65
- Quantity	1	.73
- Heavy drinking	1	.66
<b>Brief illness perception questionnaire</b>	<b>8</b>	<b>.93</b>
<b>Multidimensional scale of perceived social support</b>	<b>12</b>	<b>.91</b>
- Family	4	.91
- Friends	4	.78
- Significant other	4	.81
<b>Fatigue severity scale</b>	<b>9</b>	<b>.93</b>
<b>Functional status questionnaire</b>	<b>28</b>	<b>.83</b>
- Basic activity of daily living	3	.80
- Intermediate activity of daily living	6	.88
- Mental health	5	.78
- Work performance	6	.97
- Social activity	3	.89
- Quality of interaction	5	.85

### **Protection of the rights of human subjects**

This study was conducted with the approval of the Institutional Review Board (IRB) from four main settings. Approval was obtained from the Committee for Human Research of Sunpasitthiprasong Ubonratchathani hospital, Nakhon Phanom hospital, Nakhon Nayok hospital, and Lampang hospital (see Appendix D). The written and verbal informed consents were obtained in Thai language on the same date as the data collection. The participants were informed about the objectives of the study, benefits, risks, types of questionnaires, tasks to be completed, and their right to decline participation. In particular, the information sheet was distributed to the participants and explained about risk prevention and treatment when the risk occurs during the interviewing or the collecting of data.

The participants were also informed that if they decided to participate in the study, during the participation, they could doubt about some question or refuse to answer any of the questions. In addition, the participants were told that they were able to withdraw from the study at any time if they wish. Their decision would not affect the treatment or services that they would receive from healthcare providers at the hospitals. If the participants felt uncomfortable while filling out the questionnaires, the researchers would stop the interviews immediately and provide psychological support. The participants were assumed that their names and address would be kept strictly confidential and would not be reported with the study findings. Instead, a code number would be used to ensure confidentiality. The participants were also assumed that the study data collected from them would be stored in a secure place and would not be possible to any other person without their permission. Finally, the researcher



explained that there was no harm to the participants in this study and it would take approximately 30 to 45 minutes to complete all the questionnaire.

During the interviewing, researcher stayed nearby and being ready to help the participants in case he/she could not read or understand the questions. Furthermore, if the participants need to ask any questions about the study, researcher would be ready to answer their question via mobile phone.

### **The field test of the instruments**

The field test of the instruments was conducted during March to April 2020. The objective of this field test was to assess construct validity of five instruments including the Alcohol Use Disorders Identification Test Consumption, Brief Illness Perception Questionnaire, Multidimensional Scale of Perceived Social Support, Fatigue Severity Scale, and the Functional Status Questionnaire by using confirmatory factor analysis (CFA). Among four selected hospitals in the main study, one hospital (Sunprasitthiprosong Ubonratchathani hospital) was randomly selected for conducting a field test of the instruments.

The field test of the instruments was conducted after permission was granted by the directors of Sunprasitthiprosong Ubonratchathani hospital. The researcher made appointments to meet the nurses and the doctors of each medical and surgery outpatient department. At the meeting, the investigator introduced himself and informed the healthcare professionals of the objective of this study. Then, the researcher asked for their cooperation and collaborated with the nurses to select the study participants.

A hundred participants were needed for this field test. Participants were recruited using the same selection criteria and were excluded thereafter from the study

frame of the main study. Convenience sampling method was employed to recruit a sample of 100 persons with liver cirrhosis. After the participants were identified, the researcher explained the objectives of the study. They were informed of their right to decide to participate or refuse to participate in the study. If the participants agreed to participate in the field test of the instruments, they would be asked to sign a consent form. Then, the participants were asked to complete the questionnaires.

### **Data analysis of the field test of the instruments**

Statistical analyses were conducted using Mplus program version 7.10 (Muthén, Muthén, & Asparouhov, 2016) and SPSS for windows version 25. To imply a good fit of the model to the data, the following criteria were used: the result of equation  $\chi^2/df < 3$  (Khine, 2013), a Comparative Fit Index (CFI) of  $\geq .95$ , Tucker-Lewis Index (TLI) values of  $\geq .95$ , root-mean square error of approximation (RMSEA) of  $\leq .06$  – with values as high as .08 indicating a reasonable fit, a standardized root-mean-square residual (SRMR) of  $\leq .08$  (Khine, 2013). A p-value of equal to or less than 0.05 was considered statistically significant (Burns & Grove, 2012).

The characteristics of participants are detailed in Table 3.4. The final sample was made up of a total 100 participants, of whom 77% were male and 23% were female. The age range of the participants was 43 to 83 years old with an average of 58.81 (SD = 9.23). Duration of sickness ranged from 1 to 60 months with an average of 12.75 (SD = 11.52). In this phase, the participants spent approximately 40 minutes to complete the questionnaires. More information about the results of measurement model testing is presented in Chapter IV and Appendix H.

**Table 3.4** Characteristics of the participants (N = 100)

<b>Variables</b>	<b>n</b>	<b>%</b>
<b>Marital status</b>		
- Married	62	62.0
- Single	18	18.0
- Widow/Widower	14	14.0
- Divorced	6	6.0
<b>Education attainment</b>		
- Completed primary education	77	77.0
- Completed secondary education (high school)	16	16.0
- Completed third level education (college or university)	4	4.0
- Not completed primary education	3	3.0
<b>Etiologies of cirrhosis</b>		
- Alcohol	53	53.0
- Hepatitis B virus	24	24.0
- Chronic liver disease	14	14.0
- Unspecified cause of cirrhosis	13	13.0
- Hepatitis C virus	1	1.0
<b>Stage of disease</b>		
- Stage 1	44	44.0
- Stage 2	34	34.0

**Table 3.4** Characteristics of the participants (N = 100) (Cont.)

<b>Variables</b>	<b>n</b>	<b>%</b>
- Stage 3	16	16.0
- Stage 4	6	6.0
<b>Reason for illness-related doctor's visit</b>		
- Follow-up as appointment	72	72.0
- Fatigue	13	13.0
- Jaundice	6	6.0
- Ascites	4	4.0
- Gastrointestinal bleeding	3	3.0
- Pain	2	2.0
<b>Treatment regimens</b>		
- Medication monitoring	91	91.0
- Behavioral modification	9	9.0
<b>Comorbidity</b>		
- None	66	66.0
- Diabetes mellitus	16	16.0
- Hypertension	10	10.0
- Arthritis	6	6.0
- Gastric ulcer	2	2.0

**Abbreviations:** n = number of participants

In the period of conducting the field test of the instruments, the participants frequent confused about definition of each dimension, especially the differences between family members and significant others, of the Multidimensional Scale of

Perceived Social Support. This problem was discussed among researcher, advisor, and co-advisor. The problem solving was that the explanation regarding definition of each dimension and example were written as the instruction before answering the questionnaire. This strategy was considered and applied in all instruments used in this study.

### **Data collection**

The steps involved in data collection were described in following details.

1. A letter asking for permission to collect data from the Faculty of Nursing, Chulalongkorn University was sent to the directors of each selected setting. After the permission was granted from 4 major settings (Appendix D), the researcher explained and clarify the study objectives, data collection procedures, expected outcomes and benefits of the study to the doctors and nurses of each selected setting.

2. Researcher asked for cooperation from doctors and nurses to select the participants who met the inclusion criteria. Nurses introduced researcher to participants. Once the potential participants were identified, the researcher approached the selected participant individually. If a person did not wish to participate or do not meet the criteria for inclusion, the next number on the recruitment list for that setting was selected. To avoid confounding of measures, only one participant was invited to the interview room. If more than one person met the inclusion criteria visited the doctor at same day, two different places of interview were considered.

3. The participants were invited to interview in a prepared and quiet room at medical and surgical out-patient departments. The researcher, then, introduced himself, established rapport, explained the objectives, what contributions the subject

would make, how the confidentiality or anonymity of information given. After the participants have agreed to participate in the study, they were asked to sign a consent form.

4. Participants were interviewed using the six research instruments in a private place. This interview took approximately 30 to 45 minutes to complete. After finishing each interview, researcher examined the questionnaire to ensure completeness of the data.

5. Data were collected from May to August 2020.

### **Data analysis**

The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 25.0 for windows and Mplus software version 7.10 (Muthén et al., 2016). Data were analyzed to answer the research questions. Five types of statistical analysis techniques were used in this study.

1. Descriptive data such as frequency, percentage, mean, standard deviation, minimum value, maximum value, range of score, and descriptive statistics were analyzed for participants' general characteristics and illness – related characteristics.

2. Correlation between latent variables were analyzed using Pearson' s correlation coefficients. An alpha level of .05 was accepted as level of significance. The magnitude of relationships was determined by the following criteria:  $r < .30$  = low relationship,  $.30 \geq r \leq .50$  = moderate relationship, and  $r > .50$  = high relationship (Burns & Grove, 2012).

3. Mean, standard deviation, kurtosis, and skewness were obtained to confirm the normality of the major variables constituting the study model.

4. Confirmatory factor analysis and reliability test were conducted test the fit between the measurement model and data.

5. The structural equation modeling analysis was used to identify the model fit with empirical data.

The processes of data analysis were:

1. All data were double-checked to confirm the accuracy of the data file.
2. Missing data and outlier were investigated to prevent compromised analytic power and non-response bias. The data were cleaned to prevent random and systematic errors. For the outliers, a box plot will be used to detect a univariate outlier. For multivariate analysis, the outliers were detected by Mahalanobis distance. Mahalanobis distance is distributed as a Chi-square ( $\chi^2$ ) variable with degree of freedom (df) equal to the number of variables (Hair, Black, Babin, & Anderson, 2014).
3. Descriptive statistics were used to describe the demographic data and to examine the distribution of demographic and other major variables in the study.
4. All assumptions of the study were test in the preliminary analysis.
5. The instruments that used in the study were tested for construct validity by confirmatory factor analysis (CFA).
6. Path analysis were used to analyze the hypothesized model and assess the direct effects and indirect effects of some variables that have been theorized to be the causes of other variables.
7. The hypothesized causal model was tested and modified for best fit and parsimony. The Mplus software version 7.10 was used to analyze and estimate the parameters of the path model associated with the study's specific objectives (Muthén

et al., 2016). The overall model-fit-index was examined to determine how well the hypothesized model fit the existing data. According to Muthén et al. (2016), statistical criteria could be utilized to evaluate the overall model-fit-index, thus the researcher should select statistical criteria to evaluate the hypothesize model as follows:

7.1 The first set of goodness of fit statistics was the Chi-square ( $\chi^2$ ) value. The  $\chi^2$  test statistics were used in hypothesis testing to evaluate the appropriateness of the hypothesized model. The  $\chi^2$  was non-significant of a level with a corresponding p-value  $> .05$ , and preferably a value close to 1.00 was recommended for the hypothesized model that fit the data. For a good model fit, the ratio  $\chi^2/df$  should be as small as possible. A ratio between 2 and 3 was indicative of a “good” or “acceptable” data-model fit, respectively. Thus, the first set criteria for testing a goodness of fit statistics was that  $\chi^2$  is non-significant ( $p > .05$ ), and  $\chi^2/df$  should be less than 3.

7.2 The following indices were descriptive measures of overall model fit: Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). RMSEA values  $\leq .05$  were considered as a good fit model, while values closing to 1.0 as adequate fit model.

7.3 To imply a good fit of the model to the data, the following criteria were used: the result of equation  $\chi^2/df < 3$  (Khine, 2013), a Comparative Fit Index (CFI) of  $\geq .95$ , Tucker-Lewis Index (TLI) values of  $\geq .95$ , root-mean square error of approximation (RMSEA) of  $\leq .06$  – with values as high as .08 indicating a reasonable fit, a standardized root-mean-square residual (SRMR) of  $\leq .08$  (Khine,



2013). A p-value of equal to or less than 0.05 was considered statistically significant (Burns & Grove, 2012).

8. Once it was determined that the hypothesized model fit the data, path coefficient and  $R^2$  will be estimated and the effects of the independent variables on the dependent variable will be determined to answer the research questions and test the hypotheses. The goodness-fit-indices will be used to determine whether the model adequately fit the data.

### Summary

A cross-sectional research design was used to test a proposed model of factors contributing to functional status among persons with liver cirrhosis. This study also explored the relationship among variables including alcohol consumption, illness perception, social support, fatigue, and functional status. The population focused of this study included Thai persons with liver cirrhosis aged 40 years and over who have perceived their diagnosis and visit doctor at out-patient department as appointment. The study setting settings included Lampang hospital in North region, Nakhon Nayok hospital in Central region, and Nakhon Phanom hospital and Sunpasitthiprasong Ubonratchathani hospital in Northeastern region. Stratified three-stage random sampling was employed to select these four hospitals. Proportionate was used to include 400 participants in accordance with inclusion criteria.

Six self-report instruments were used to collect the data including the demographic data form, the Alcohol Use Disorders Identification Test Consumption, the Brief Illness Perception Questionnaire, the Multidimensional Scale of Perceived Social Support, the Fatigue Severity Scale, and the Functional Status Questionnaire.

Results from a pilot study indicated that the instruments were culturally appropriated for Thai persons with liver cirrhosis. No problems were found during data collection. The psychometric properties of the instruments were acceptable. The data were analyzed by using maximum likelihood method run by the Mplus version 7.10 program. Results of this investigation are reported in the following chapter.



## **CHAPTER IV**

### **RESULTS**

This chapter presents the findings of the study. This cross-sectional correlation study aimed to (1) examine the relationships between alcohol consumption, illness perception, social support, fatigue, and functional status among persons with liver cirrhosis, and (2) develop and test the casual model of functional status among persons with liver cirrhosis. A stratified three-stage random sampling approach was utilized to recruit 400 persons with liver cirrhosis aged 40 years old and older who visited out-patients department from four hospitals across three regions of Thailand. The findings of this study are presented in these following topics.

Descriptive characteristics of the participants

Descriptive characteristics of the study variables

Structural Equation Modeling assumptions testing

Findings of research questions

Hypothesis testing

## **Descriptive characteristics of the participants**

### **Characteristics of the study participants**

The total of 400 persons with liver cirrhosis (100%) participated in this study. These participants were obtained from four out-patient departments in four public general hospitals across three regions of Thailand including Northern, Central, and Northeastern. The data analysis showed no missing data for the variables. The following sections present characteristics of the participants including demographic characteristics, medical history, and results blood examination.

The findings in Table 4.1 revealed that the age range of the participants was 40 to 83 years old with an average of 60.39 (SD = 7.57). Most of the participants were male (77.80%). More than half of them were married (64.50%) and 19% of them were widowed. Most of the participants lived with their spouse (65.20%) and relative members (20.70%), while 5.30% lived alone. Biggest number of them were Buddhist (96.80%). Over three-fourths of them completed primary school (77.70%) while only 3.30% had not graduated at least primary education.

Considering about working status, most of the participants were still working (87%) such as agriculturist (45%), company employee (26%), and government officer/ state enterprise employee (7%). Nevertheless, 13% of them were unemployed. Over three-fourths of the participants (85.20%) used universal health coverage services. The monthly income of the participants ranged from 0 to 35,000 Thai Bath. The average of monthly income was 6,304.25 (SD = 5,821.67) Thai Bath (1 US dollar = 31.24 Thai Bath), while 1.80% of the participants reported had no income at the time data collection taken place. The Body Mass Index (BMI) range of

the participants was 15.6 to 23.9 score. The mean of BMI was 19.53 score (SD = 1.63).

**Table 4.1** Demographic characteristics of the study participants (N = 400)

<b>Characteristics</b>	<b>n</b>	<b>%</b>
<b>Age (Years old)</b>		
- 40 - 55	117	29.2
- 56 – 71	248	62.0
- 72 and older	35	8.8
<b>Gender</b>		
- Male	311	77.8
- Female	89	22.2
<b>Marital status</b>		
- Married	258	64.5
- Widow/ Widower	76	19.0
- Single	54	13.5
- Divorced	12	3.0
<b>Primary caregiver</b>		
- Spouses	261	65.2
- Relative	83	20.7
- Daughter/ Son	32	8.0
- Lived alone	21	5.3
- Father/ Mother	3	0.8

**Table 4.1** Demographic characteristics of the study participants (N = 400) (Cont.)

<b>Characteristics</b>	<b>n</b>	<b>%</b>
<b>Religion</b>		
- Buddhist	387	96.8
- Muslim	7	1.8
- Christian	6	1.4
<b>Education attainment</b>		
- Primary school	311	77.7
- Senior high school/ Vocational certificate	35	8.8
- Junior high school	23	5.8
- No formal education	13	3.3
- Diploma/ High vocational certificate	9	2.2
- Bachelor or higher degree	9	2.2
<b>Occupation</b>		
- Agriculturist	180	45.0
- Company employee	104	26.0
- Unemployed	52	13.0
- Government officer/ State enterprise employee	28	7.0
- Business owner	21	5.2
- Barber	8	2.0
- Monk	5	1.3
- Security guard	2	0.5

**Table 4.1** Demographic characteristics of the study participants (N = 400) (Cont.)

Characteristics	n	%
<b>Medical benefits scheme</b>		
- Universal health coverage scheme	341	85.2
- Social security scheme	29	7.2
- Civil servant scheme	23	5.8
- Private health insurance	7	1.8

**Note:** n = frequency

#### **Medical history of the participants**

Based on the findings remained in Table 4.2, the findings revealed that the average of duration of illness was 9.20 weeks (SD = 8.02) at the time the data collection taken place. The duration of being diagnoses with liver cirrhosis among the sample varied from 1 to 50 months. Most of the participants visited doctor due to follow-up as appointment (84%) followed by had gastrointestinal bleeding (6.50%) and ascites (3.80%), respectively. One-third of participants (35.50%) had been diagnosed with liver cirrhosis in stage 2 (compensated with ascites with/or without varices stage) followed by 30.20% of them were in stage 3 (decompensated with ascites with or without varices stage). More than haft of participants (61.70%) was diagnosed with liver cirrhosis due to alcoholic cirrhosis, while close to one-fourths of the participants (20.80%) was diagnosed from hepatitis B virus. Most of the participants (79%) had been treated using medications, while 21% of the participants had been treated with no medication. In addition, over haft of the participants (53%) had no reported comorbidities.

**Table 4.2** Medical history of the participants (N = 400)

<b>Medical history</b>	<b>n</b>	<b>%</b>
<b>Reason for visiting doctor</b>		
- Follow-up as appointment	336	84.0
- Gastrointestinal bleeding	26	6.5
- Ascites	15	3.8
- Pain	10	2.5
- Suffering with more than 1 symptoms	5	1.2
- Fatigue	4	1.0
- Jaundice	2	0.5
- Emergency condition	2	0.5
<b>Stage of disease</b>		
- Stage 1	93	23.3
- Stage 2	142	35.5
- Stage 3	121	30.2
- Stage 4	44	11.0
<b>Etiology of cirrhosis</b>		
- Alcoholic	247	61.7
- Hepatitis B virus	83	20.8
- Chronic liver disease	51	12.8
- Unspecified cause	14	3.4
- Hepatitis C virus	5	1.3



**Table 4. 2** Medical history of the participants (N = 400) (Cont.)

<b>Medical history</b>	<b>n</b>	<b>%</b>
<b>Treatment option</b>		
- Medication	316	79.0
- Non-medication	84	21.0
<b>Comorbidity</b>		
None of comorbidity	212	53.0
Having comorbidity	188	47.0
- Having more than 1 disease (DM, HT, kidney, Renal failure, or heart)	57	14.1
- Hypertension	37	9.2
- Arthritis	32	8.0
- Diabetes mellitus	31	7.8
- Gastric ulcer	20	5.0
- Asthma	5	1.3
- Chronic cholangitis	3	0.8
- Gout	2	0.5
- Amyotrophic lateral sclerosis	1	0.3

**Note:** n = frequency

### **The laboratory findings for persons with liver cirrhosis**

The results of blood examination were retrospectively collected from the medical history of the participants. Notably, not all participants were examined blood examination. Laboratory findings for the participants are shown in Table 4.3.

**Table 4.3** Laboratory findings for persons with liver cirrhosis

Blood tests	n	Min	Max	$\bar{X}$	SD	Interpretation
<b>Hematology</b>						
- Red blood cell	162	3.8	4.7	4.3	0.5	Normal
- White blood cell ( <i>cells/mm<sup>3</sup></i> )	162	6.0	82,100.0	14,537.9	23,850.6	Normal
- Hematocrit (%)	162	22.0	47.2	35.2	6.3	Normal
- Hemoglobin ( <i>g/dl</i> )	162	6.9	18.6	11.6	2.9	Normal
- Prothrombin ( <i>sec</i> )	113	1.5	23.3	12.6	10.9	Normal
- Partial thromboplastin time ( <i>sec</i> )	76	14.3	98.7	45.7	16.6	Normal
- Platelet count	142	61,000.0	267,000.0	167,923.1	49,287.7	Normal
<b>Blood chemistry</b>						
- Blood urea nitrogen ( <i>mg/dl</i> )	118	7.0	16.0	12.6	2.6	Normal
- Creatinine ( <i>mg/dl</i> )	129	5.9	17.1	12.0	3.5	Normal
<b>Liver function test</b>						
- Bilirubin ( <i>mg/dl</i> )	118	0.52	3.3	1.6	1.1	High
- Alanine transaminase ( <i>U/L</i> )	126	11.0	110.0	40.8	24.6	Normal
- Aspartate transaminase ( <i>U/L</i> )	126	8.0	187.0	46.2	35.3	Normal
- Alkaline phosphatase ( <i>U/L</i> )	126	70.0	359.0	159.0	77.4	High
<b>Protein electrophoresis</b>						
- Albumin ( <i>g/dl</i> )	160	12.1	59.3	21.0	4.9	High
- Globulin ( <i>g/dl</i> )	113	14.72	52.50	28.6	4.7	High

From table 4.3, the results demonstrated that no participants had hematology and blood chemistry level within normal values. Furthermore, the findings of liver function test revealed that the average of bilirubin among 118 participants was found as higher than normal level ( $\bar{X} = 1.6$ ,  $SD = 1.1$ ) (*mg/dl*). While the average of alkaline

phosphatase among 126 participants was found in high concentration level ( $\bar{X} = 159.0$ ,  $SD = 77.4$ ) *U/L*. These findings indicate the participants suffer with hyperbilirubinemia which can cause jaundice.

For the protein electrophoresis, the average of serum albumin among 160 participants was found in high concentration ( $\bar{X} = 21.0$ ,  $SD = 4.9$ ) *g/dL*. The average of globulin among 113 participants was found as higher than normal level ( $\bar{X} = 28.6$ ,  $SD = 4.7$ ) *g/dL*. These findings indicate a relative reduction in serum water (e.g., dehydration).

### **Descriptive characteristics of the study variables**

#### **Characteristics of the study variables**

There were five variables in the current study. The dependent variable was functional status. The independent variables were alcohol consumption, illness perception, social support, and fatigue. The details regarding characteristics of each study variable are presented hereunder.

#### **Functional status**

As can be seen in Table 4.4, participants experienced a problem with a wide range of functional status decline (16.7 – 100). Using the cut – off point to categorize level of functional status into warning zone and good zone, it was found that the mean score of four dimensions were categorized into the warning zone of functional status including the basic activities of daily living ( $\bar{X} = 80.43$ ,  $SD = 16.47$ ), intermediate activities of daily living ( $\bar{X} = 74.10$ ,  $SD = 16.58$ ), social activity ( $\bar{X} = 66.51$ ,  $SD = 14.34$ ), and work performance ( $\bar{X} = 59.73$ ,  $SD = 15.77$ ), respectively. Meanwhile two dimensions were found as good functional status including the mental health

functioning ( $\bar{X} = 72.69$ ,  $SD = 15.90$ ) and quality of interactions ( $\bar{X} = 69.79$ ,  $SD = 14.39$ ).

**Table 4.4** Possible range, actual range, mean, standard deviation, and the interpretation of functional status (N = 400)

Functional status	Possible range	Actual range	$\bar{X}$	SD	Interpretation
Mental health	0 – 100	36.0-100.0	72.69	15.90	Good
Quality of interaction	0 – 100	33.3-100.0	69.79	14.39	Good
Basic activities of daily living	0 – 100	33.3–100.0	80.43	16.47	Warning zone
Intermediate activities of daily living	0 – 100	33.3-100.0	74.10	16.58	Warning zone
Social activity	0 – 100	33.3-100.0	66.51	14.34	Warning zone
Work performance	0 – 100	16.7-100.0	59.73	15.77	Warning zone

The results of six single questions are presented in Table 4.5. The data presented in this study demonstrated that majority of the participant did not have any sexual relationships (56.0%), did not satisfied with their health status (40.3%), kept their work status as full-time job (35.0%), did get along with friends or relative about once a month (28.2%), became unemployed because of health condition (25.5%), became unemployed and looking for a job (25.5%), respectively.

**Table 4.5** Frequency and percentage of additional six questions of the FSQ (N = 400)

<b>Additional questions of the FSQ</b>	<b>n</b>	<b>%</b>
<b>Work situation during the past month</b>		
- Working full-time	140	35.0
- Unemployed because of my health	102	25.5
- Unemployed and looking for work	54	13.5
- Working part-time	45	11.2
- Retired for some other reason.	33	8.3
- Retired because of health condition	26	6.5
<b>Bed and restriction due to illness (days):</b>		
$\bar{X} = 7.40$ , SD = 7.05, Min = 0, Max = 31	-	-
<b>Cut down things to do due to illness (days):</b>		
$\bar{X} = 7.37$ , SD = 6.85, Min = 0, Max = 31	-	-
<b>Sexual satisfaction</b>		
- Did not have any sexual relationships	224	56.0
- Satisfied	96	24.0
- Dissatisfied	34	8.5
- Not sure	26	6.5
- Very dissatisfied	13	3.3
- Very satisfied	7	1.7

**Table 4.5** Frequency and percentage of additional six questions of the FSQ (N = 400) (Cont.)

<b>Additional questions of the FSQ</b>	<b>n</b>	<b>%</b>
<b>Individual's current health satisfaction</b>		
- Dissatisfied	161	40.3
- Satisfied	119	29.7
- Not sure	59	14.7
- Very dissatisfied	52	13.0
- Very satisfied	9	2.3
<b>Frequency of social interaction</b>		
- About once a month	113	28.1
- Not at all	104	26.0
- About once a week	79	19.8
- Several times a week	52	13.0
- Two or three times a month	51	12.8
- Every day	1	0.3

### Alcohol consumption

Summary of the score of alcohol consumption is presented in Table 4.6. There was 9% (n = 36) of the participants reported no consuming alcohol during previous month of collecting data. Participants showed a moderate risk of alcohol drinking that would affect their health. The total score of alcohol consumption (AUDIT-C) ranged from 0 to 12 points with a mean of 4.72 (SD = 3.17), indicating that the participants had moderate risk of being harm to health based on alcohol drinking. Regarding to frequency of drinking, the mean score was 1.84 (SD = 1.23). The mean score of quantity consumed at typical occasion was 1.30 (SD = 1.30). Meanwhile, the mean score of frequency of heavy episodic drinking was 1.60 (SD = 1.17). All these three dimensions were categorized in low associated – health from drinking alcohol.

**Table 4.6** Possible range, actual range, mean, standard deviation, and interpretation of alcohol consumption (N = 400)

Alcohol consumption	Possible range	Actual range	$\bar{X}$	SD	Interpretation
Frequency of drinking	0 – 4	0 - 4	1.84	1.23	Low-risk drinker
Quantity consumed	0 – 4	0 - 4	1.30	1.13	Low-risk drinker
Heavy episodic drinking	0 – 4	0 - 4	1.60	1.17	Low-risk drinker
<b>Total score</b>	<b>0 – 12</b>	<b>0 - 12</b>	<b>4.72</b>	<b>3.17</b>	<b>Moderate-risk drinker</b>

### Illness perception

Characteristics of illness perception among the sample are presented in Table 4.7. The total sum score of illness perception ranged from 10 to 80 points with a mean of 46.57 (SD = 16.34). The mean score of each dimension ranged from 4.87 to 6.27 and was classified in moderate level about perceived threatening of illness.

**Table 4.7** Possible range, actual range, mean, standard deviation, and interpretation of illness perception (N = 400)

Illness perception	Possible range	Actual range	$\bar{X}$	SD	Interpretation
Consequences	0 – 10	0 – 10	6.27	2.20	-
Timeline	0 – 10	1 – 10	5.99	2.25	-
Personal control	0 – 10	0 – 10	4.87	2.14	-
Treatment control	0 – 10	0 – 10	4.99	2.14	-
Identity	0 – 10	0 – 10	5.96	2.17	-
Concern	0 – 10	1 – 10	6.01	2.21	-
Illness comprehensibility	0 – 10	1 – 10	4.91	2.07	-
Emotions	0 – 10	1 – 10	6.21	2.15	-
<b>Total score</b>	<b>0 – 80</b>	<b>10 – 80</b>	<b>46.57</b>	<b>16.34</b>	<b>Moderate</b>

Concerning the factor believed to cause of liver cirrhosis (item 9), the majority answered to consuming alcohol (49.8%), having no idea about cause (24.3%), and involving with chemical hazards in work life (10.8%), respectively



### Social support

The total sum score for the level of social support ranged from 31 to 84 with a mean of 58.40 (SD = 13.73). Regarding the average of the mean score in each dimension of social support, the highest support in perception of the participants was family members (average mean score = 21.62, SD = 4.50), followed by significant others (average mean score = 19.29, SD = 4.87), and friends (average mean score = 17.50, SD = 5.02), respectively. The findings regarding social support among the participants were summarized in Table 4.8.

**Table 4.8** Possible range, actual range, mean, standard deviation, and the interpretation of social support (N = 400)

Social support	Possible range	Actual range	$\bar{X}$	SD	Interpretation
Family	4 – 28	10 -28	21.62	4.50	-
Significant others	4 - 28	8 - 28	19.29	4.87	-
Friends	4 - 28	8 - 28	17.50	5.02	-
<b>Total score</b>	<b>12 - 84</b>	<b>31 - 84</b>	<b>58.40</b>	<b>13.73</b>	<b>Moderate</b>

### Fatigue

The score of fatigue ranged from 9 to 63 with a mean of 41.34 (SD = 15.24). It was interpreted as that the sample in this study had moderate level of fatigue. The summary finding of fatigue is presented in Table 4.9.

**Table 4.9** Possible range, actual range, mean, standard deviation, and the interpretation of fatigue (N = 400)

Fatigue	Possible range	Actual range	$\bar{X}$	SD	Interpretation
Severity of fatigue	9 - 63	9 - 63	41.34	15.24	Moderate

## **Structural equation modeling assumptions testing**

In the period of preliminary analysis, assumptions of structural equation modeling (SEM) testing were conducted to ensure that there was no violation of the underlying assumption. According to Tabachnick, Fidell, and Ullman (2007), the assumptions underlying multivariate analysis included, normality, linearity, homoscedasticity, and multicollinearity testing. This section presents the assessment of statistic assumptions prior to SEM analysis.

### **Normality testing**

#### **Univariate normality**

In the current study, skewness and kurtosis values were used to test normal distribution of the data. Regarding to West, Finch, and Curran (1995), the skewness and kurtosis values of 3 and 21, respectively, represent a highly non-normality. The skewness value of 2 and kurtosis value of 7 indicate a moderate departure from normal distribution. In this study, since the construct of functional status cannot calculate as the sum score, the skewness and kurtosis of functional status sub-dimension was analyzed separately. The skewness values of all dimensions were found in negative zone ranged from -.03 to -.41. The kurtosis values of all dimensions also found in negative zone ranged from -.37 to -.83.

For other studied variables, the distribution of the score for the alcohol consumption was close to normal since the skewness value of this variable was .22. The kurtosis value was -.70. The distribution of the score for the level of illness perception was close to normal since the skewness value of this variable was -.13. The kurtosis value was -.73. The distribution of the score for the level of social support was close to normal since the skewness value of this variable was .12. The kurtosis

value was -.89. The distribution of the score for the level of fatigue was close to normal since the skewness value of this variable was -.67. The kurtosis value was -.84.

These values demonstrate that data dose not remarkably depart from normal distribution. Importantly, it is evidenced that the Maximum Likelihood still works well as long as measured variables were not severely non-normal (the skewness exceeds 2 and the kurtosis exceeds 7) (Pituch & Stevens, 2015). It can be concluded that there is efficient evidence about the reasonable satisfaction of the univariate normality assumption. The summary of SEM assumption testing is shown in Table 4.10.

**Table 4.10** Descriptive statistics for the major studied variables (N = 400)

<b>Variables</b>	<b>Min</b>	<b>Max</b>	<b><math>\bar{X}</math></b>	<b>SD</b>	<b>CV</b>	<b>Sk</b>	<b>Ku</b>
<b>Functional status</b>	215.40	600.00	423.22	87.57	314.39	-0.17	-0.86
<b>Alcohol consumption</b>	0.00	12.00	4.72	3.17	67.21	0.22	-0.70
<b>Illness perception</b>	10.00	80.00	46.57	16.34	35.08	-0.13	-0.73
<b>Social support</b>	31.00	84.00	58.40	13.73	23.51	0.12	-0.89
<b>Fatigue</b>	9.00	63.00	41.34	15.24	36.87	-0.67	-0.84

**Abbreviations:** *Min* = Minimum, *Max* = Maximum, *SD* = Standard deviation, *CV* = Coefficient of variation, *Sk* = Skewness, *Ku* = Kurtosis, *BADL* = Basic activity of daily living, *IADL* = Intermediate activity of daily living

### **Homoscedasticity testing**

Homoscedasticity is defined as the assumptions that the dependent variables exhibit equal level of variance across the range of predictor variables. Homoscedasticity is desirable because the variance of the dependent variable being explained in the dependence relationship should not be concentrated in only a limited

range of the value. This assumption could be tested by the graphical test of equal variance dispersion. According to Hair, Black, Babin, and Anderson (2009 ), the test of homoscedasticity for two metric variables is best examined graphically. The homoscedasticity data will show an equal distribution of residual across the central line. In the current study, the residual scatter plots show no violation of the homoscedasticity assumption. The mean score of residuals among independent variables and dependent variable were found as zero. The distribution of residual ranged from 9.48-11.45. The residual scatter plots are presented in Appendix G1.

### **Linearity testing**

The assumption of linearity requires that the associations among variables must be in linear pattern. Because correlation represent only the linear association between variables, nonlinear effects will not be represented in the correlation values. This omission results in an underestimation of the actual strength of the relationship. According to Hair et al. (2009 ), linearity can be examined by simple regression analysis to assess residual, the residual reflect the unexplained portion of the dependent variable. Therefore, any nonlinear portion of the relationship will show up in the residuals. In this study, normal P–P plots of regression standardized residual showed linear association among variables. Thus, it could be concluded that the assumption of linearity was met. The P–P plots of regression standardized residual among each variable in this study are presented in APPENDIX G2.

### **Multicollinearity testing**

Multicollinearity is defined as the interrelatedness of the independent variables. It is believed that the high correlations among variables would make the

evaluation of statistical results problematic (Grewal, Cote, & Baumgartner, 2004). According to Khine (2013), there were three strategies that can be used to utilized to examine multicollinearity among variables. First, it can be found by calculating a squared multiple correlation between each variable and all the rest. The observation that R-square greater than .90 for a particular variable analyzed as the criterion suggests as extreme multivariate collinearity. Second, tolerance statistic is the proportion of total standardized variance that is not explained by all the other variables. It can be calculated by the formular  $1 - R^2$ . Tolerance value  $<.10$  may indicate extreme multivariate collinearity. Finally, the variance inflation factor (VIF). The formular for VIF is  $1/(1 - R^2)$ . The VIF exceed 10 indicates multicollinearity (Meyers, Gamst, & Guarino, 2013). Khine (2013) suggested that the high correlations ( $>.90$ ) among variables imply multicollinearity. As the results, correlation coefficients, tolerance and VIF were used to examine multivariate collinearity in this study.

Table 4.11 demonstrates the values of the tolerance statistic and VIF. The current study found that the tolerance of variables ranged from 0.72 to 0.91, which were very close to 1.0. Additionally, the VIF varied from 1.10 to 1.39, which were much less than 10. Therefore, it could be concluded that there was no evidence toward multicollinearity found in this study.

**Table 4.11** Collinearity statistics

Variables	Functional status											
	Basic activity of daily living		Intermediate activity of daily living		Mental health		Work performance		Social activity		Quality of interactions	
	Tolerance	VIF	Tolerance	VIF	Tolerance	VIF	Tolerance	VIF	Tolerance	VIF	Tolerance	VIF
Alcohol consumption	0.91	1.10	0.91	1.10	0.91	1.10	0.91	1.10	0.91	1.10	0.91	1.10
Illness perception	0.77	1.29	0.77	1.29	0.77	1.29	0.77	1.29	0.77	1.29	0.77	1.29
Social support	0.72	1.39	0.72	1.39	0.72	1.39	0.72	1.39	0.72	1.39	0.72	1.39
Fatigue	0.88	1.14	0.88	1.14	0.88	1.14	0.88	1.14	0.88	1.14	0.88	1.14

In the current study, the correlation coefficients among the five major variables ranged from -.370 to .709. Therefore, these correlation coefficients indicated no multicollinearity. None of them exceeded the value of .90. The correlation matrix between the studied variables is presented in Table 4.13.

### Measurement model of the latent variables

Five instruments were tested for the measurement model including the Functional Status Questionnaire, Alcohol Use Disorders Identification Test Consumption, Brief-Illness Perception Questionnaire, Multidimensional Scale of Perceived Social Support, and Fatigue Severity Scale.

Statistical analyses were conducted using Mplus program version 7 for student (Muthén et al., 2016) and SPSS for windows version 25. To imply a good fit of the model to the data, the following criteria were used: the result of equation  $\chi^2/df < 3$  (Khine, 2013), a Comparative Fit Index (CFI) of  $\geq .95$ , Tucker-Lewis Index (TLI) values of  $\geq .95$ , root-mean square error of approximation (RMSEA) of  $\leq .06$  with values as high as .08 indicating a reasonable fit, a standardized root-mean-

square residual (SRMR) of  $\leq .08$  (Khine, 2013). A p-value of equal to or less than 0.05 was considered statistically significant (Burns & Grove, 2012).

### **The Functional Status Questionnaire measurement model**

Previously, the Functional Status Questionnaire (FSQ) is 28-item scale with six dimensions: basic activity of daily living, intermediate activity of daily living, mental health, work performance, social activity, and quality of interactions. The FSQ was tested by the confirmatory factor analysis (CFA). It was found that the model showed good fit to the empirical data ( $\chi^2$  (df = 5) = 9.077,  $p > .05$ ,  $\chi^2/df = 1.815$ , RMSEA = .045, CFI = .999, TLI = .997, SRMR = .003). The factor loading for each factor ranged from .831 to .975. The measurement model of the FSQ is presented in APPENDIX H1.

### **The Alcohol Use Disorders Identification Test Consumption measurement model**

The Alcohol Use Disorders Identification Test Consumption (AUDIT-C) is a 3-item scale. Each item assesses each dimension of alcohol consumption including frequency of drinking, quantity consumed at typical occasion, and frequency of heavy episodic drinking. After conducting the CFA, although the value of Chi-Square per degree of freedom was higher than 3, however, other criteria were acceptable. As the result, the model showed acceptable fit to the empirical data ( $\chi^2$  (df = 1) = 3.734,  $p > .05$ ;  $\chi^2/df = 3.734$ , RMSEA = .083, CFI = .997, TLI = .990, SRMR = .008). The factor loading for each item ranged from .730 to .900. The measurement model of the AUDIT-C demonstrates in APPENDIX H2.

### **The Brief–Illness Perception Questionnaire measurement model**

The Brief–Illness Perception Questionnaire (Brief-IPQ) is a 8-item scale, each item assesses one dimension of illness perceptions including consequences, timeline, personal control, treatment control, identity, concerns, illness comprehension, and emotions. The CFA was used to test the construct of the Brief-IPQ. It was found that the model showed good fit to the empirical data ( $\chi^2$  (df = 15) = 31.435,  $p > .05$ ,  $\chi^2/df = 2.10$ , RMSEA = .052, CFI = .997, TLI = .995, SRMR = .004). The factor loading for each item ranged from .916 to .971. The measurement model of the Brief-IPQ is showed in APPENDIX H3.

### **The Multidimensional Scale of Perceived Social Support measurement model**

The Multidimensional Scale of Perceived Social Support (MSPSS) consists of 12 items. As the three factors were theoretically considered to be factors of social support, a second-order factor was specified. Confirmatory factor analysis testing of the three-factor structure of Family, Friends, and Significant Others yielded the following adequately fit indices:  $\chi^2(df=1) = 0.033$ ;  $p = 0.855$ ;  $\chi^2/df = 0.033$ ; CFI = 1.000; TLI = 1.000; RMSEA = 0.000; and SRMR = 0.001. Factor loading of the Family, Significant others, and Friend factors were ranged as .966, .966, and .999 (explained 93.4%, 93.4%, and 99.8% of variance), respectively. The measurement model of the MSPSS is illustrated in APPENDIX H4.

### **The Fatigue Severity Scale measurement model**

The Fatigue Severity Scale (FSS) is a single dimensional scale, consisting of 9 items. CFA was used to assess the measurement model of the FSS. As only one factor intends to measure the severity of fatigue, thus, a first-order factor was



specified. As the results, the one factor structure of severity of fatigue yielded the following adequately fit indices:  $\chi^2(df=10) = 16.841$ ,  $p < 0.05$  ( $\chi^2/df = 1.684$ ), CFI = 0.999, TLI = 0.996, RMSEA = 0.041, and SRMR = 0.005. Factor loading of each observed variable ranged from 0.914 to 0.975. The measurement model of the FSS is displayed in APPENDIX H5.

The summary of measurement model of the latent variables is showed in

**Table 4.12** Goodness of fit of each construct (N = 100)

Construct	$\chi^2$	df	$\chi^2/df$	p-value	RMSEA	CFI	TLI	SRMR
AUDIT-C	3.734	1	3.734	.053	.083	.997	.990	.008
Brief-IPQ	31.435	15	2.100	.077	.052	.997	.995	.004
MSPSS	0.033	1	0.033	.855	.000	1.000	1.000	.001
FSS	16.841	10	1.684	.078	.041	.999	.996	.005
FSQ	9.077	5	1.815	.106	.045	.999	.997	.003

**Abbreviations:**  $\chi^2$  = Chi-square, df = Degree of freedom, RMSEA = Root-mean square error of approximation, CFI = Comparative fit index, TLI = Tucker-Lewis index, SRMR = Standardized root-mean-square residual, FSQ = Functional Status Questionnaire, AUDIT-C = Alcohol Use Disorders Identification Test Consumption, Brief-IPQ = Brief-Illness Perception Questionnaire, MSPSS = Multidimensional Scale of Perceived Social Support, FSS = Fatigue Severity Scale.

In conclusion, all instruments were tested for their measurement models. It was found that overall measurement model had been accepted. The indicator loading and construct validity of each studied instruments were examined. The measurement model of all studied instruments was fit with empirical data.

## Findings of research questions

**Research question 1: What are the relationships among alcohol consumption, illness perception, social support, fatigue, and functional status among persons with liver cirrhosis?**

### The relationships among five variables in this study

Bivariate Pearson correlations were used to evaluate relationships among alcohol consumption, illness perception, social support, fatigue, and functional status. The correlation matrix between the studied variables is presented in Table 4.13.

**Table 4.13** Correlation matrix between the studied variables (N = 400)

Variables	AC	IP	SS	Fa
Alcohol consumption	1.000			
Illness perception	.201**	1.000		
Social support	-.258**	-.463**	1.000	
Fatigue	.214**	.218**	-.318**	1.000
Functional status	-.409**	-.597**	.676**	-.462

\*\* . Correlation is significant at the 0.01 level (2-tailed).

**Abbreviations:** AC = Alcohol consumption, IP = Illness perception, SS = Social support, Fa = Fatigue.

From Table 4.13, it was found that the correlation coefficients among the five major variables ranged from -.409 to .676. Therefore, these correlation coefficients indicated no multicollinearity. None of them exceeded the value of .90. The relationships among variables in this study are described as following details.

**The relationships between alcohol consumption, illness perception, social support, fatigue, and functional status**

The results showed that alcohol consumption had a moderate negative correlation with functional status ( $r = -.409, p < .01$ ). A moderate negative correlation existed between fatigue and functional status ( $r = -.462, p < .01$ ). A high negative correlation existed between illness perception and functional status ( $r = -.597, p < .01$ ). On the other hand, social support had a high positive correlation with functional status ( $r = .676, p < .01$ ).

Additionally, the results showed that alcohol consumption had a low positive correlation with illness perception ( $r = .201, p < .01$ ), fatigue ( $r = .214, p < .01$ ), and a low negative correlation with social support ( $r = -.258, p < .01$ ). Illness perception had a low positive correlation with fatigue ( $r = .218, p < .01$ ) and a moderate negative correlation with social support ( $r = -.463, p < .01$ ). Furthermore, social support had a moderate negative correlation with fatigue ( $r = -.318, p < .01$ ).

**Research question 2: Does the hypothesized model explain the functional status of persons with live cirrhosis including alcohol consumption, illness perception, social support, and fatigue, and dose it adequately fit the data?**

In order to answer this research question, five steps for conducting structural equation model (SEM) analysis were evaluated including model specification, model identification, model estimation, model testing, and model modification (Crockett, 2012).

### **Model specification**

The hypothesized model was developed based on the Theory of unpleasant Symptoms (TOUS) and review of the literature. The model had 5 latent variables which divided into 1 exogenous variable (social support) and 4 endogenous variables (alcohol consumption, illness perception, fatigue, and functional status).

### **Model identification**

Model identification is a requirement for developing results that can be estimated the model fit in SEM analysis as well as its parameters. When the number of covariance exceeds the number of parameters being estimated, the model is over-identified. If the number of covariance equals to the number of estimated parameters, the model is called as just - identified. Finally, the model is under-identified if the number of parameters is higher than the number of covariances (Crockett, 2012). SEM analysis requires the model to be over-identified (Crockett, 2012).

There are several conditions for establishing the identification of a model. A necessary is the order condition, under which the number of free parameters to be estimated must be less than or equal to the number of distinct values in the matrix  $S$ , that is, only the diagonal variances and one set of off-diagonal covariance terms are counted. For example, because  $s_{12} = s_{21}$  in the off-diagonal of the matrix, only one of these covariance terms is counted. The number of distinct values in the matrix  $S$  is equal to  $p(p + 1)/2$ , where  $p$  is the number of observed variables. The number of free parameters (saturated model-all paths) with the number of means =  $p$  is equal to  $p(p + 1)/2 + p = p(p + 3)/2$  free parameters. For a sample matrix  $S$  with 3 observed variables, there are six distinct values [ $3(3 + 1)/2 = 6$ ] and 9 free (independent) parameters [ $3(3 + 3)/2$ ] that can be estimated. Consequently, the number of free

parameters estimated in any theoretical implied model must be less than or equal to the number of distinct values in the S matrix. However, this is only one necessary condition for model identification; it does not by itself imply that the model is identified. For example, if the sample size is small ( $n = 10$ ) relative to the number of variables ( $p = 20$ ), then not enough information is available to estimate parameters in a saturated model (Schumacker & Lomax, 2010). In this study, the hypothesized model of the current study consisted of 5 variables. Therefore, the number of distinct values in the matrix was 15 [ $5(5+1)/2$ ]. There are 2 free parameters in the model. Thus, the number of distinct values in the matrix was 13 (15 minus 2). In sum, the hypothesized model is over-identification. This allows the SEM can be tested in this study.

The method that used to avoiding identification problems in the measurement model was that either one indicator for each latent variable must have a factor loading fixed to 1, or the variance of each latent variable must be fixed to 1. The reason for imposing these constraints was to set the measurement scale for each latent variable, primarily because of indeterminacy between the variance of the latent variable and the loadings of the observed variables on that latent variable. Confirmatory factory analysis (CFA) found that the Fatigue Severity Scale was the unidimensional scales. According to Raykov and Marcoulides (2006), the model with unidimensional scale assessing latent variable is not identified. To solve this problem, some researchers set the error variance of unidimensional latent variable equal to zero (Byrne, 2012). Unlike path analysis, structural regression takes measurement errors into the estimation of the model. Thus, unlike observed indicators, it may not be

suitable to set the variance of the latent variable to zero, which mean that the measurement is perfectly reliable.

Other options are to use first-order measurement model in the structure model (Byrne, 2012). This means that every single observed variable is treated as indicators of the latent variable. However, this approach requires a large sample because the sample size is calculated based on the number of parameters under estimation. Therefore, this model is not suitable with this study. Cohen, Cohen, Teresi, Marchi, and Velez (1990) suggested that the method of total aggregation with reliability correction to deal with unidimensional latent variable. This method helps the hypothesized model identified but allow the consideration of measurement errors. In this method, the internal consistency coefficient of the instrument is priori determined. The variance of measurement error then is calculated by subtract 1 with the Cronbach's alpha coefficient.

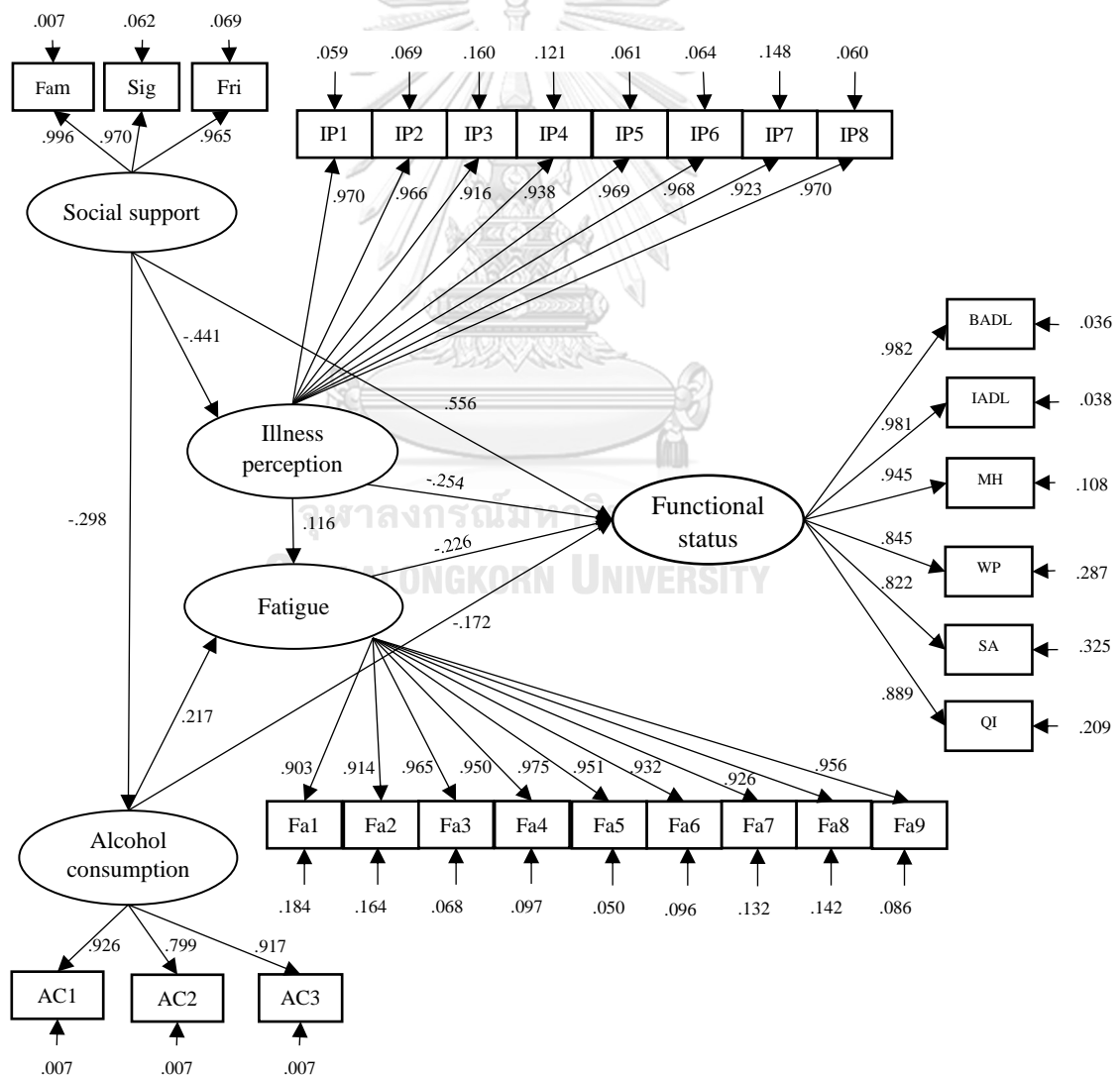
In the field test of measurement, it was found that the Cronbach's alpha of the AUIT-C, Brief-IPQ, and FSS were .82, .93, and .96, respectively. Therefore, variance of measurement errors of such scales was set at .18, .07, and .04, consecutively.

### **Model testing and model modification**

At this step, structural equation model analysis and path analysis were conducted to test the proposed model of functional status among persons with liver cirrhosis. From the hypothesized model, the exogenous variable was social support, while alcohol consumption, illness perception, fatigue, and functional status were severed as endogenous variables. The process of model testing is presented as follows:

**Model 1: The initial model**

In the initially hypothesized model (see Figure 4.1), the researcher did not constrain or fix any parameter. The results from conducting SEM revealed that the model did not fit well with empirical data ( $\chi^2$  (df = 213) = 863.934,  $p = .000$ ,  $\chi^2/df = 4.056$ , RMSEA = .059, CFI = .975, TLI = .972, SRMR = .083). The model explained 71% of the total variance in functional status. Despite several fit indices were at the acceptable level, the chi-square test was non-significant and the results of equation  $\chi^2/df$  higher than 3. Therefore, model modification was necessary.



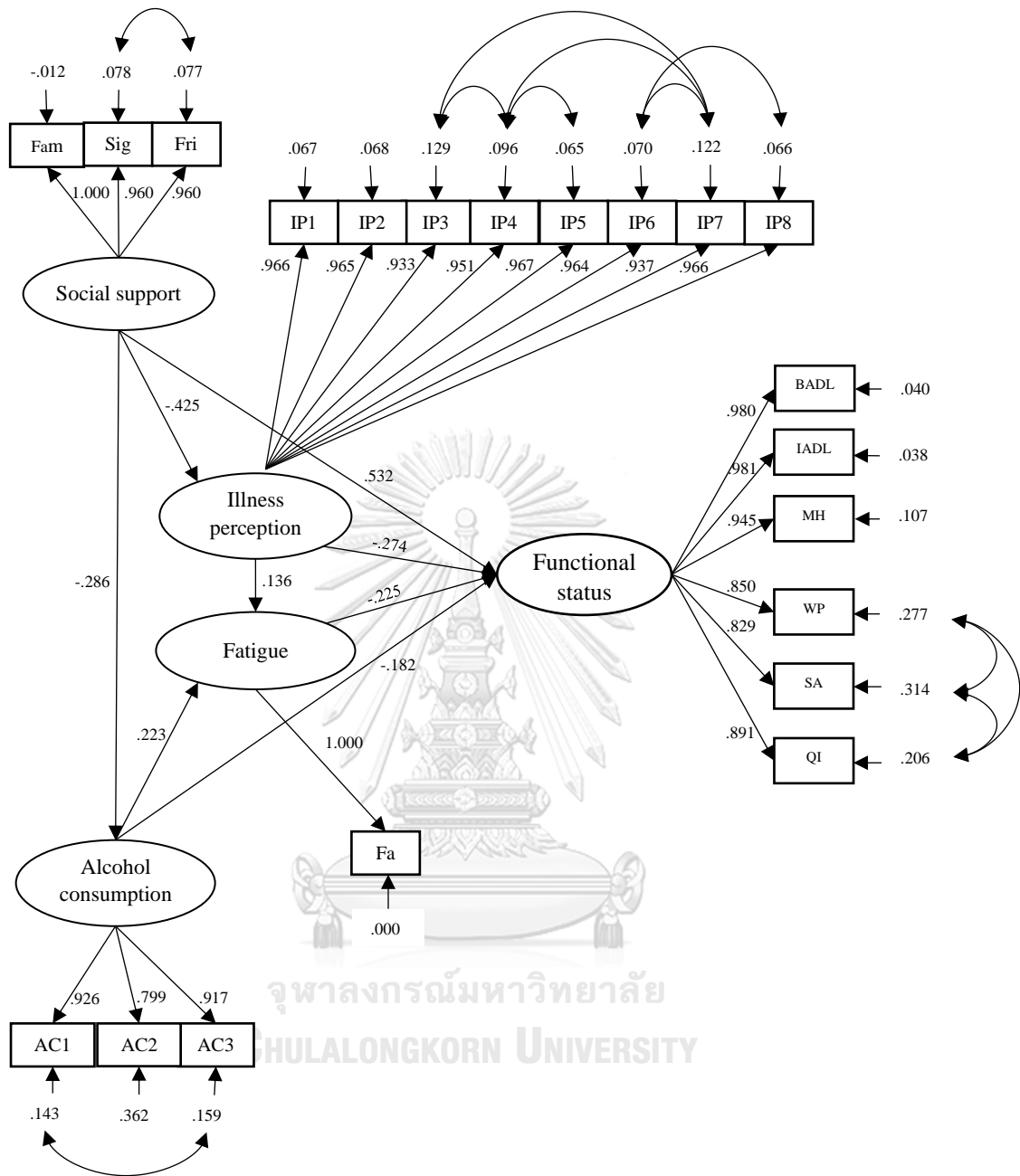
**Figure 4.1** The initially model of functional status among persons with liver cirrhosis

### **Model 2: The modification of hypothesized model**

At this step, the construct of fatigue was fixed by considering residual variance as 1.000 and error value as 0.000. In the standardized model results, it was found that one residual variance of significant other in the construct of social support had negative value (-0.320). Therefore, a residual variance of significant other in the construct of social support was fixed as .05 for upgrading the model. As the result, the first round of model modification found that the model did not fit well to the empirical data ( $\chi^2 = 845.432$ ,  $df = 182$ , ( $p = .000$ ),  $\chi^2/df = 4.645$ ,  $RMSEA = .095$ ,  $CFI = .953$ ,  $TLI = .945$ ,  $SRMR = .054$ ). The model explained 70.9 % of the variance of functional status. Despite several fit indices were at the acceptable level, the chi-square test was non-significant and the results of equation  $\chi^2/df$  higher than 3. As can be seen, although several fit indices improved, the model still appeared not to fit well to the empirical data. Therefore, the further modification was needed.

After that, in the model modification indices (MIs), the model was modified by using a command of fix a parameter. The highest value of residual variance among observed variables in “with statements” were fixed (see Appendix I). Fixation of the residual variance was considered within the same construct only. An adequate assessment of statistical criteria based on information pooled from various indices of fit and a watchful eye on parsimony were considered until the model testing yielded satisfaction and fit with empirical data.

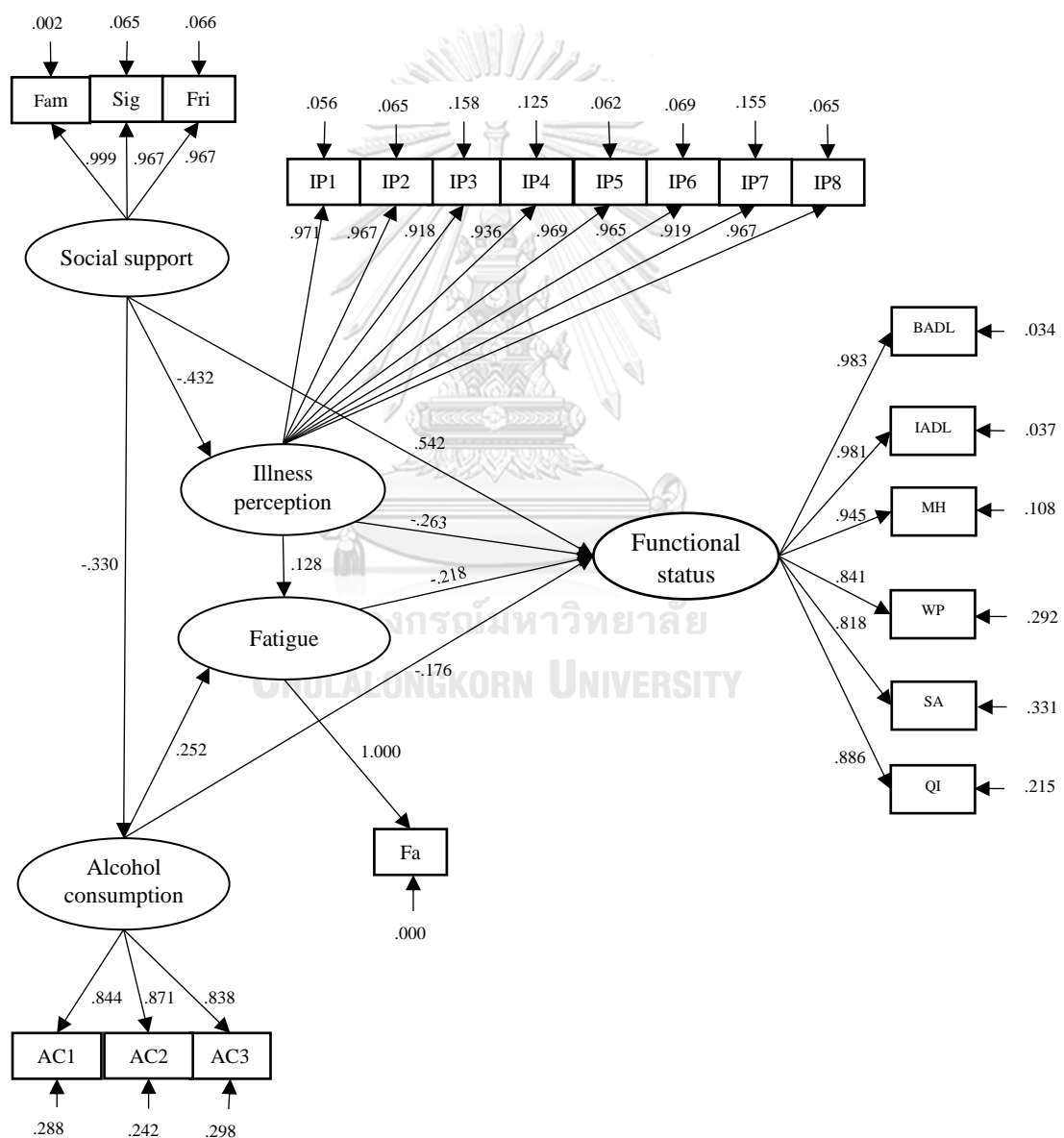




**Figure 4.2** The modified model of functional status among persons with liver cirrhosis

### Model 3: The final model

Finally, it was found that the fit index statistics were in the acceptable range more than the initially and modified hypothesized models. The final model explained 71.3% of the total variance in functional status. Model testing yielded the results as follow:  $\chi^2$  (df = 172) = 386.458;  $p = .061$ ;  $\chi^2/df = 2.397$ ; RMSEA = .056; CFI = .985; TLI = .981; SRMR = .048. At this step, the model fit well to the empirical data.



**Figure 4.3** The causal model of functional status among persons with liver cirrhosis

According to Byrne (2012), there is no standard rule for the researcher to know when to stop re-specification her model. Hence, the researcher's best yardsticks included (a) a thorough knowledge of the substantive theory, (b) an adequate assessment of statistical criteria based on information pooled from various indices of fit, and (c) a watchful eye on parsimony. In this regard, the researcher must walk a fine line between incorporating a sufficient number of parameters to yield a model that adequately represents the data, and falling prey to the temptation of incorporating too many parameters in a zealous attempt to attain the best-fitting model statistically. In the current model, the fit statistics were all at the acceptable threshold. Importantly, the proposed modification helped improve model fit but the model, at this step, appeared to be parsimonious with initial hypothesized model. Therefore, the model was accepted at this stage and no further modifications were proposed. The fit indices comparison between the initial model, modified model, and final model are presented in Table 4.14.

**Table 4.14** Comparison of the goodness of fit statistics among the initial hypothesized model, modified model, and final model of functional status among persons with liver cirrhosis.

Model-Fit criterion	Cut-off points	Initial model	Modified model	Final model
$\chi^2$	-	863.934	845.432	386.458
df	-	213.000	182.000	172.000
$\chi^2/df$	< 3.0	4.056	4.645	2.247
p-value	> .05	0.000	0.000	0.061
RMSEA	$\leq$ .08	0.059	0.095	0.056
CFI	$\geq$ .95	0.975	0.953	0.985
TLI	$\geq$ .95	0.972	0.945	0.981
SRMR	$\leq$ .08	0.083	0.054	0.048

### Hypothesis testing

The summary of hypothesis testing is shown in accordance with hypothesized model as showed in Table 4.15.

**Hypothesis 1:** Alcohol consumption has a negative direct effect on functional status and an indirect effect on functional status through fatigue in persons with liver cirrhosis.

The result showed that the standardized total effect from alcohol consumption to functional status is  $-.231$ . The effect was statistically significant ( $p < .01$ ). The direct effect was  $-.176$  ( $p < .01$ ) and indirect effect was  $-.055$  ( $p < .01$ ) (Table 4.15). The above-zero standardized regression weights represented a negative impact. Alcohol consumption had a negative indirectly effected on functional status through fatigue ( $\beta = -.055$ ,  $p < .01$ ). This suggested that the indirect impact of alcohol consumption on functional status was found via fatigue.

Therefore, it is concluded that the hypothesis toward the negative both direct and indirect effects (via fatigue) from alcohol consumption to functional status. The hypothesis is supported by the empirical data.

**Hypothesis 2:** Social support has a positive direct effect on functional status and an indirect effect on functional status through alcohol consumption and illness perception in persons with liver cirrhosis.

The result revealed that the standardized total effect from social support to functional status was  $.744$ . The effect was statistically significant ( $p < 0.01$ ). The direct effect was  $.542$  ( $p < 0.01$ ) and indirect effect was  $.201$  ( $p < 0.01$ ) (table 4.15). The above-zero standardized regression weights represented a positive impact. Social support had a significant impact on alcohol consumption ( $\beta = -.330$ ,  $p < 0.01$ ) and

illness perception ( $\beta = -.432, p < 0.01$ ). This indicated that the indirect impact of social support in functional status was not only via alcohol consumption but also via illness perception.

Thus, it was summarized that the hypothesis toward the positive directly and negative indirectly effect (via alcohol consumption and illness perception) from social support to functional status. This hypothesis was supported by empirical data.

**Hypothesis 3:** Illness perception has a negative direct effect on functional status and an indirect effect on functional status through fatigue in persons with liver cirrhosis.

The result showed that the standardized total effect from illness perception to functional status was  $-.291$ . The effect is statistically significant ( $p < .01$ ). The direct effect was  $-.263$  ( $p < .01$ ) and indirect effect was  $-.028$  ( $p < .01$ ) (table 4.15). The above-zero standardized regression weights represented a negative impact. Illness perception had significant impact on fatigue ( $\beta = .128, p < .05$ ). However, the above-zero standardized regression weights represented a positive impact. This suggested that the illness perception was not only directly impacted on functional status but also indirectly impacted on functional status via fatigue.

Therefore, it was concluded that the hypothesis toward the negative directly and positive indirectly effect (via fatigue) from illness perception to functional status. This hypothesis in the current study was supported by empirical data.

**Hypothesis 4:** Fatigue has a negative direct effect on functional status in persons with liver cirrhosis.

The result shows that the standardized total effect from fatigue to functional status is -.218 (Table 4.15). The effect is statistically significant ( $p < .01$ ). The effect is directed. The above-zero standardized regression weight represented a negative impact. Therefore, it is concluded that the hypothesis toward the negative and direct effect from fatigue to functional status is supported by empirical data in the current study.

In summary, all hypothesized paths in the current study were statistically significant which indicating that the proposed hypotheses were fully supported by the empirical data.

**Table 4.15** Summary of total, direct, and indirect effects of casual variables of functional status (N = 400)

IV \ DV	Functional status			Alcohol consumption			Illness perception			Fatigue		
	TE	IE	DE	TE	IE	DE	TE	IE	DE	TE	IE	DE
Social support	.744** (.023)	.202** (.023)	.542** (.032)	-.330** (.049)	-	-.330** (.049)	-.432** (.041)	-	-.432** (.041)			
Alcohol consumption	-.231** (.034)	-.055** (.013)	-.176** (.033)	-	-	-	-	-	-	.252** (.051)	-	.252** (.051)
Illness perception	-.291** (.033)	-.028* (.011)	-.263** (.031)	-	-	-	-	-	-	.128* (.049)	-	.128* (.049)
Fatigue	-.218** (.032)	-	-.218** (.032)	-	-	-	-	-	-	-	-	-

Model fit index:  
chi-square (n=400, df = 172) = 386.458,  $p = .061$ ,  $\chi^2/df = 2.397$ , RMSEA = .056, CFI = .985, TLI = .981, SRMR = .048

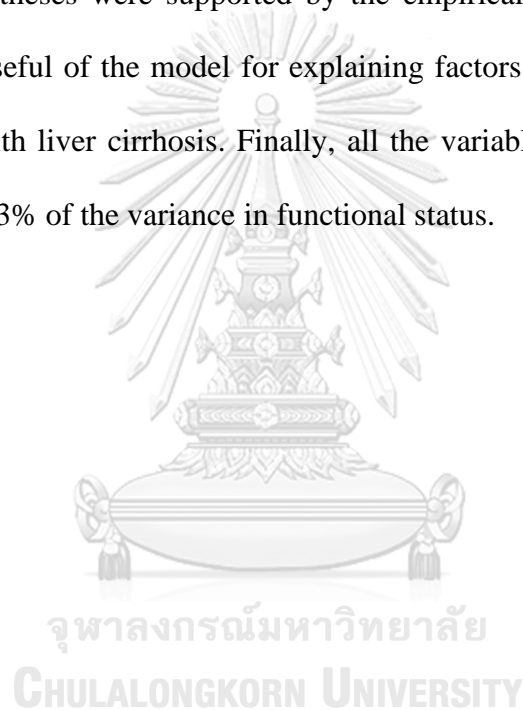
R - SQUARE	.713**	.109**	.186**	.089**
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**Noted:** \* $p < .05$ , \*\* $p < .001$ , Value in parentheses (...) = Standard error

**Abbreviations:** ID = Independent variable, DV = Dependent variable, TE = Total effect, IE = Indirect effect, DE = Direct effect

## Summary

The descriptive statistic characteristics of the variables investigated in the current study have been explained. The preliminary analysis reported did not violate the assumption for the path analysis. The hypothesized path model of functional status among persons with liver cirrhosis was tested. It is noteworthy that the hypothesized model fit the empirical data of functional status among persons with liver cirrhosis. All research hypotheses were supported by the empirical data which expanded the meaningful and useful of the model for explaining factors affecting functional status among persons with liver cirrhosis. Finally, all the variables in the model explained approximately 71.3% of the variance in functional status.



## **CHAPTER V**

### **DISCUSSION**

The objective of this study was to develop and test the causal model of functional status among persons with liver cirrhosis. The dependent variable was functional status. The independent variables were alcohol consumption, illness perception, social support, and fatigue. This chapter emphasizes on the discussion of the study findings. The topics of discussion includes characteristics of the study sample and variables, the causal model, the hypothesis testing, and limitations of the study. Furthermore, the obtained results were interpreted and evaluated in terms of nursing implication. The latter section in this chapter also provides the recommendations for further study as well as a conclusion of the study.

#### **Characteristics of the study participants**

The statistical analyses presented in the previous chapter showed that age range of the participants was in the range of 40 to 83 years old. The mean value of the age is 60.39 (SD = 7.57) years old. The majority of the sample was male (77.80%). Similarly, Ney et al. (2017) conducted a study in 127 patients with liver cirrhosis in Canada found that the mean age of the participants was 60 years old (SD = 9). Most of the participants was male (57.50%) and married (57.50%). In Thailand, Amornchevanun et al. (2015) conducted a correlational study in 100 patients with liver cirrhosis and found that the more than half of the sample were males (56%) with mean aged of 59.44 (SD = 10.29) years old, ranged from 33 to 80. In worldwide studies also support that most of the persons with liver cirrhosis was male (Kotarska



et al., 2014; Loria et al., 2014). These findings indicate that most of persons with liver cirrhosis in worldwide were male and diagnosed at late adult age. This appears to reflect the nature of chronic liver disease that does not commonly happen at young age group.

The findings revealed that duration of being diagnosed with liver cirrhosis ranged from 1 to 50 months, with the mean of 9.20 months (SD = 8.02). This length of time appeared to be shorter in comparison to the other findings by previous studies. For example, Ko, Yang, Tsai, Zhou, and Xu (2013) conducted a descriptive study in 125 patients with liver cirrhosis recruited from out-patient department in China. It was found that the average mean duration of illness was 38 months. It is possible that the period since the individual perceived they had something wrong with their health until receiving the investigation from physician is time consuming. In the current study, most of the participants were diagnosed in stage 2 and stage 3. These stages of disease are risked for having several complications such as esophageal bleeding, ascites, pain, and fatigue. Therefore, the mortality rate for this groups is about 20% to 57% per year. Unfortunately, almost half of them may pass away within 6 weeks after having esophageal bleeding (Chirapongsathorn, 2018).

While the current study assessed stage of disease based on the guideline this have been used in Thailand which classified stage of liver cirrhosis into 5 stages. Therefore, the current study found that the majority groups of the sample in this study were in stage 2 (35.50%) and stage 3 (stage 30.20%). The wide range difference in the duration of illness may be explained by the differences in screening process, treatment options, characteristics of the sample, and other factors. In addition, it is possible that

using different indicators to assess the stage of disease may influence the way to assess duration of disease.

It is important to note that, more than half of participants (61.70%) was diagnosed with liver cirrhosis due to heavy alcohol consumption. One prior study based on liver cirrhosis in Thailand found that the high prevalence of liver cirrhosis associated to their alcohol drinking behavior (Wakabayashi et al., 2015). A possible reason used as an explanation to understand this phenomenon is that Thai alcohol consumption differs from most western countries. Overall, consumption is lower, but spirits are the most popular type of alcohol drinking among Thai community. Razvodovsky (2015) conducted a nationwide study in Russia to examine the relation between the consumption of different beverage types and liver cirrhosis mortality rates in Russia. The investigator found that spirits was the key beverage driving the association between being diagnosed with liver cirrhosis. In contrast, Wu et al. (2011) conducted a correlational study in 40 participant who visited outpatient department in Taiwan. They found that most of common cause of being diagnosed with liver cirrhosis was viral infection (52.50%) followed by excessive alcohol consumption (27.50%). The differences in factor causing liver cirrhosis seems to be explained by the differences in risky drinking behavior, health conditions, and alcohol consumption pattern in each culture (León-Muñoz, Guallar-Castillón, García-Esquinas, Galán, & Rodríguez-Artalejo, 2017; Rattawitton & Perngarn, 2017).

### **Characteristics of the study variables**

In the current study, the five major variables in the current study included functional status, alcohol consumption, illness perception, social support, and fatigue. The discussions of these variables are presented as follows:

#### **Functional status**

The findings in this study revealed that the mean score of four dimensions were categorized into the warning zone of functional status including the basic activities of daily living ( $\bar{X} = 80.43$ ,  $SD = 16.47$ ), intermediate activities of daily living ( $\bar{X} = 74.10$ ,  $SD = 16.58$ ), social activity ( $\bar{X} = 66.51$ ,  $SD = 14.34$ ), and work performance ( $\bar{X} = 59.73$ ,  $SD = 15.77$ ), respectively. Meanwhile the participants had a good functioning in the dimension of mental health ( $\bar{X} = 72.69$ ,  $SD = 15.90$ ) and quality of interaction ( $\bar{X} = 69.79$ ,  $SD = 14.39$ ). These results indicated that, sometime, most of the sample had difficulty to perform usual activity of daily living such as dressing up, walking around the house, or stepping up the stairs. The reason may possibly be due to almost half of the sample (46%) being older persons who had limited ability to perform activities of daily living independently. The obtained mean score of basic activity of daily living score of the study samples was therefore low as in warning zone. In addition, this finding is consistent with previous studies which found that persons with liver cirrhosis had difficulty to perform physical functioning including activities of daily living (Kotarska et al., 2014; Wu et al., 2011). In addition, the findings in this study add the new knowledge that persons with liver cirrhosis also had problem of unable to perform regular work and participate with social around

them properly. Nevertheless, it should be noted that the instruments used to assess functional status in previous studies differed from those used in the current study.

Persons with liver cirrhosis who had 60 years old and older reported decreased functional status when compared with the one whose younger. Especially in the work performance dimension, older cirrhotic persons had more declined of work performance level than the one with aged less than 60 years old. This may reflect normal function changes associated with aging. This finding is in consistent with a previous study which found association between age and functional status (Kotarska et al., 2014). Kotarska et al. (2014) reported an interaction between age and gender in cirrhotic patients over 70 years old. The women reported more limitations to physical functioning and role functioning compared with men and younger women. Persons with liver cirrhosis who had higher monthly income described poorer work performance and social activities, when compared with those who had low income. Almost half the participants are more likely to continue their working. They may have difficulty to perform regular work as usual and need more time to take a rest after working, which may explain these findings.

### **Alcohol consumption**

Regarding to the findings of this study, the total score of alcohol consumption (AUDIT-C) ranged from 0 to 12 points with a mean of 4.72 (SD = 3.17), indicating that the participants had moderate risk of being harm from consuming alcohol. Considering frequency of drinking, the mean score was 1.84 (SD = 1.23). The mean score of quantity consumed at typical occasion was 1.30 (SD = 1.30). The mean score of frequency of heavy episodic drinking was 1.60 (SD = 1.17). The findings in this study support a growing literature that shows drinking alcohol more

than recommended quantities and frequencies is linked to variety of poor health outcomes. For example, Jacobus and Tapert (2013) found that chronic heavy alcohol consumption alters brain structure and circuitry (Jacobus & Tapert, 2013), particularly in frontocerebellar circuits underlying working memory, visuospatial, and physical functioning (Brumback et al., 2017). Comparing with persons with underlying of gastrointestinal – related hospitalization who have excessive alcohol use, Lembke, Bradley, Henderson, Moos, and Harris (2011) conducted a national study among 225,092 among persons who have excessive alcohol use. Level of alcohol consumption was assessed using the AUDIT-C. They found that mean score of alcohol consumption in the period of onset liver disease was 5 – 8 scores, indicating the participants had positive for alcohol misuse. In Thailand, Rattawitton and Perngparn (2017) conducted a cross-sectional study to identify and characterize the situation of alcohol consumption among 3,586 people who were at risk for and being diagnosed with liver cirrhosis their health problems. The results revealed that frequency of drinking associated with functional limitation.

### **Illness perception**

The participants in this study showed a moderate level of illness perception, with the mean total score of 46.57 (SD = 16.34). In addition, the mean score of each dimension ranged from 4.87 to 6.27 and was classified in moderate level of illness perception. Most of participants perceived that being diagnosed with liver cirrhosis impacted on health condition (average score = 6.27), followed by emotional problem (average score = 6.21) and concerning about the disease (average score = 6.01), respectively. These findings indicate that persons with liver cirrhosis had moderate held beliefs about the chronicity of their condition, the negative consequences of liver

cirrhosis, threatening beliefs about the impact of disease on health outcomes and concerning about liver cirrhosis. This is consistent with theoretical derived dimensions of the TOUS (Lenz et al., 2014) that psychological factors such as illness perception emphasizes on individual perception regarding to disease. In the light of the common-sense model of illness perception, persons with liver cirrhosis respond to signs and symptoms of their illness by forming cognitive and emotional representation, guiding to coping responses (Lenz et al., 2014).

The findings in this study are consistent with growing literature, one study have examined the effect of illness perception on many aspects of live among 286 patients with hepatocellular carcinoma in Taiwan (Fan, Eiser, Ho, & Lin, 2013). They found that cognitive representations (consequence, timeline, personal control, treatment control, and identity) and emotional representations (concerns and emotions) were mediators and effect on physical functioning ( $\beta = - 16.15, p < .001$ ), leading to having difficulty to perform activity of daily life and work activities (Fan et al., 2013). Current evidence suggests that when compared to a variety of different chronic diseases, persons with liver cirrhosis report higher levels of believe about consequence of illness that impacts on functional status (Langston et al., 2018; Sun, 2010). Overall, the participants believed that consuming alcohol, stress, and genetics to be the top-ranking cause of their liver cirrhosis. It was not surprising to find that alcohol consumption was that number one of cause selected by persons with liver cirrhosis because most of them having experience of drinking alcohol for long time.

### **Social support**

The total sum score for the level of social support ranged from 31 to 84 with a mean of 58.40 (SD = 13.73). Regarding the average of the mean score in each

dimension of social support, the participants perceived that most support came from family members (average score = 21.62, SD = 4.50), followed by significant others (average score = 19.29, SD = 4.87), and friends (average score = 17.50, SD = 5.02), respectively. The results showed that the participants perceived social support as a moderate level. These findings may be related to the fact that most of the participants were married (64.5%) and lived with their spouses (65.3%) followed by their relatives (20.8%). These findings are consistent with the study of Poorkaveh et al. (2012) which found that persons with chronic liver disease had the highest support from family members. In contrast with other studies, These results are not similar to the study of Youssef (2013) who have found that more than half of the participants (52.6%) felt that their family members did not really try to support them in particular activities such as preparing food, giving mental support, or helping with horse work. The same researcher also found that friends were the last persons whose try to help the participants when things go wrong and more than half of them (56.4%) cannot talk about their health problems with friends. In addition, one study in also found that most of persons with chronic liver disease (98.26%) perceived having moderate to high level of social support from people around (Ben, Puwarawuttipanit, & Thosingha, 2017).

One plausible explanation is that more than half of the participants (50.6%) were newly diagnosed with liver cirrhosis and some participants had met healthcare providers for only one to two times. Generally, healthcare providers are a good source of information support. Therefore, it may explain why the participants in the present study had a moderate level of social support.

## Fatigue

In the current study, the participants experienced fatigue with a wide range (9 – 63). They had a moderate level of fatigue ( $\bar{X} = 41.34$ ,  $SD = 15.24$ ). It should be noted that the possible range of score could be 9 – 63 when this study sample reported a score as the same range with a mean score as moderate level, suggesting that participants were suffered from remarkable severity of fatigue. Furthermore, the total mean score of overall severity of fatigue was 4.1 ( $SD = 1.86$ ). Most of the participants perceived that severity of fatigue impacted their motivation (average mean score = 4.35) as well as work, family, and social life (average score = 4.35). In previous study, which used the Fatigue Severity Scale (FSS) also found moderate severity of fatigue in patients with chronic liver disease. One study conducted by Rosa et al. (2014) found that mean score of fatigue (FSS) in 848 persons with hepatitis C virus in United Kingdom was also in moderate level (average score = 4.30). Similarly, Kleinman et al. (2000) studied 1,225 patients with hepatitis C virus in USA and found the mean score of fatigue was in moderate level (average score = 4.10). These above findings strongly highlight the need to manage fatigue in persons with chronic liver disease such liver cirrhosis effectively worldwide.

Another reason to explain why persons with liver cirrhosis suffered with fatigue is the pathophysiology of liver cirrhosis. It is possible that their feeling of fatigue was the results of both pathology and the side effects of the treatments since most of the participants had been recently diagnosed (ranging from 1 to 6 months) and they were undergoing long terms of medical treatment (79%). In addition, almost half of the participants were aged over 60 years old (49%): thus, they may easily feel fatigue than younger one. In the current study also found that almost half of the



participants (49.60%) had long duration of illness (range from 13 to 60 months). This may be related to the fact that long term of inflammation either causing or resulting from chronic liver disease such liver cirrhosis contributes to fatigue (Gerber, Weinstein, Mehta, & Younossi, 2019).

### **The casual model and hypotheses testing results**

#### **The casual model of functional status among persons with liver cirrhosis**

The final model in this study fit well to the empirical data ( $\chi^2$  (df = 172) = 386.458,  $p = .061$ ,  $\chi^2/df = 2.397$ , RMSEA = .056, CFI = .985, TLI = .981, SRMR = .048). The variance of functional status that the model of current study accounted for was high (71.30%). This suggests that there could be other factors may be included in the casual model of this phenomenon. The current study relied the construction of its model on the Theory of Unpleasant Symptoms and empirical evidence. Therefore, since the current state of science identified only several variables that could be included in the model explaining functional status among persons with liver cirrhosis, this study examined only those factors including alcohol consumption, illness perception, social support, and fatigue. Hence, the examination of other factors is recommended for future studies. As stated at the beginning, this study model accounted for 71.30% of the variance of functional status. Interestingly, since there is no studies have been explored a casual model of functional status among persons with liver cirrhosis, thus, the findings in this study contribute to confirm the consistency theory and empirical data which explain the variance of functional status and verify several variables in the same model.

Particularly, this study found that social support was the most the influential factor affecting functional status by having both positive direct and indirect effects on

functional status through illness perception and alcohol consumption. illness perception had a negative both direct and indirect effects on functional status through fatigue. Furthermore, alcohol consumption had a negative direct and indirect effects on functional status through fatigue. These indicate that functional status among persons with liver cirrhosis was normally affected not only by many factors directly but also via indirectly as well. Since the phenomenon of functional status decline is complex, the findings from this study help to explain the causal relationships among these factors to represent the real world of factors that impact on functional status among persons with liver cirrhosis.

In summary, these findings have yielded support to the conclusion that functional status of persons with liver cirrhosis have affected by several factors including alcohol consumption, illness perception, social support, and fatigue. Therefore, the integrated nursing intervention to enhance functional status among this population should be developed. Implementing these factors in the component of the intervention is important and necessary.

### **Hypothesis testing**

**Hypothesis 1: Alcohol consumption has a negative direct effect on functional status and an indirect effect on functional status through fatigue in persons with liver cirrhosis.**

**1.1: Alcohol consumption has a negative direct effect on functional status.**

This study found that alcohol consumption had a negative direct effect on functional status ( $\beta = -.176, p < .01$ ). The finding supports the hypothesis of the study. The result of the study is consistent with the study of Gerber et al. (2019)

which found that alcohol consumption had negatively correlated with health problems in term of limitation of physical, mental, and social functioning. Longitudinal study by Hu et al. (2016) also found that physical functioning decline faster among persons who frequent and heavier drinker than in light-to-moderate drinkers. In addition, Wilson, Castillo, Batey, Sapyta, and Aronson (2010) conducted a cross-sectional study in persons with hepatitis C virus and found that current use of alcohol was associated with worsening functional status.

Declining of functional status from alcohol consumption can be explained by the pathogenesis of specific forms of alcohol liver disease. Alcohol consumption induces changes in lipid metabolism which also increased lipogenesis and mobilization of lipids and simultaneously decreases hepatic lipid catabolism. It results in the accumulation of lipids in fatty liver (Rehm et al., 2017). Furthermore, blood alcohol concentration is the most important dimension to impair vision, psychomotor skills/ abilities, and reaction-time. All of these process and other in the central nervous system can be affected negatively (Rehm et al., 2017). In other words, persons with liver cirrhosis who continue drinking alcohol would affect from all kind of injuries in the body organs, together destroy the capability of individual to maintain daily activities.

The findings about level of functional status among persons with liver cirrhosis in this study consistent with some previous studies. The impact of alcohol consumption on functional status have been explored in various with liver cirrhosis. For example, some studies have reported a predominant type 2 fiber atrophy, indicating the existence of a chronic alcoholic myopathy (Hanai et al., 2016; Sharma, Ray, Banerjee, & Lakshmanan, 1990). In other studies, mitochondrial alterations were

observed, whereas fiber-type proportions and dimensions remained normal (Negro, Angulo, & Rivera-Pomar, 1984; Ohara et al., 2018). Considering the few and unspecific histological abnormalities, the existence of the entity alcoholic myopathy is not generally accepted. Furthermore, some investigators suggest that chronic impairment of muscles in alcoholic patients is caused exclusively by neurogenic atrophy (Vidot et al., 2019). It can be concluded that the results in this study replicate previous findings with functional status.

**1.2: Alcohol consumption has a negative indirect effect on functional status through fatigue.**

Alcohol consumption had a negative indirectly effected on functional status through fatigue ( $\beta = -.055$ ,  $p < .01$ ). Thus, this result supported the hypothesis model. Although the coefficient between alcohol consumption, fatigue, and functional status was a bit small, but it explains the phenomenon of functional status among persons with liver cirrhosis in terms of pathophysiological issues. Prior work has shown that chronic heavy alcohol consumption alters brain structure and circuitry (Jacobus & Tapert, 2013), particularly in frontocerebellar circuits underlying working memory, visuospatial, and physical functioning (Brumback et al., 2017).

Prior studies reported a gene-environment interaction between alcohol consumption and the risk of liver cirrhosis (Meroni, Longo, Rametta, & Dongiovanni, 2018), To date there is no study reporting such interactions predicting disease activity or functional status in liver cirrhosis. This study found that moderate alcohol consumption effect both direct and indirect effect on functional status. These results would be explained by the fact that the correlation between alcohol consumption and liver disease is now widely recognized and the majority of

individuals (90%) who regularly consume more than 40–60 g/day of alcohol develop steatosis. However, steatosis also develops after binge drinking, defined as the consumption of four or five drinks in two hours or less. If the affected individual ceases drinking, steatosis is a reversible condition. In 20–40% of dependent drinkers, the presence of steatosis may be complicated by the development of inflammation and fibrosis while cirrhosis develops in about 10–20% (Meier & Seitz, 2008). Older people consume alcohol more frequently than other age groups, but they are less able to metabolize it and more susceptible to be affected by alcohol-related problems such as functional status decline, fatigue, lack of appetite, and so on (Meier & Seitz, 2008).

**Hypothesis 2: Social support has a positive direct effect on functional status and an indirect effect on functional status through alcohol consumption and illness perception in persons with liver cirrhosis.**

### **2.1 Social support has a positive direct effect on functional status.**

The results of this study showed that social support had a significant positive direct effect on functional status ( $\beta = .542, p < .01$ ). Perceived social support score was relatively moderate, with the support from family members rating the highest. This suggests that patients perceive the family as the master source of social support followed by significant other and friends, respectively. This is consistent with the finding of previous study which conducted by Youssef (2013) who explored how 401 cirrhotic patients in perceive social support from spouse, family and friends and identified the factors associated with perceived social support. The results revealed that there was a significantly positive association between the perception of social support and general health perception in terms of physical psychological, and social functioning ( $r = 0.21, p = 0.0005$ ). Stepwise regression analysis showed that the

regression model could significantly explain 11 % of the variation in social support ( $R^2 = 0.11$ ,  $R^{2adj} = 0.100$ ,  $p = 0.0005$ ). Theoretically, it has been hypothesized that a better supportive from family, friends, and significant other can improve the patient's physical, psychological, social, and role functioning (Lenz et al., 2014). Fortunately, in this study perceived social support was significantly associated with all dimensions of functional status.

Furthermore, the findings in this study are consistent with research conducted among patients with other chronic disease. For example, using another social support questionnaire (Interview Schedule for Social Interaction, 50 items assess perceived availability and adequacy of social support), for people with cardiac disease, Arestedt et al. (2012) found that social support was associated specifically with mental but not with physical health domains (SF-12). In a study with a 12-months follow up investigating the impact of perceived social support on health-related quality of life in people with chronic heart failure, Bennett et al. (2001) found that an increase in social support significantly predicted improvement in functional status. Low social support may increase mortality or morbidity in different groups (Heikkinen 2006), suggesting that increased social support has a positive influence on health outcomes such functional status. This suggests that when social support decreases, functional status also decreases or and vice versa.

As expected, persons with liver cirrhosis who had better social support also had higher level of functional status. It could be explained that social support is a resource which assistance and encourage persons with liver cirrhosis to deal with the traumatic life events from the disease and its aggressive treatments.

## **2.2 Social support has a positive indirect effect on functional status through alcohol consumption and illness perception.**

Social support had a positive indirect effect on functional status through alcohol consumption and illness perception ( $\beta = .202, p < .05$ ). The results in this study supported the hypothesis model. Nevertheless, it could be seen that the coefficient between social support and functional status through alcohol consumption and fatigue was quite small. This suggests that although the raising of social support through alcohol consumption and fatigue may increase functional status, the effectiveness of such intervention might not be high. However, it is strongly believed that this factor should not be neglected in the management of functional status because this situational factor and unpleasant symptom are a very common and basic relationships of human being in social life, which significantly influence person's well-being. S. Cohen and Wills (1985) proposed that social support can prevent the occurrence of stressors by modify the patient's perceptions of their illness and enhance coping skills that can reflect on the patient's health. It is clear from the present study that well perceived social support is responsive to risky behavior and cognitive factor that have beneficial effects on well-being. Therefore, the combination of social support, alcohol consumption, and illness perception in an integrated functional status promoting program is recommended.

**Hypothesis 3: Illness perception has a negative direct effect on functional status and an indirect effect on functional status through fatigue in persons with liver cirrhosis.**

### **3.1 Illness perception has a negative direct effect on functional status.**

Illness perception had a negative direct effect on functional status ( $\beta = -.263, p < .01$ ). The result of this study can be explained by the fact that a person's experience of illness has central importance, and the greatest importance is given to the model which patients form themselves of their condition. Patients evaluate information on illness in five categories: identity, duration, reason, serious consequences, and the possibility of treatment or control (Nehir, Tavşanlı, Özdemir, & Akyol, 2017). One study have examined the effect of illness perception on many aspects of live among 286 patients with hepatocellular carcinoma in Taiwan (Fan et al., 2013). They found that perceived negative cognitive representation (consequence, timeline, personal control, treatment control, and identity) had a negative correlation with physical functioning ( $r = -.50, p < .01$ ) and emotional functioning (concerns and emotions) ( $r = -.52, p < .01$ ). Meanwhile emotional representation had a negative correlation with physical functioning ( $r = -.51, p < .01$ ) and emotional functioning ( $r = -.63, p < .01$ ). Furthermore, they found that cognitive representations and emotional representations were mediators and effect on physical functioning ( $\beta = -16.15, p < .001$ ), leading to having difficulty to perform activity of daily life and work activities (Fan et al., 2013).

According to Langston et al. (2017), they have investigated the relationship between illness perception and functional status among persons with chronic liver diseases including liver cirrhosis and found that increased negative



illness perception was associated with lower functional status scores ( $r = -.47$ ,  $p < .001$ ). Moreover, illness perception was positively associated with functional status. Furthermore, higher illness identification was significantly predicted functional status such that greater illness identification predicted poorer functional status ( $\beta = -.33$ ,  $t = -3.37$ ,  $p = .001$ ) (Langston et al., 2017). The explanation is given that illness perception may encourage the feeling of individual to perceive whether the illness would interfere their activities of daily living.

In sum, the results from this study provide a preliminary insight into the illness perception of persons with liver cirrhosis that perceive having more negative illness perception would have lower functional status.

### **3.2 Illness perception has a negative indirect effect on functional status through fatigue.**

Illness perception had a negative indirect effect on functional status through fatigue ( $\beta = -.028$ ,  $p < .05$ ). These findings supported the hypothesis model. Previous studies have reported that persons with alcohol-related liver disease who perceived more severity of fatigue also concern about their illness in negative way, which in turn reduce their capability to maintain daily activities (Lau-Walker et al., 2016). Consequently, they ignore to cope with symptoms and side effect of treatment, which cause poor daily functioning (Leventhal, Phillips, & Burns, 2016). Similarly, Blackburn, Freeston, Baker, Jones, and Newton (2007) examined relationships among psychological factors in fatigue of primary biliary cirrhosis and found that participants with fatigue were significantly more likely to worry about their illness ( $p < 0.05$ ). Fatigue participants had more frequent thoughts about the impact of fatigue ( $p < 0.005$ ). It means that participants with high levels of fatigue

seem to be more to perceive that their functional status has been negatively affected to engage in everyday activities, as called functional status in this study.

**Hypothesis 4: Fatigue has a negative direct effect on functional status in persons with liver cirrhosis.**

Fatigue had a negative direct effect on functional status ( $\beta = -.218, p < .01$ ). This finding supported the hypothesis. The findings in this study is congruent with previous literature. For example, Kim and Seo (2015) reported that symptom experience was negatively significant associated with functional status ( $r = -0.49, p < 0.001$ ). Zalai et al. (2015) indicated that fatigue perceptions were the main predictors of physical functioning ( $B = .114, 95\% \text{ CI: } .054 \text{ to } .154$ ). Wu et al. (2012) reported that a significant negative correlation was found between interfere of fatigue physical activity of moderate or higher intensity ( $r = -0.34, p = 0.03$ ). In other words, the greater the interference of fatigue with daily life, the less likely a patient was to engage in physical activity of moderate or higher intensity. Moreover, significant negative correlations were found between interference of fatigue and the average level of moderate - intensity ( $r = -0.31, p = 0.04$ ), moderate- to high-intensity ( $r = -0.40, p = 0.01$ ) and very high-intensity physical activities ( $r = -0.32, p = 0.04$ ). In addition, fatigue accounted for 11.4% of variance in negative effect on functional status (Zalai et al., 2015). The results of this study may imply that fatigue is associated with general daily life, as called functional status.

### **Implications for nursing**

The implications of this study focus on the implications for nursing science, nursing practice, nursing education, and nursing research as follows:

#### **Implications for nursing science**

One of the strengths of this study is the use of the theoretical model of TOUS by Lenz et al. (2014) for the first time for patients with liver cirrhosis. It helped to direct this study in terms of selecting the studied concepts, defining these concepts theoretically and operationally and directing data analysis. Furthermore, this theory was used as a theoretical framework to gather empirical data to conduct a casual model for testing the effects of alcohol consumption, illness perception, social support, and fatigue, on functional status among persons with liver cirrhosis. The TOUS is a middle range theory that provide the specificity needed for usefulness in research and practice. The current study can be considered as a TOUS testing among persons with liver cirrhosis that contributes to knowledge development for strengthening of nursing science. The findings support the TOUS and empirical literature that perceived social support enhance level of functional status. Alcohol consumption, illness perception, and fatigue are the main factors that impact on level of functional status among persons with liver cirrhosis.

The findings in this study help to confirm the practicality and feasibility of using this model to explore factors associated with functional status. This study has contributed the new knowledge that can explain the influence of each variable in the whole model on functional status in persons with liver cirrhosis. Furthermore, the findings provide knowledge that offers directions for development of interventions to maintain and promote functional status among persons with liver cirrhosis.

### **Implications for nursing practice**

The current study highlights on the knowledge regarding the influence of alcohol consumption, illness perception, social support, fatigue, and functional status among persons with liver cirrhosis. Regarding on the findings, several significant implications for nursing practice can be proposed. For example, understanding the predictors of functional status in persons with liver cirrhosis provides valuable information which enables nurses and associated healthcare professionals to plan for effective intervention to maintain or improve functional status among persons with liver cirrhosis.

In this study, social support was found to have strongest effect on functional status among persons with liver cirrhosis. The results indicated that a higher perceived social support could reduce volume of alcohol consumption, encourage positive illness perception, and decrease severity of fatigue, and increase functional status among persons with liver cirrhosis in the current study. In addition, perceived social support from family members was found to be most important to help persons with liver cirrhosis dealing with progress of disease, their symptoms, plan for treatment, and being persons who can talk discuss with. Other significant persons such as nurses, doctors, and healthcare providers seemed to be established more support for persons with liver cirrhosis when they needed. In addition, friends were the last group of persons that can share the joys and sorrows with cirrhotic persons. Consequently, family members are key persons who should provide support to persons with liver cirrhosis.

Nurses and healthcare providers are then another group of persons who should be around when persons with liver cirrhosis need help. Especially, nurses should

emphasize effective counselling programs to newly diagnosed cirrhotic persons and their family. The intervention should include using effective communication when educating persons with liver cirrhosis and their family by providing opportunity for them to express their feelings about the diagnosis, its prognosis, and treatments, suggesting the risk of consuming alcohol, and assessing fatigue. Furthermore, nurses should promote a social support system including enhancing existing support of the patients' family, healthcare providers, friends, community, and organizing a self-help group and establishing a social network. Telephone counseling from nurses or healthcare providers is also considered a resource of information support and true willing to support this population who have health problems at home.

#### **Implications for nursing education**

Currently, healthcare providers are certain that functional status is an important outcome to guarantee quality of care among persons with liver cirrhosis. Maintaining and promoting functional status among persons with liver cirrhosis can be seen as a challenge for nurses. This study has provided a comprehensive understanding of the predictors of functional status among persons with liver cirrhosis that can help nurse improve ways to maintain or promote functional status in these persons. Nurse educators can use these findings to generate new perspectives and new options in teaching and learning about promoting functional status among persons with liver cirrhosis. Nursing students should have opportunities to investigate and critique all the issues that are relevant to functional status among persons with liver cirrhosis.

### **Implications for nursing research**

The current study is the first study of its kind to explore the influence of alcohol consumption, illness perception, social support, and fatigue on functional status among persons with liver cirrhosis. The findings of this study will serve as a reference point for interventions to further explore and promote functional status in this specific group of population. Since this study was conducted in the three regions of Thailand, significant associations among the major concepts proposed in the model indicate that further investigations carried out in all six regions are warranted.

### **Implications for healthcare policy**

Evidently, policy makers have the power to introduce change and have experience of what is feasible and justifiable to implement. However, they may not always be experts in the field. Researchers on the other hand have expert knowledge, but they cannot make decisions (Tricco et al., 2018). Therefore, close collaboration between the two groups is essential. To achieve the ultimate goal of good quality care as well as better health outcomes among persons with liver cirrhosis, researchers and policy makers should involve as a partnership and exchange the knowledge in shaping and implementing the study and disseminating the findings. The results of this study could be a knowledge-driven in the sense that it sought to provide relevant information to policy makers in the following policy implications.

1. Policy makers in the field of public health and nursing council need to be informed about the causal relationships of functional status among persons with liver cirrhosis. Particularly, this study found that social support is the most the influential factor affecting functional status by having both positive direct and indirect effects on functional status through illness perception and alcohol consumption. These

data are important because policy makers should consider articulating social support programs to relieve alcohol consumption behaviors and psychological burden such as threatening of illness perception of persons with liver cirrhosis. Important to note is the fact that social support is a dynamic aspect of individuals' lives and should be considered when evaluating the burden of liver cirrhosis. Considerable evidence links social support with increased health-promoting behaviors and decreased health-compromising behaviors such as alcohol intake, perceived threat of illness, and severity of symptom. Therefore, policy makers could add the findings of this study as the empirical evidence into some components of health promotion framework for enhancing functional status among persons with liver cirrhosis.

2. Mass media campaigns can play an important role in promoting health outcomes and health-related behaviors. There is evidence that well devised and adequately resourced program incorporating mass media can improve health outcome and health related behaviors (Porthé et al., 2020). Based the findings of current study, mass media campaigns should be carefully planned to raising awareness about functional status decline and its related factors including alcohol consumption issues, perceived threatening of illness, perceived social support, and severity of fatigue. Among those factors, social support can act as a pathway to frame and help individuals regulate their own behavioral changes and lead to positive outcomes. Thus, the involvement of family members in treatment and nursing care for enhancing functional status among persons with liver cirrhosis is necessary. Encouraging more interpersonal relationship among healthcare providers and persons with liver cirrhosis would help in increasing quality and satisfaction of care.

3. Actions to enable persons with liver cirrhosis to maintain or enhance functional status at home should prioritize ways of empowering families and public education, balanced with a continuing effort to improve hospital and home-based models of care (assuring intensive, sustained, and coordinated hospital and home care), early and continuous risk assessment, and training on functional status enhancement not just for specialists but also for primary care professionals.

4. This study provides policymakers entities with insights into how they might adjust their approach to use research results for policy decision-making. In particular, the interventions to enhance functional status among persons with liver cirrhosis may be based on using social support groups to facilitate individual behavioral changes, utilize peer-trained health educators, and create community sites that provide easier access to increase social support. By regarding lifestyle as the consequence of socially constructed choices, it is possible to identify interventions that will facilitate healthier lifestyle choices to increasing functional status among persons with liver cirrhosis. Importantly, the components of the interventions should be consisting of the strategies to reduce or stop alcohol consumption behavior, the ways to convey about beliefs about the threatening of illness, the methods that could relieve level of fatigue. As such, to enhance functional status among this population, it is necessary to first elaborate on how to select influential factors and determine the optimal effectiveness when implementing the interventions.

5. Beside the findings of this study, persons with liver cirrhosis need continuous care for all trajectory of the disease because they have to encounter moderate level of social support and negative illness perception that can affect their functional status. The effective referral system for persons with liver cirrhosis is



necessary to be established in the healthcare system and propose to health care policy. Healthcare providers should urge policy makers to devise an action plan to support the continuing care from the tertiary care system to homecare among persons with liver cirrhosis. Moreover, healthcare providers in the primary care system and tertiary care system should coordinate in caring for cirrhotic persons.

### **Limitations of the study**

On overall, the present study involved a rigorous methodology and had adequate power of sample to detect a significant difference of the findings. However, there were several issues that should be considered as caveats. This discussion of limitations issues related to these findings emphasized study design and generalization of the findings. The information on each issue is present as follows.

This study is a cross-sectional study. It cannot infer a causal relationship, nor can it rule out the possibility that reverse causation exists among the study variables. Since the study assessed constructs simultaneously, the causal path in the model is based on the hypothesized relationship that has been assessed in the Theory of Unpleasant Symptoms and has accumulated in literature review. It is possible that effects may occur in other directions. Finally, over half of the participants were the older and each questionnaire need to recall answers. Thus, this may interfere to the correct answer.

### **Recommendations for future research**

1. This study is an exploratory study conducted within Thai persons with liver cirrhosis who visited outpatient department for medical monitoring in public general hospitals across Thailand. Therefore, future studies should be conducted to validate the functional status in Thai persons with liver cirrhosis model in other settings such as in critical setting, age groups, and people in difference socioeconomic status.

2. Since this is a cross-sectional study, it needs the longitudinal study to assess the change of alcohol consumption, illness perception, social support, fatigue, and functional study among persons with liver cirrhosis overtime. Therefore, this implication may provide a more casual explanation regarding functional status among persons liver cirrhosis and its predictors.

3. Studies should be conducted to replicate the present study in diverse settings and with a large sample size recruited by means of random sampling to increase generalizability of the findings. Model testing in subgroup of cirrhotic persons should involve comparisons between men and women, outpatient and inpatients, stages of disease, and treatment options, for instance, to increase trustworthiness of the tested model.

4. Since the concept of functional status is a broad multidimensional concept, so it is difficult to capture the whole picture of what can be summarized as functional status. The selected instrument to assess concept of functional status in this study is limited by the nature of measuring and summing the overall score. Therefore, in the future, qualitative research should be carried out to explore concepts of functional status in Thai persons. The definition of functional status should be more clearly

defined. The instruments to assess functional status in Thai persons with liver cirrhosis should be developed.

5. A nursing intervention study to promote functional status among persons with liver cirrhosis should be developed and tested as well. It should incorporate enhancing social support and positive illness perception, and selection of appropriate strategies to reduce or stop alcohol consumption to decrease risk of harm from alcohol that might increase level of functional status among persons with liver cirrhosis. Furthermore, fatigue management should also be promoted in the program.



## REFERENCES

- Aamann, L., Dam, G., Rinnov, A. R., Vilstrup, H., & Gluud, L. L. (2018). Physical exercise for people with cirrhosis. *The Cochrane Database of Systematic Reviews*, 12, CD012678.
- Abdi, F., Daryani, N. E., Khorvash, F., & Yousefi, Z. (2015). Experiences of Individuals With Liver Cirrhosis. *Gastroenterology Nursing*, 38(4), 252-257.
- Alameri, H. F., Sanai, F. M., Al Dukhayil, M., Azzam, N. A., Al-Swat, K. A., Hersi, A. S., & Abdo, A. A. (2007). Six minute walk test to assess functional capacity in chronic liver disease patients. *World Journal of Gastroenterology*, 13(29), 3996.
- Alfarsi, H. M., Binobaid, A. O., Alghamdi, T. S., Albeladi, F. H., Alqudaihi, A., Talal, H., . . . Khalfan, U. I. (2018). Meta-analysis study on alcoholic liver cirrhosis. *Egyptian Journal of Hospital Medicine*, 70(5), 1083-1089.
- Almanasreh, E., Moles, R., & Chen, T. F. (2019). Evaluation of methods used for estimating content validity. *Research in Social and Administrative Pharmacy*, 15(2), 214-221.
- Amornchevanun, P., Pongthavornkamol, K., Charoenkitkarn, V., & Tanwandee, T. (2015). Unpleasant symptoms and their influences on quality of life in patients with liver cirrhosis. *Journal of Nursing Science*, 33(2), 19-28.
- Amtmann, D., Bamer, A. M., Noonan, V., Lang, N., Kim, J., & Cook, K. F. (2012). Comparison of the psychometric properties of two fatigue scales in multiple sclerosis. *Rehabilitation Psychology*, 57(2), 159.
- Andersen, H., Borre, M., Jakobsen, J., Andersen, P. H., & Vilstrup, H. (1998). Decreased muscle strength in patients with alcoholic liver cirrhosis in relation to

nutritional status, alcohol abstinence, liver function, and neuropathy.

*Hepatology*, 27(5), 1200-1206.

Anderson, J. C., & Gerbing, D. W. (1984). The effect of sampling error on convergence, improper solutions, and goodness-of-fit indices for maximum likelihood confirmatory factor analysis. *Psychometrika*, 49(2), 155-173.

Annunziata, M. A., Muzzatti, B., Mella, S., Narciso, D., Giacalone, A., Fratino, L., & Tirelli, U. (2010). The revised piper fatigue scale (PFS-R) for Italian cancer patients: A validation study. *Tumori Journal*, 96(2), 276-281.

Applebaum, A. J., Stein, E. M., Lord-Bessen, J., Pessin, H., Rosenfeld, B., & Breitbart, W. (2014). Optimism, social support, and mental health outcomes in patients with advanced cancer. *Psycho-Oncology*, 23(3), 299-306.

Asrani, S., Devarbhavi, H., Eaton, J., & Kamath, P. (2019). Burden of liver diseases in the world. *Journal of Hepatology*, 70, 151-171.

Asrani, S., & Kamath, P. (2013). Natural history of cirrhosis. *Current Gastroenterology Reports*, 15(2), 308.

Bajaj, J., Wade, J., Gibson, D., Heuman, D., Thacker, L., Sterling, R., . . . White, M. (2011). The multi-dimensional burden of cirrhosis and hepatic encephalopathy on patients and caregivers. *The American Journal Of Gastroenterology*, 106(9), 1646.

Barry, A. E., Chaney, B. H., Stollefson, M. L., & Dodd, V. (2015). Evaluating the psychometric properties of the AUDIT-C among college students. *Journal of Substance Use*, 20(1), 1-5.

Bazzazian, S., & Besharat, M. A. (2010). Reliability and validity of a Farsi version of

- the brief illness perception questionnaire. *Procedia-Social and Behavioral Sciences*, 5, 962-965.
- Ben, D. T., Puwarawuttipanit, W., & Thosingha, O. (2017). Factors related to quality of life among patients with chronic hepatitis B infection in Vietnam. *Journal of Nursing Science*, 35(1), 39-46.
- Bentler, P. M., & Chou, C.-P. (1987). Practical issues in structural modeling. *Sociological Methods & Research*, 16(1), 78-117.
- Bianco, T., Cillo, U., Amodio, P., Zanus, G., Salari, A., Neri, D., . . . Ronco, C. (2013). A numbers of studies have indicated that a variety of factors affect HRQOL in cancer patients. These factors can be divided into four groups including demographic factors, physical factors, psychosocial and cognitive factors, and clinical factors. *Blood Purification*, 36(3-4), 231-236.
- Blachier, M., Leleu, H., Peck-Radosavljevic, M., Valla, D.-C., & Roudot-Thoraval, F. (2013). The burden of liver disease in Europe: a review of available epidemiological data. *Journal of Hepatology*, 58(3), 593-608.
- Blackburn, P., Freeston, M., Baker, C. R., Jones, D. E., & Newton, J. L. (2007). The role of psychological factors in the fatigue of primary biliary cirrhosis. *Liver International*, 27(5), 654-661.
- Blake, R. L., & Vandiver, T. A. (1986). The reliability and validity of a ten-item measure of functional status. *The Journal of Family Practice*, 23(5), 455-459.
- Bradley, K. A., DeBenedetti, A. F., Volk, R. J., Williams, E. C., Frank, D., & Kivlahan, D. R. (2007). AUDIT-C as a brief screen for alcohol misuse in primary care. *Alcoholism: Clinical and Experimental Research*, 31(7), 1208-1217.

- Brink, H. L. L. (1988). The impact of advanced cancer on the functional status of patients attending oncology clinics in selected urban areas. *Curationis*, 11(3), 11-16.
- Broadbent, E., Petrie, K. J., Main, J., & Weinman, J. (2006). The brief illness perception questionnaire. *Journal of Psychosomatic Research*, 60(6), 631-637.
- Brumback, T., Cao, D., McNamara, P., & King, A. (2017). Alcohol-induced performance impairment: A 5-year re-examination study in heavy and light drinkers. *Psychopharmacology*, 234(11), 1749-1759.
- Burns, N., & Grove, S. K. (2012). *The practice of nursing research: Appraisal, synthesis, and generation of evidence* USA: Elsevier Health Sciences.
- Bush, K., Kivlahan, D. R., McDonell, M. B., Fihn, S. D., & Bradley, K. A. (1998). The AUDIT alcohol consumption questions (AUDIT-C): An effective brief screening test for problem drinking. *Archives of Internal Medicine*, 158(16), 1789-1795.
- Byass, P. (2014). The global burden of liver disease: a challenge for methods and for public health. *Medicine*, 12(1), 159.
- Byrne, B. M. (2012). *Structural equation modeling with Mplus : Basic concepts, applications, and programming*: Routledge Academic.
- Cella, D. F., Tulsky, D. S., Gray, G., Sarafian, B., Linn, E., Bonomi, A., ... & Eckberg, K. (1993). The Functional Assessment of Cancer Therapy scale: development and validation of the general measure. *Journal of Clinical Oncology*, 11(3), 570-579.
- Chaniang, S., Meuangkhwa, P., & Klongdee, K. (2019). Factors related to suicide risk behaviors among secondary school students in nakhon phanom province.

*Journal of The Police Nurse*, 12(1), 28-35.

- Cheung, A. K. L. (2014). Probability Proportional Sampling. In M. A.C. (Ed.), *Encyclopedia of Quality of Life and Well-Being Research*. Dordrecht: Springer Netherlands Dordrecht.
- Chirapongsathorn, S. (2018). Stage and natural history of cirrhosis. *Thai Association for the Study of the Liver*, 1(2), 14-18.
- Chirapongsathorn, S., Krittanawong, C., Enders, F. T., Pendegraft, R., Mara, K. C., Borah, B. J., . . . Talwalkar, J. A. (2018). Incidence and cost analysis of hospital admission and 30-day readmission among patients with cirrhosis. *Hepatology Communications*, 2(2), 188-198.
- Chirapongsathorn, S., Talwalkar, J. A., & Kamath, P. S. (2016). Readmission in cirrhosis: A growing problem. *Current Treatment Options in Gastroenterology*, 14(2), 236-246.
- Chung, M. L., Moser, D. K., Lennie, T. A., & Frazier, S. K. (2013). Perceived social support predicted quality of life in patients with heart failure, but the effect is mediated by depressive symptoms. *Quality of Life Research*, 22(7), 1555-1563.
- Cleary, P. D., & Jette, A. M. (2000). Reliability and validity of the Functional Status Questionnaire. *Quality of Life Research*, 9(1), 747-753.
- Cohen, Cohen, J., Teresi, J., Marchi, M., & Velez, C. N. (1990). Problems in the measurement of latent variables in structural equations causal models. *Applied Psychological Measurement*, 14(2), 183-196.
- Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin*, 98(2), 310.



- Commission, I. T. (2017). The ITC Guidelines for Translating and Adapting Tests  
Available at: [www. InTestCom. org](http://www.InTestCom.org).
- Christensen, U., Støvring, N., Schultz-Larsen, K., Schroll, M., & Avlund, K. (2006).  
Functional ability at age 75: is there an impact of physical inactivity from middle  
age to early old age?. *Scandinavian Journal of Medicine & Science in Sports*,  
16(4), 245-251.
- Crockett, S. A. (2012). A five-step guide to conducting SEM analysis in counseling  
research. *Counseling Outcome Research and Evaluation*, 3(1), 30-47.
- D'Amico, G., Garcia-Tsao, G., & Pagliaro, L. (2006). Natural history and prognostic  
indicators of survival in cirrhosis: A systematic review of 118 studies. *Journal of  
Hepatology*, 44(1), 217-231.
- de Lima, D. C., Ribeiro, H. S., Cristina, R., Oliveira, M., de Vasconcelos Generoso, S.,  
Lima, A. S., & Correia, M. I. T. D. (2015). Functional status and heart rate  
variability in end-stage liver disease patients: Association with nutritional status.  
*Nutrition*, 31(7-8), 971-974.
- DeVellis, R. (2012). Validity. Scale development: Theory and applications. *Applied  
Social Research Methods Series*, 109-110.
- Dhar, P., Greenslade, L., Westbrooke, R. H., Jackson, C. D., Marshall, A., & Morgan,  
M. Y. (2019). Relationship between nutritional status, disease severity and  
indices of functional decline in patients with cirrhosis. *Clinical Nutrition*, 29,  
254 - 263.
- Diefenbach, M. A., & Leventhal, H. (1996). The common-sense model of illness  
representation: Theoretical and practical considerations. *Journal of Social*

*Distress and the Homeless*, 5(1), 11-38.

- Dwivedi, A. K., Chatterjee, K., & Singh, R. (2017). Lifetime alcohol consumption and severity in alcohol dependence syndrome. *Industrial Psychiatry Journal*, 26(1), 34-38.
- Dunn, M. A., Josbeno, D. A., Schmotzer, A. R., Tevar, A. D., DiMartini, A. F., Landsittel, D. P., & Delitto, A. (2016). The gap between clinically assessed physical performance and objective physical activity in liver transplant candidates. *Liver Transplantation*, 22(10), 1324-1332.
- Fabio, A. D., & Kenny, M. E. (2012). Emotional intelligence and perceived social support among Italian high school students. *Journal of Career Development*, 39(5), 461-475.
- Fagerström, C., & Frisman, G. H. (2017). Living with liver cirrhosis: A vulnerable Life. *Gastroenterology Nursing*, 40(1), 38-46.
- Fan, S. Y., Eiser, C., Ho, M. C., & Lin, C. Y. (2013). Health-related quality of life in patients with hepatocellular carcinoma: The mediation effects of illness perceptions and coping. *Psycho-Oncology*, 22(6), 1353-1360.
- Fawcett, J., & Desanto-Madeya, S. (2013). *Contemporary nursing knowledge: Analysis and evaluation of nursing models and theories* (3<sup>rd</sup> ed.). New York: F.A. Davis.
- Fayers, P., & Bottomley, A. (2002). Quality of life research within the EORTC—the EORTC QLQ-C30. *European Journal of Cancer*, 38, 125-133.
- Fleming, K. M., Aithal, G. P., Card, T. R., & West, J. (2012). All-cause mortality in people with cirrhosis compared with the general population: A population-based cohort study. *Liver International*, 32(1), 79-84.

- Gallanagh, S., Castagno, D., Wilson, B., Erdmann, E., Zannad, F., Remme, W. J., ... & Mareev, V. (2011). Evaluation of the functional status questionnaire in heart failure: a sub-study of the second cardiac insufficiency bisoprolol survival study (CIBIS-II). *Cardiovascular Drugs and Therapy*, 25(1), 77-85.
- Galant, L. H., Forgiarini Junior, L. A., Dias, A. S., & Marroni, C. A. (2012). Functional status, respiratory muscle strength, and quality of life in patients with cirrhosis. *Brazilian Journal of Physical Therapy*, 16(1), 30-34.
- Garcia, C., Lima, A., La-Rotta, E. I. G., & Boin, d. F. S. F. (2018). Social support for patients undergoing liver transplantation in a public university hospital. *Health and Quality of Life Outcomes*, 16(35), 1-8.
- Ge, P. S., & Runyon, B. A. (2016). Treatment of patients with cirrhosis. *The New England Journal of Medicine*, 375(8), 767-777.
- Gerber, L. H., Weinstein, A. A., Mehta, R., & Younossi, Z. M. (2019). Importance of fatigue and its measurement in chronic liver disease. *World Journal of Gastroenterology*, 25(28), 3669.
- Goldblatt, J., James, O. F., & Jones, D. E. (2001). Grip strength and subjective fatigue in patients with primary biliary cirrhosis. *JAMA*, 285(17), 2196-2197.
- Grewal, R., Cote, J. A., & Baumgartner, H. (2004). Multicollinearity and measurement error in structural equation models: Implications for theory testing. *Marketing Science*, 23(4), 519-529.
- Gutierrez, W. (2016). *Alcohol consumption : Patterns, influences and health effects*. New York: Nova Science Publishers.
- Hagström, H., Hemmingsson, T., Discacciati, A., & Andreasson, A. (2018). Alcohol

consumption in late adolescence is associated with an increased risk of severe liver disease later in life. *Journal of Hepatology*, 68(3), 505-510.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2009). *Multivariate data analysis* (7<sup>th</sup> ed.). Upper Saddle River: Prentice Hall.

Halbesleben, J. R. (2006). Sources of social support and burnout: a meta-analytic test of the conservation of resources model. *Journal of Applied Psychology*, 91(5), 1134.

Hanai, T., Shiraki, M., Ohnishi, S., Miyazaki, T., Ideta, T., Kochi, T., . . . Moriwaki, H. (2016). Rapid skeletal muscle wasting predicts worse survival in patients with liver cirrhosis. *Hepatology Research*, 46(8), 743-751.

Hayward, K. L., Horsfall, L. U., Ruffin, B. J., Cottrell, W. N., Chachay, V. S., Irvine, K. M., . . . Valery, P. C. (2017). Optimising care of patients with chronic disease: Patient-oriented education may improve disease knowledge and self-management. *Internal Medicine Journal*, 47(8), 952-955.

Hien, L. T., Chanruangvanich, W., & Thosingha, O. (2017). Factors related to needs in palliative care among patients with hepatocellular carcinoma. *Journal of Nursing Science*, 35(3), 87-95.

Hlebec, V., Mrzel, M., & Kogovšek, T. (2009). Social support network and received support at stressful events. *Advances in Methodology & Statistics*, 6(2), 155-171.

Hoogerduijn, J. G., Schuurmans, M. J., Korevaar, J. C., Burman, B. M., & De Rooij, S. E. (2010). Identification of older hospitalised patients at risk for functional decline, a study to compare the predictive values of three screening instruments. *Journal of Clinical Nursing*, 19(9-10), 1219-1225.

- House, J., Umberson, D., & Landis, K. R. (1988). Structures and processes of social support. *Annual Review of Sociology*, 14(1), 293-318.
- Hsu, C., Lin, H., Lin, H., Hsu, C., & Shih, M. (2019). Quality of life of primary caregivers of liver cirrhosis patients and related factors. *Hu Li Za Zhi*, 66(1), 60-69.
- Hu, Y., Pikhart, H., Kubinova, R., Malyutina, S., Pajak, A., Besala, A., . . . Bobak, M. (2016). Alcohol consumption and longitudinal trajectories of physical functioning in central and eastern Europe: A 10-Year Follow-up of HAPIEE Study. *Journals of Gerontology Series*, 71(8), 1063-1068.
- Huang, C., Lv, X.-w., Xu, T., Ni, M.-m., Xia, J.-l., Cai, S.-p., . . . Li, J. (2018). Alcohol use in Hefei in relation to alcoholic liver disease: A multivariate logistic regression analysis. *Alcohol*, 71, 1-4.
- Hsu, C., Lin, H., Lin, H., Hsu, C., & Shih, M. (2019). Quality of life of primary caregivers of liver cirrhosis patients and related factors. *Hu Li Za Zhi*, 66(1), 60-69.
- Jackson, D. L. (2001). Sample size and number of parameter estimates in maximum likelihood confirmatory factor analysis: A Monte Carlo investigation. *Structural Equation Modeling*, 8(2), 205-223.
- Jackson, D. L. (2003). Revisiting sample size and number of parameter estimates: Some support for the N: q hypothesis. *Structural Equation Modeling*, 10(1), 128-141.
- Jacobus, J., & Tapert, S. F. (2013). Neurotoxic effects of alcohol in adolescence. *Annual Review of Clinical Psychology*, 9, 703-721.
- Jette, A., Davies, A., Cleary, P., Calkins, D., Rubenstein, L., Fink, A., . . . Delbanco, T.

- (1986). The functional status questionnaire. *Journal of General Internal Medicine*, 1(3), 143-149.
- Jijomon, Lobo, D. J., & Castelino, F. (2017). Correlates of quality of life patients with cirrhosis of liver admitted in selected hospitals of Udupi Taluk, Karnataka. *Indian Journal of Public Health Research & Development*, 8(4).
- Jones, D. E., Al-Rifai, A., Frith, J., Patanwala, I., & Newton, J. L. (2010). The independent effects of fatigue and UDCA therapy on mortality in primary biliary cirrhosis: results of a 9 year follow-up. *Journal of hepatology*, 53(5), 911-917.
- Junpen, S. (2015). Nursing care for cirrhosis of the liver with complication: A comparison study. *Journal of the Department of the Medical Services*, 29(1), 171-181.
- Kaptein, Yamaoka, K., Snoei, L., Kobayashi, K., Uchida, Y., van der Kloot, W. A., . . . Rabe, K. (2011). Illness perceptions and quality of life in Japanese and Dutch patients with non-small-cell lung cancer. *Lung Cancer*, 72(3), 384-390.
- Kaptein, A., Yamaoka, K., Snoei, L., Van der Kloot, W. A., Inoue, K., Tabei, T., . . . Meirink, C. (2013). Illness perceptions and quality of life in Japanese and Dutch women with breast cancer. *Journal of Psychosocial Oncology*, 31(1), 83-102.
- Kawada, T., Inagaki, H., & Kuratomi, Y. (2011). The alcohol use disorders identification test: reliability study of the Japanese version. *Alcohol*, 45(3), 205-207.
- Keaveny, A. P., & Cárdenas, A. (2015). *Complications of cirrhosis*: Springer.
- Khadjesari, Z., White, I. R., McCambridge, J., Marston, L., Wallace, P., Godfrey, C., & Murray, E. (2017). Validation of the AUDIT-C in adults seeking help with their

- drinking online. *Addiction Science & Clinical Practice*, 12(1), 1 - 11.
- Khine, M. S. (2013). *Application of Structural Equation Modeling in Educational Research and Practice*. Rotterdam, The Netherlands: Sense.
- Kim, Kim, K., Paik, N., Kim, K., Jang, H., & Lim, J. (2016). Muscle strength: A better index of low physical performance than muscle mass in older adults. *Geriatrics & Gerontology International*, 16(5), 577-585.
- Kim, Oh, E. G., & Lee, W. H. (2006). Symptom experience, psychological distress, and quality of life in Korean patients with liver cirrhosis: A cross-sectional survey. *International Journal of Nursing Studies*, 43(8), 1047-1056.
- Kim, & Seo, S. (2015). Factors influencing on quality of life in patients with liver cirrhosis: Convergence on the theory of unpleasant symptoms. *Journal of Digital Convergence*, 13(4), 271-281.
- Kimbell, B. (2015). *Living, dying and caring in advanced liver disease: the challenge of uncertainty* (Doctoral dissertation). University of Edinburgh. Retrived from <https://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.687984>.
- Kleinman, L., Zodet, M., Hakim, Z., Aledort, J., Barker, C., Chan, K., . . . Revicki, D. (2000). Psychometric evaluation of the fatigue severity scale for use in chronic hepatitis C. *Quality of Life Research*, 9(5), 499-508.
- Kline, R. B. (1998). Software review: Software programs for structural equation modeling: Amos, EQS, and LISREL. *Journal of Psychoeducational Assessment*, 16(4), 343-364.
- Kline, R. B. (2015). *Principles and practice of structural equation modeling*: Guilford publications.

- Ko, F.-Y., Yang, A. C., Tsai, S.-J., Zhou, Y., & Xu, L.-M. (2013). Physiologic and laboratory correlates of depression, anxiety, and poor sleep in liver cirrhosis. *Gastroenterology*, 13, 18-18.
- Kotarska, K., Wunsch, E., Kempńska-Podhorodecka, A., Raszeja-Wyszomirska, J., Bogdanos, D. P., Wójcicki, M., & Milkiewicz, P. (2014). Factors affecting health-related quality of life and physical activity after liver transplantation for autoimmune and nonautoimmune liver diseases: A prospective, single centre study. *Journal of Immunology Research*, 14(2), 1-10.
- Krupp, L. B., LaRocca, N. G., Muir-Nash, J., & Steinberg, A. D. (1989). The fatigue severity scale: Application to patients with multiple sclerosis and systemic lupus erythematosus. *Archives of Neurology*, 46(10), 1121-1123.
- Lai, J. C., Dodge, J. L., Sen, S., Covinsky, K., & Feng, S. (2016). Functional decline in patients with cirrhosis awaiting liver transplantation: Results from the functional assessment in liver transplantation (FrAILT) study. *Hepatology*, 63(2), 574-580.
- Langston, S., Edwards, M. S., & Lyvers, M. (2018). Illness perceptions, coping, benefit finding, and adjustment in individuals with hepatitis C. *Australian Psychologist*, 53(1), 87-96.
- Langston, S., Edwards, M. S., Lyvers, M., & Stapleton, P. (2017). The self-regulatory model of illness and adjustment outcomes in hepatitis C. *Professional Psychology: Research and Practice*, 48(5), 317-326.
- LaPier, T. K., & Mizner, R. (2009). Outcome measures in cardiopulmonary physical therapy: focus on the Late Life Function and Disability Instrument (LLFDI). *Cardiopulmonary physical therapy journal*, 20(2), 32.



- Lau-Walker, M., Presky, J., Webzell, I., Murrells, T., & Heaton, N. (2016). Patients with alcohol-related liver disease—beliefs about their illness and factors that influence their self-management. *Journal of Advanced Nursing*, 72(1), 173-185.
- Lee, J., Nguyen, H. Q., Jarrett, M. E., Mitchell, P. H., Pike, K. C., & Fan, V. S. (2018). Effect of symptoms on physical performance in COPD. *Heart & Lung*, 47(2), 149-156.
- Leidy, N. K. (1994). Functional status and the forward progress of merry-go-rounds: toward a coherent analytical framework. *Nursing Research*, 43(4), 196-202.
- Lembke, A., Bradley, K. A., Henderson, P., Moos, R., & Harris, A. H. (2011). Alcohol screening scores and the risk of new-onset gastrointestinal illness or related hospitalization. *Journal of General Internal Medicine*, 26(7), 777-782.
- Lemeshow, S., Hosmer, D. W., Klar, J., Lwanga, S. K., & Organization, W. H. (1990). *Adequacy of sample size in health studies*: Chichester: Wiley.
- Lee, J., Nguyen, H. Q., Jarrett, M. E., Mitchell, P. H., Pike, K. C., & Fan, V. S. (2018). Effect of symptoms on physical performance in COPD. *Heart & Lung*, 47(2), 149-156.
- Lenz, & Pugh, L. (2008). *Middle range theory for nursing*. (2<sup>nd</sup> ed). New York, NY: Springer.
- Lenz, Gift, A., & Pugh, L. (2014). *The theory of unpleasant symptoms* (Bredow Ed. 3<sup>rd</sup> ed.). Philadelphia: Lippincott Williams and Wilkins.
- Lenz, Pugh, L., Milligan, R., Gift, A., & Suppe, F. (1997). The middle-range theory of unpleasant symptoms: an update. *Advances in Nursing Science*, 19(3), 14-27.
- Lenz, E. R., Suppe, F., Gift, A. G., Pugh, L. C., & Milligan, R. A. (1995). Collaborative

- development of middle-range nursing theories: Toward a theory of unpleasant symptoms. *Advances in Nursing Science*, 17(3), 1–13.
- León-Muñoz, L. M., Guallar-Castillón, P., García-Esquinas, E., Galán, I., & Rodríguez-Artalejo, F. (2017). Alcohol drinking patterns and risk of functional limitations in two cohorts of older adults. *Clinical Nutrition*, 36(3), 831-838.
- Les, I., Doval, E., Flavià, M., Jacas, C., Cárdenas, G., Esteban, R., ... & Córdoba, J. (2010). Quality of life in cirrhosis is related to potentially treatable factors. *European Journal of Gastroenterology & Hepatology*, 22(2), 221-227.
- Leventhal, H., Phillips, L. A., & Burns, E. (2016). The Common-Sense Model of Self-Regulation (CSM): A dynamic framework for understanding illness self-management. *Journal of Behavioral Medicine*, 39(6), 935-946.
- Lin, P. C., & Chang, S. Y. (2004). Functional recovery among elderly people one year after hip fracture surgery. *The Journal of Nursing Research*, 12(1), 72-82.
- Li, Yang, Y.-L., Liu, L., & Wang, L. (2016). Effects of social support, hope and resilience on quality of life among Chinese bladder cancer patients: a cross-sectional study. *Health and Quality of Life Outcomes*, 14(73), 2-9.
- Li, H., Xie, L., Yang, J., & Pang, X. (2018). Symptom burden amongst patients suffering from end-stage renal disease and receiving dialysis: A literature review. *International Journal of Nursing Sciences*, 5(4), 427-431.
- Liver, T. A. f. t. S. o. t. (2018). Thailand practice guideline for management of chronic hepatitis C 2018. *Thai Journal of Hepatology*, 1(3), 50-60.
- Loria, A., Doyle, K., Weinstein, A. A., Winter, P., Escheik, C., Price, J., . . . Gerber, L. (2014). Multiple factors predict physical performance in people with chronic

- liver disease. *American Journal of Physical Medicine & Rehabilitation*, 93(6), 470-476.
- Low, J. T., Rohde, G., Pittordou, K., Candy, B., Davis, S., Marshall, A., & Stone, P. (2018). Supportive and palliative care in people with cirrhosis: International systematic review of the perspective of patients, family members and health professionals. *Journal of Hepatology*, 69(6), 1260-1273.
- Lynn, M. R. (1986). Determination and quantification of content validity. *Nursing Research*, 35(6), 382-385.
- Mahoney F. Barthel D. (1965). Functional evaluation: the Barthel Index. *The Moldovan Medical Journal*. 14, 61–65.
- Marcellin, P., & Kutala, B. K. (2018). Liver diseases: A major, neglected global public health problem requiring urgent actions and large-scale screening. *Liver International*, 38, 2-6.
- Matura, L. A., Malone, S., Jaime-Lara, R., & Riegel, B. (2018). A systematic review of biological mechanisms of fatigue in chronic illness. *Biological Research for Nursing*, 20(4), 410-421.
- McCabe, P., & Wong, R. J. (2018). More severe deficits in functional status associated with higher mortality among adults awaiting liver transplantation. *Clinical Transplantation*, 32(9), e13346.
- Meemajam, S., Somrarnyart, M., & Tachaudomdach, C. (2018). Functional status, anxiety and depression among persons with automatic implantable cardioverter defibrillator. *Nursing Journal*, 45(1), 26-36.
- Medical statistics unit of Sunpasitthiprasong hospital hospital. (2018). *Statistics of liver*

*cirrhosis in 2018*. Sunpasitthiprasong hospital, Thailand.

- Mendoza, T. R., Wang, X. S., Cleeland, C. S., Morrissey, M., Johnson, B. A., Wendt, J. K., & Huber, S. L. (1999). The rapid assessment of fatigue severity in cancer patients: use of the Brief Fatigue Inventory. *Cancer*, 85(5), 1186-1196.
- Meier, P., & Seitz, H. K. (2008). Age, alcohol metabolism and liver disease. *Current Opinion in Clinical Nutrition & Metabolic Care*, 11(1), 21-26.
- Meroni, M., Longo, M., Rametta, R., & Dongiovanni, P. (2018). Genetic and epigenetic modifiers of alcoholic liver disease. *International Journal of Molecular Sciences*, 19(12), 3857-3878.
- Methawasin, K., Chonmaitree, P., Wongjitrat, C., Rattanamongkolgul, S., & Asawavichienjinda, T. (2016). Movement disorders in non-Wilsonian cirrhotic patients: A report of the prevalence and risk factors from a study done in a medical school in an agricultural-based community. *Journal of Movement Disorders*, 9(1), 28–34.
- Meyers, L. S., Gamst, G., & Guarino, A. J. (2013). *Applied multivariate research : design and interpretation* (2<sup>nd</sup> ed.). Los Angeles: SAGE.
- Mhoryadee, K., Kanogsunthornra, N., & Panpakdee, O. (2018). Relationships between illness perception and pulmonary rehabilitation behaviors in persons with chronic obstructive pulmonary disease. *Thai Journal of Cardio-Thoracic Nursin*, 29(2), 95-110.
- Michelli, M. L. (2011). *Liver Cirrhosis : Causes, Diagnosis, and Treatment*. New York: Nova Science Publishers, Inc.
- Miquel, M., Clèries, M., Vergara, M., & Vela, E. (2018). Economic burden of cirrhosis

- in Catalonia: A population-based analysis. *BMJ open*, 8(3), 1-10.
- Monteiro, M., Rehm, J., Shield, K., & Stockwell, T. (2017). Alcohol Consumption: An Overview of International Trends. In *International encyclopedia of public health edition* (2<sup>nd</sup> ed.): International Encyclopedia of Public Health.
- Moore, M. (2018). Chronic crisis: Burden of chronic disease on preventable deaths. *Australian Nursing and Midwifery Journal*, 25(11), 18.
- Mor, V., Laliberte, L., Morris, J. N., & Wiemann, M. (1984). The Karnofsky performance status scale: an examination of its reliability and validity in a research setting. *Cancer*, 53(9), 2002-2007.
- Moss-Morris, R., Weinman, J., Petrie, K., Horne, R., Cameron, L., & Buick, D. (2002). The revised illness perception questionnaire (IPQ-R). *Psychology and Health*, 17(1), 1-16.
- Motl, R. W., McAuley, E., Wynn, D., Suh, Y., Weikert, M., & Dlugonski, D. (2010). Symptoms and physical activity among adults with relapsing-remitting multiple sclerosis. *The Journal of Nervous and Mental Disease*, 198(3), 213-219.
- Muir, A. J. (2015). Understanding the complexities of cirrhosis. *Clinical Therapeutics*, 37(8), 1822-1836.
- Munro, B. H. (2005). *Statistical methods for health care research* (5<sup>th</sup> ed.). Philadelphia: Lippincott.
- Muthén, B. O., Muthén, L. K., & Asparouhov, T. (2016). *Regression and mediation analysis using Mplus*. Los Angeles, CA: Muthén & Muthén
- Nardelli, S., Pentassuglio, I., Pasquale, C., Ridola, L., Moscucci, F., Merli, M., ... & Merkel, C. (2013). Depression, anxiety and alexithymia symptoms are major

- determinants of health related quality of life (HRQoL) in cirrhotic patients. *Metabolic Brain Disease*, 28(2), 239-243.
- Neff, G. W., Duncan, C. W., & Schiff, E. R. (2011). The current economic burden of cirrhosis. *Gastroenterology & Hepatology*, 7(10), 661.
- Negro, A. D. V., Angulo, J. M., & Rivera-Pomar, J. (1984). Skeletal muscle changes in chronic alcoholic patients. A conventional, histochemical, ultrastructural and morphometric study. *Acta Neurologica Scandinavica*, 70(3), 185-196.
- Nehir, S., Tavşanlı, N. G., Özdemir, Ç., & Akyol, T. (2019). A Determination of Hopelessness and the Perception of Illness in Cancer. *Journal of Death and Dying*, 79(2), 115-131.
- Nelson, R. (2016). *Liver disease : Diagnosis, treatment and management*. New York: Nova Science Publishers, Inc.
- Neuberger, J., Ferguson, J., & Newsome, P. (2014). *Liver transplantation: clinical assessment and management*. West Sussex: Wiley Blackwell.
- Newton, J. L., & Jones, D. E. (2012). Managing systemic symptoms in chronic liver disease. *Journal of Hepatology*, 56, S46-S55.
- Ney, M., Gramlich, L., Mathiesen, V., Bailey, R. J., Haykowsky, M., Ma, M., . . . Tandon, P. (2017). Patient-perceived barriers to lifestyle interventions in cirrhosis. *The Saudi Journal of Gastroenterology*, 23(2), 97-104.
- Nindrea, R. D., Aryandono, T., & Lazuardi, L. (2017). Breast cancer risk from modifiable and non-modifiable risk factors among women in Southeast Asia: a meta-analysis. *Asian Pacific Journal of Cancer Prevention*, 18(12), 3201.
- Nowicka-Sauer, K., Banaszkiwicz, D., Staśkiwicz, I., Kopczyński, P., Hajduk, A.,

- Czuszynska, Z., . . . Kałużna, A. (2016). Illness perception in Polish patients with chronic diseases: Psychometric properties of the brief illness perception questionnaire. *Journal of Health Psychology, 21*(8), 1739-1749.
- Ohara, M., Ogawa, K., Suda, G., Kimura, M., Maehara, O., Shimazaki, T., . . . Izumi, T. (2018). L-carnitine suppresses loss of skeletal muscle mass in patients with liver cirrhosis. *Hepatology Communications, 2*(8), 910-922.
- Oh, S., Kim, W., Han, K.-T., Park, E.-C., & Jang, S.-I. (2018). Alcohol consumption frequency or alcohol intake per drinking session: which has a larger impact on the metabolic syndrome and its components? *Alcohol, 71*(3), 15-23.
- Orman, Ghabril, M., & Chalasani, N. (2016). Poor performance status is associated with increased mortality in patients with cirrhosis. *Clinical Gastroenterology and Hepatology, 14*(8), 1189-1195.
- Parikh-Patel, A., Gold, E. B., Utts, J., Worman, H., Krivy, K. E., & Gershwin, M. E. (2002). Functional status of patients with primary biliary cirrhosis. *The American Journal Of Gastroenterology, 97*(11), 2871-2879.
- Park, H., & Shin, Y. (2017). Factors related self-care behavior among liver cirrhosis patients: focusing on disease knowledge and family support. *Journal of the Korea Academia-Industrial cooperation Society, 18*(5), 647-656.
- Piper, B. F., Dibble, S. L., Dodd, M. J., Weiss, M. C., Slaughter, R. E., & Paul, S. M. (1998). The revised Piper fatigue scale: psychometric evaluation in women with breast cancer. *Oncology Nursing Society, 25*(4), 677-684.
- Pituch, K. A., & Stevens, J. P. (2015). *Applied multivariate statistics for the social sciences: Analyses with SAS and IBM's SPSS*. Texas: Routledge.

- Polit, D., & Beck, C. (2017). *Nursing research : Generating and assessing evidence for nursing practice* (10<sup>th</sup> ed.). USA: Philadelphia
- Poorkaveh, A., Modabbernia, A., Ashrafi, M., Taslimi, S., Karami, M., Dalir, M., . . .
- Poustchi, H. (2012). Validity, reliability and factor structure of hepatitis B quality of life questionnaire version 1.0: Findings in a large sample of 320 patients. *Archives of Iranian Medicine*, 15(5), 1-8.
- Poovorawan, K., Treeprasertsuk, S., Thepsuthammarat, K., Wilairatana, P., Kitsahawong, B., & Phaosawasdi, K. (2015). The burden of cirrhosis and impact of universal coverage public health care system in Thailand: nationwide study. *Annals of Hepatology*, 14(6), 862-868.
- Porthé, V., García-Subirats, I., Ariza, C., Villalbí, J. R., Bartroli, M., Juárez, O., & Díez, E. (2020). Community-Based Interventions to Reduce Alcohol Consumption and Alcohol-Related Harm in Adults. *Journal of Community Health*, 8, 1-12.
- Rakoski, M., McCammon, R. J., Piette, J. D., Iwashyna, T. J., Marrero, J. A., Lok, A. S., . . . Volk, M. L. (2012). Burden of cirrhosis on older Americans and their families: analysis of the health and retirement study. *Hepatology*, 55(1), 184-191.
- Rattanamongkolgul, S., Wongjitrat, C., & Puapankitcharoen, P. (2011). Prevalence of cirrhosis registered in Nakhon Nayok, Thailand. *Journal of the Medical Association of Thailand*, 93(2), 87.
- Rattawitton, T., & Perngparn, U. (2017). Alcohol consumption and health consequences among villagers in Thum Tong sub-district, Muang Nan district, Nan province, Thailand. *Journal of Health Research*, 26(1), 25-29.



- Raykov, T., & Marcoulides, G. A. (2006). On multilevel model reliability estimation from the perspective of structural equation modeling. *Structural Equation Modeling, 13*(1), 130-141.
- Razvodovsky, Y. (2015). The effects of beverage specific alcohol sale on liver cirrhosis mortality in Russia. *Journal of Addiction Medicine and Therapeutic Science, 1*(2), 20-26.
- Ream, E., & Richardson, A. (1996). Fatigue: a concept analysis. *International Journal of Nursing Studies, 33*(5), 519-529.
- Rehm, J., Gmel Sr, G. E., Gmel, G., Hasan, O. S., Imtiaz, S., Popova, S., . . . Samokhvalov, A. V. (2017). The relationship between different dimensions of alcohol use and the burden of disease—an update. *Addiction, 112*(6), 968-1001.
- Román, E., García-Galcerán, C., Torrades, T., Herrera, S., Marín, A., Doñate, M., . . . Serra-Grima, R. (2016). Effects of an exercise programme on functional capacity, body composition and risk of falls in patients with cirrhosis: a randomized clinical trial. *PLOS ONE, 11*(3), 1-15
- Rosa, K., Fu, M., Gilles, L., Cerri, K., Peeters, M., Bubb, J., & Scott, J. (2014). Validation of the Fatigue Severity Scale in chronic hepatitis C. *Health and Quality of Life Outcomes, 12*(1), 1-12.
- Rossi, D., Galant, L. H., & Marroni, C. A. (2017). Psychometric property of fatigue severity scale and correlation with depression and quality of life in cirrhotics. *Arquivos De Gastroenterologia, 54*(4), 344-348.
- Rotman, Y., & Sanyal, A. J. (2017). Current and upcoming pharmacotherapy for non-alcoholic fatty liver disease. *Gut, 66*(1), 180-190.

Russ, K. B., Chen, N.-W., Kamath, P. S., Shah, V. H., Kuo, Y.-F., & Singal, A. K.

(2016). Alcohol use after liver transplantation is independent of liver disease etiology. *Alcohol and Alcoholism*, 51(6), 698-701.

Saberifiroozi, M. (2017). Improving Quality of Care in Patients with Liver Cirrhosis.

*Middle East Journal of Digestive Diseases*, 9(4), 189.

Samai, L., Karl, P., Wirat, P., & Chalernpol, T. (2017). Alcohol use disorder and

tuberculosis treatment: a longitudinal mixed method study in Thailand. *South African Journal of Psychiatry*, 23(0), 1-5.

Samokhvalov, A. V., Popova, S., Room, R., Ramonas, M., & Rehm, J. (2010).

Disability associated with alcohol abuse and dependence. *Alcoholism: Clinical and Experimental Research*, 34(11), 1871-1878.

Scaglione, S., Kliethermes, S., Cao, G., Shoham, D., Durazo, R., Luke, A., & Volk, M.

L. (2015). The epidemiology of cirrhosis in the United States. *Journal of Clinical Gastroenterology*, 49(8), 690-696.

Schuppan, D., & Afdhal, N. H. (2018). Liver cirrhosis. *The Lancet*, 371(9615), 838-851.

Saberifiroozi M. (2017). Improving Quality of Care in Patients with Liver Cirrhosis.

*Middle East Journal of Digestive Diseases*. 9(4), 189-200.

Sharma, S., Ray, R., Banerjee, A., & Lakshmanan, C. (1990). Chronic muscle wasting

in alcoholics-a histochemical and biochemical study. *Indian Journal of Pathology & Microbiology*, 33(3), 244-249.

Silpakit, P., & Kittirattanapaiboon, P. (2009). *The alcohol use disorders identification*

*test: guidelines for use in primary care*. Bangkok Trantawan paper.

Sperber, A. D. (2004). Translation and validation of study instruments for cross-cultural

- research. *Gastroenterology*, 126, S124-S128.
- Sperber, A. D., Devellis, R. F., & Boehlecke, B. (1994). Cross-cultural translation: methodology and validation. *Journal of Cross-cultural Psychology*, 25(4), 501-524.
- Stahre, M., Naimi, T., Brewer, R., & Holt, J. (2006). Measuring average alcohol consumption: the impact of including binge drinks in quantity–frequency calculations. *Addiction*, 101(12), 1711-1718.
- Shumaker, S. A., & Brownell, A. (1984). Toward a theory of social support: Closing conceptual gaps. *Journal of Social Issues*, 40(4), 11-36.
- Sobell, L. C., & Sobell, M. B. (1992). Timeline follow-back. In J. P. A. Raye Z. Litten (Ed.), *Measuring alcohol consumption* (pp. 41-72). New York Humana press
- Soper, D. S. (2019). A-priori sample size calculator for structural equation models (software). <https://www.danielsoper.com/statcalc/calculator.aspx?id=89>
- Stockwell, T., Murphy, D., & Hodgson, R. (1983). The severity of alcohol dependence questionnaire: its use, reliability and validity. *British journal of addiction*, 78(2), 145-155.
- Suktrakul, S., Yunibhand., and Chaiyawat. (2009). *The effect of alcohol craving control program on alcohol consumption in alcohol dependents* (Doctoral dissertation). Chulalongkorn University.
- Sun, V. C.-Y. (2010). *Illness perception, symptom distress, and quality of life in advanced gastrointestinal cancers* (Dissertation). University of California, Los Angeles,
- Swain, M. G. (2006). Fatigue in liver disease: pathophysiology and clinical

- management. *Canadian Journal of Gastroenterology and Hepatology*, 20(3), 181-188.
- Tabachnick, B. G., Fidell, L. S., & Ullman, J. B. (2007). *Using multivariate statistics* (5<sup>th</sup> ed): Pearson Boston, MA.
- Tan, H., Wutthilert, C., & O'Connor, M. (2011). Spirituality and quality of life in older people with chronic illness in Thailand. *Progress in Palliative Care*, 19(4), 177-184.
- Tanaka, J. S. (1987). "How big is big enough?": Sample size and goodness of fit in structural equation models with latent variables. *Child Development*, 134-146.
- Tang, C.-C., Von Ah, D., & Fulton, J. S. (2018). The symptom experience of patients with advanced pancreatic Cancer: An integrative review. *Cancer Nursing*, 41(1), 33-44.
- Tapper, E. B., Kanwal, F., Asrani, S. K., Ho, C., Ovchinsky, N., Poterucha, J., . . . Luxon, B. (2018). Patient-reported outcomes in cirrhosis: A scoping review of the literature. *Hepatology*, 67(6), 2375-2383.
- Tricco, A. C., Zarin, W., Rios, P., Nincic, V., Khan, P. A., Ghassemi, M., ... & Langlois, E. V. (2018). Engaging policy-makers, health system managers, and policy analysts in the knowledge synthesis process: a scoping review. *Implementation Science*, 13(1), 12-31.
- Trivedi, H. D., & Tapper, E. B. (2018). Interventions to improve physical function and prevent adverse events in cirrhosis. *Gastroenterology Report*, 6(1), 13-20.
- Tsunoda, K., Kai, Y., Uchida, K., Kuchiki, T., & Nagamatsu, T. (2014). Physical activity and risk of fatty liver in people with different levels of alcohol

- consumption: A prospective cohort study. *BMJ open*, 4(8).
- Tulman, L., Fawcett, J., & McEvoy, M. D. (1991). Development of the inventory of functional status-cancer. *Cancer Nursing*, 14(5), 254-260.
- Valery, P. C., Clark, P. J., McPhail, S. M., Rahman, T., Hayward, K., Martin, J., . . . Powell, E. (2017). Exploratory study into the unmet supportive needs of people diagnosed with cirrhosis in Queensland, Australia. *Internal Medicine Journal*, 47(4), 429-435.
- Valery, P. C., Powell, E., Moses, N., Volk, M. L., McPhail, S. M., Clark, P. J., & Martin, J. (2015). Systematic review: Unmet supportive care needs in people diagnosed with chronic liver disease. *British Medical Journal*, 5(1), 1-15.
- van Abbema, D., van Vuuren, A., van den Berkmortel, F., van den Akker, M., Deckx, L., Buntinx, F., . . . de Vos-Geelen, J. (2017). Functional status decline in older patients with breast and colorectal cancer after cancer treatment: A prospective cohort study. *Journal of Geriatric Oncology*, 8(3), 176-184.
- Vasiliadis, H.-M., Payette, M.-C., Berbiche, D., Grenier, S., & Hudon, C. (2019). Cognitive decline and alcohol consumption adjusting for functional status over a 3-year period in French speaking community living older adults. *Journal of Public Health*, 12(6), 1-8.
- Vaux, A., Phillips, J., Holly, L., Thomson, B., Williams, D., & Stewart, D. (1986). The social support appraisals (SS-A) scale: Studies of reliability and validity. *American Journal of Community Psychology*, 14(2), 195.
- Vearrier, D., & Greenberg, M. I. (2017). The implementation of medical monitoring programs following potentially hazardous exposures: A medico-legal

- perspective. *Clinical Toxicology*, 55(9), 956-969.
- Vidot, H., Kline, K., Cheng, R., Finegan, L., Lin, A., Kempler, E., . . . Carey, S. (2019). The relationship of obesity, nutritional status and muscle wasting in patients assessed for liver transplantation. *Nutrients*, 11(9), 2097.
- Wakabayashi, M., McKetin, R., Banwell, C., Yiengprugsawan, V., Kelly, M., Sam-ang, S., . . . Thai Cohort Study, T. (2015). Alcohol consumption patterns in Thailand and their relationship with non-communicable disease. *BioMed Central Public Health*, 15(1), 1-9.
- Wang, T.-J. (2004). Concept analysis of functional status. *International Journal of Nursing Studies*, 41(4), 457-462.
- Ware Jr, J. E. (2000). SF-36 health survey update. *Spine*, 25(24), 3130-3139.
- Weinman, J., Petrie, K. J., Moss-Morris, R., & Horne, R. (1996). The illness perception questionnaire: a new method for assessing the cognitive representation of illness. *Psychology and Health*, 11(3), 431-445.
- West, S. G., Finch, J. F., & Curran, P. J. (1995). Structural equation models with nonnormal variables: Problems and remedies. In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, Issues, and Applications* (pp. 56–75): Sage Publications.
- World Health Organization. (2018). *Indicator Code Book, Global Information System on Alcohol and Health*. In: WHO Press, October.
- Wilson, I. B., & Cleary, P. D. (1995). Linking clinical variables with health-related quality of life: a conceptual model of patient outcomes. *JAMA*, 273(1), 59-65.
- Wilson, M. P., Castillo, E. M., Batey, A. M., Sapyta, J., & Aronson, S. (2010). Hepatitis

- C and depressive symptoms: psychological and social factors matter more than liver injury. *The International Journal of Psychiatry in Medicine*, 40(2), 199-215.
- Wongpakaran, T., Wongpakaran, N., & Ruktrakul, R. (2011). Reliability and validity of the multidimensional scale of perceived social support (MSPSS): Thai version. *Clinical Practice & Epidemiology in Mental Health*, 7, 161–166.
- Woolley, J., Allen, R., & Wessely, S. (2004). Alcohol use in chronic fatigue syndrome. *Journal of Psychosomatic Research*, 56(2), 203-206.
- Wu, L. J., Wu, M. S., Lien, G. S., Chen, F. C., & Tsai, J. C. (2011). Fatigue and physical activity levels in patients with liver cirrhosis. *Journal of Clinical Nursing*, 21(2), 129-138.
- Wu, L. J., Wu, M. S., Lien, G. S., Chen, F. C., & Tsai, J. C. (2012). Fatigue and physical activity levels in patients with liver cirrhosis. *Journal of Clinical Nursing*, 21(2), 129-138.
- Yang, I.-S., & Kang, Y. (2018). Self-care model based on the theory of unpleasant symptoms in patients with heart failure. *Applied Nursing Research*, 43, 10-17.
- Youssef, N. (2013). *Health-related quality of life, symptoms experience and perceived social support among patients with liver cirrhosis : A cross-sectional study in Egypt* (Dissertation), University of Stirling,
- Zalai, D., Sherman, M., McShane, K., Shapiro, C. M., & Carney, C. E. (2015). The importance of fatigue cognitions in chronic hepatitis C infection. *Journal of Psychosomatic Research*, 78(2), 193-198.
- Zenith L, Meena N, Ramadi A, Yavari M, Harvey A, Carbonneau M, et al. (2014). Eight

weeks of exercise training increases aerobic capacity and muscle mass and reduces fatigue in patients with cirrhosis. *Clinical Gastroenterology and Hepatology*, 2(11),1920-1926.

Zelber-Sagi, S., Bord, S., Dror-Lavi, G., Smith, M. L., Towne Jr, S. D., Buch, A., . . .

Shibolet, O. (2017). Role of illness perception and self-efficacy in lifestyle modification among non-alcoholic fatty liver disease patients. *World Journal of Gastroenterology*, 23(10), 1881.

Zhang, R., Liu, Y., Zhu, J., Hu, M., & Wang, J. (2018). Effect of individual psychological nursing intervention on quality of life and mental health status of patients with liver cirrhosis. *Biomedical Research*, 28(22), 9994-9997.

Zimet, G., Dahlem, N., Zimet, S., & Farley, G. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment*, 52(1), 30-41.

Zimet, G., Powell, S., Farley, G., Werkman, S., & Berkoff, K. (1990). Psychometric characteristics of the multidimensional scale of perceived social support. *Journal of Personality Assessment*, 55(4), 610-617.





**APPENDIX A**  
**INSTRUMENTS**

จุฬาลงกรณ์มหาวิทยาลัย  
**CHULALONGKORN UNIVERSITY**

## APPENDIX A 1

## แบบบันทึกข้อมูลทั่วไปของบุคคลที่เป็นโรคตับแข็ง

## ส่วนที่ 1 ข้อมูลส่วนบุคคล

คำชี้แจง โปรดทำเครื่องหมาย (✓) หน้าข้อความที่ตรงกับตัวท่านหรือเติมคำในช่องว่างเฉพาะส่วนที่เป็นข้อมูลส่วนบุคคล

## ข้อมูลส่วนบุคคล

วันที่เก็บข้อมูล..... รหัส.....

1. เพศ ( ) 1. ชาย ( ) 2. หญิง
2. อายุ ..... ปี
3. สถานภาพการสมรส
  - ( ) 1. โสด ( ) 2. คู่ ( ) 3. หม้าย/หย่า/แยก
4. ผู้ให้การดูแลหลัก ในช่วงที่เจ็บป่วย
  - ( ) 1. ภรรยา ( ) 2.สามี ( ) 3. บุตร
  - ( ) 4. พ่อ/แม่ ( ) 5. อื่น ๆ ระบุ .....
5. ศาสนา
  - ( ) 1. พุทธ ( ) 2. อิสลาม ( ) 3. คริสต์ ( ) 4. อื่น ๆ ระบุ.....
6. ระดับการศึกษา
  - ( ) 1. ไม่ได้เรียน ( ) 4. มัธยมศึกษาตอนปลาย หรือ ปวช.
  - ( ) 2. ประถมศึกษา ( ) 5. อนุปริญญา หรือ ปวส.
  - ( ) 3. มัธยมศึกษาตอนต้น ( ) 6.ปริญญาตรีหรือสูงกว่า
7. อาชีพ
  - ( ) 1. เกษตรกรรม ( ) 4. ส่วนตัวหรือประกอบธุรกิจส่วนตัว
  - ( ) 2. รับราชการ/รัฐวิสาหกิจ ( ) 5. ไม่ได้ประกอบอาชีพ
  - ( ) 3. รับจ้าง ( ) 6. อื่น ๆ โปรดระบุ .....
8. รายได้เฉลี่ยของผู้ป่วย ..... บาท ต่อเดือน
9. สิทธิค่ารักษาพยาบาล
  - ( ) 1. จ่ายเงินสด ( ) 4. ประกันสังคม
  - ( ) 2. บัตรประกันสุขภาพ ( ) 5. ประกันชีวิต
  - ( ) 3. ข้าราชการ/รัฐวิสาหกิจ

ส่วนที่ 2 ข้อมูลเกี่ยวกับโรคและการรักษา (สำหรับผู้วิจัยเก็บจากเวชระเบียน)

10. ระยะเวลาที่เจ็บป่วย (นับจากวันที่วินิจฉัยโรค).....ปี.....เดือน
11. ระยะของโรค.....
12. น้ำหนักร่างกาย.....กิโลกรัม ความสูง.....เซนติเมตร ดัชนีมวลกาย.....คะแนน
13. สาเหตุของการเกิดโรค
- ( ) 1. ไวรัสตับอักเสบ บี ( ) 4. ตับอักเสบเรื้อรัง
- ( ) 2. ไวรัสตับอักเสบ ซี ( ) 5. อื่น ๆ ระบุ .....
- ( ) 3. สุรา
14. การรักษาที่ได้รับในปัจจุบัน
- ( ) 1. ยา ระบุ.....
- ( ) 2. ติดตามผลการรักษา
- ( ) 3. อื่น ๆ .....
15. สาเหตุที่ต้องมาพบแพทย์ในครั้งนี เนื่องจาก
- ( ) 1. มาตรวจตามแพทย์นัด ( ) 5. มีอาการปวด
- ( ) 2. มีเลือดออกในระบบทางเดินอาหาร ( ) 6. มีอาการตัวเหลืองตาเหลือง
- ( ) 3. มีอาการแน่นอึดท้อง จากท้องมาน (ascites) ( ) 7. มีอาการรบกวนมากกว่า 1 อาการ
- ( ) 4. มีอาการเหนื่อยล้า ( ) 8. ส่งมาพบแพทย์จากแผนกฉุกเฉิน
16. โรคประจำตัว/โรคร่วม
- ( ) 0. ไม่มีโรคประจำตัว ( ) 6. เบาหวาน และความดันโลหิตสูง
- ( ) 1. เบาหวาน ( ) 7. ภูุน้ำดีอักเสบเรื้อรัง
- ( ) 2. ช้ออักเสบ ( ) 8. โรคเกาต์
- ( ) 3. ความดันโลหิตสูง ( ) 9. หอบหืด
- ( ) 4. ภาวะพร่องอาหารอักเสบ ( ) 10. อื่น ๆ โปรดระบุ.....
- ( ) 5. โรคทางจิตเวช

## APPENDIX A 2

### แบบสอบถามปัญหาการค้ำสุรา

**คำชี้แจง** เนื่องจากการค้ำสุราอาจมีผลต่อสุขภาพ หรืออาจรบกวนต่อยารักษาหรือการรักษาอื่น ๆ ดังนั้น จึงเป็นเรื่องสำคัญที่จะขอถามเกี่ยวกับการค้ำสุราของคุณ โดยสุราหมายถึงเครื่องดื่มที่มีแอลกอฮอล์ทุกชนิด ได้แก่ เบียร์ เหล้า สาโท กระแช่ วิสกี้ สเปย์ไวน์ เป็นต้น กรุณาตอบคำถามตามความเป็นจริง โปรดทำเครื่องหมายกากบาท (X) ลงในช่องคำตอบที่ตรงความเป็นจริงมากที่สุดในแต่ละข้อคำถาม

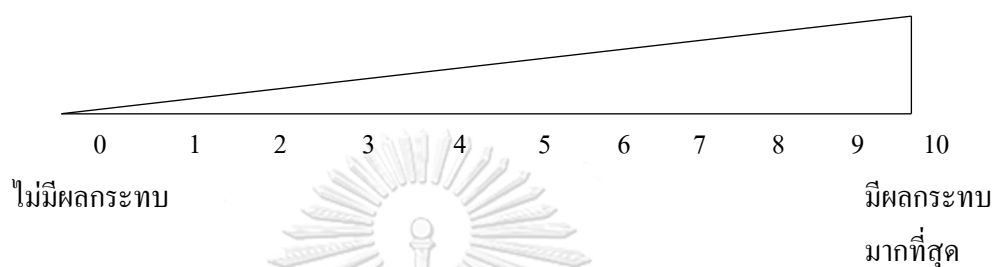
ข้อคำถาม	0	1	2	3	4
1. คุณค้ำสุราบ่อยเพียงไร	ไม่เคยเลย	เดือนละครั้ง หรือน้อยกว่า	2 - 4 ครั้ง ต่อเดือน	2 - 3 ครั้ง ต่อสัปดาห์	4 ครั้งขึ้นไป ต่อสัปดาห์
2. เวลาที่คุณค้ำสุรา โดยทั่วไปแล้วคุณค้ำประมาณเท่าไรต่อวัน หรือ	1-2 ค่ำ มาตรฐาน	3-4 ค่ำ มาตรฐาน	5-6 ค่ำ มาตรฐาน	7-9 ค่ำ มาตรฐาน	ตั้งแต่ 10 ค่ำ มาตรฐานขึ้นไป
3. คุณค้ำ 6 ค่ำมาตรฐาน หรือมากกว่าในคราวเดียวกันบ่อยแค่ไหน?	ไม่เคยเลย	น้อยกว่า เดือนละครั้ง	เดือนละครั้ง	สัปดาห์ละ ครั้ง	ทุกวัน หรือ เกือบทุกวัน

## APPENDIX A 3

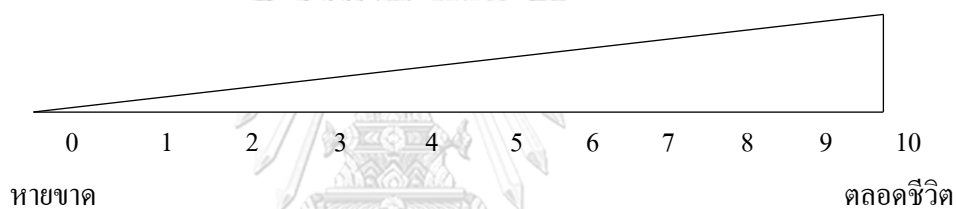
## ชุดที่ 3 แบบสอบถามการรับรู้เกี่ยวกับความเจ็บป่วย

คำชี้แจง โปรดทำเครื่องหมายกากบาท (X) ลงบนตัวเลขที่แสดงถึงความคิดเห็นเกี่ยวกับความเจ็บป่วยของท่านในครั้งนี

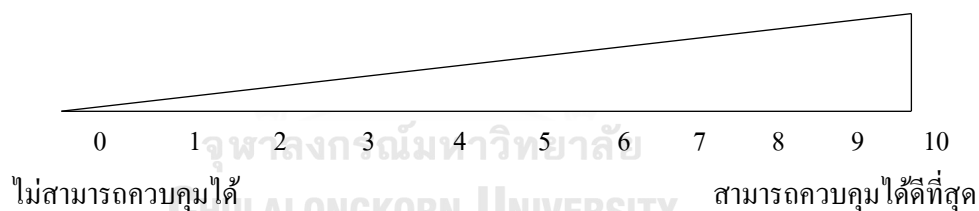
1. ความเจ็บป่วยมีผลกระทบต่อการดำเนินชีวิตของท่านมากน้อยเพียงใด



2. ท่านคิดว่าความเจ็บป่วยของท่านจะคงอยู่นานเท่าไร



3. ท่านรู้สึกว่าคุณสามารถควบคุมความเจ็บป่วยได้มากน้อยเพียงใด

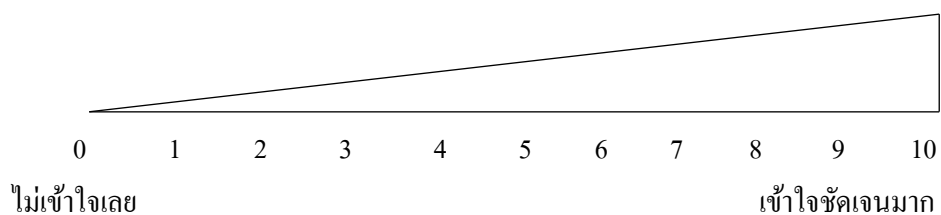


4. ....

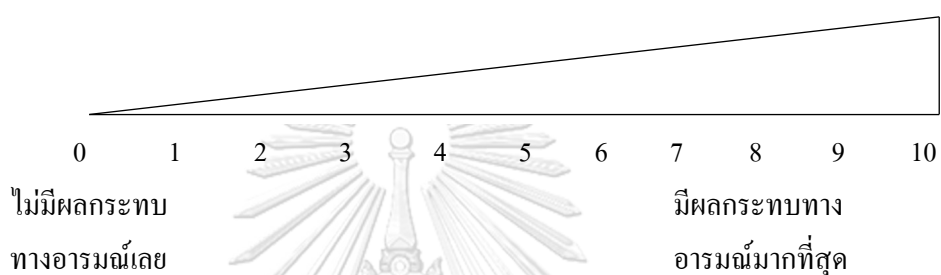
5. ....

6. ....

7. ท่านรู้สึกเข้าใจความเจ็บป่วยของท่านดีเพียงใด



8. ความเจ็บป่วยมีผลกระทบต่ออารมณ์ของท่านมากน้อยเพียงใด



ท่านเชื่อว่าอะไรเป็นสาเหตุของความเจ็บป่วยของท่าน โปรดเรียงลำดับตามความสำคัญจาก 1-3

1. ....
2. ....
3. ....

## APPENDIX A 4

### แบบสอบถามความรู้สึกหลากหลายมิติเกี่ยวกับความช่วยเหลือทางสังคม

คำชี้แจง โปรดบอกว่าความรู้สึกอย่างไรเกี่ยวกับสมาชิกในครอบครัว เพื่อน และบุคคลพิเศษ (บุคคลพิเศษ หมายถึง แพทย์ พยาบาล ผู้ดูแล หรือบุคคลอื่น ๆ ที่ช่วยเหลือ ให้การดูแล) โปรดทำเครื่องหมาย (X) ลงในช่องที่ตรงกับความรู้สึกของท่านมากที่สุดเพียงคำตอบเดียวในแต่ละข้อ และมีเกณฑ์ในการตอบดังนี้

#### ช่องหมายเลข ความหมาย

- 1 ถ้าคุณ ไม่เห็นด้วยอย่างมาก
- 2 ถ้าคุณ ไม่เห็นด้วย
- 3 ถ้าคุณ ค่อนข้างไม่เห็นด้วย
- 4 ถ้าคุณ เฉย ๆ
- 5 ถ้าคุณ ค่อนข้างเห็นด้วย
- 6 ถ้าคุณ เห็นด้วย
- 7 ถ้าคุณ เห็นด้วยอย่างมาก

คำถาม	1	2	3	4	5	6	7
1. มีบุคคลพิเศษที่คอยช่วย หากฉันต้องการความช่วยเหลือขึ้นมา							
2. มีบุคคลพิเศษที่สามารถร่วมทุกข์ร่วมสุขกับฉันได้							
3. ครอบครัวของฉันพยายามช่วยฉันจริง ๆ							
4. ....							
5. ....							
6. ....							
7. ....							
8. ....							
9. ....							
10. มีบุคคลพิเศษในชีวิตที่คอยห่วงใยความรู้สึกของฉัน							
11. ครอบครัวของฉันเต็มใจที่จะช่วยฉันในการตัดสินใจ							
12. ฉันสามารถเล่าปัญหาของฉันให้เพื่อนฟังได้							





## APPENDIX A 6

## แบบสอบถามภาวะการทำงานที่

## แบบสอบถามภาวะการทำงานที่

คำชี้แจง กรุณาอ่านข้อความในแต่ละข้อแล้วพิจารณาเลือกคำตอบที่ตรงกับความรู้สึกของท่านมากที่สุด โดยทำเครื่องหมายวงกลม ○ บนตัวเลข เพียงข้อเดียว

ด้านร่างกาย:	โดยปกติจะไม่ทำ เพราะสาเหตุอื่น (0)	โดยปกติจะไม่ทำ เพราะปัญหาสุขภาพ (1)	ทำได้ด้วยความ ลำบากมาก (2)	ทำได้ด้วยความ ลำบากในบางครั้ง (3)	ทำได้ดีปกติ ไม่ลำบาก (4)
ในช่วง 1 เดือนที่ผ่านมา คุณมีความลำบากในการที่กิจกรรมประจำวัน ดังนี้					
1. ดูแลตนเอง เช่น การรับประทานอาหาร การแต่งตัว หรือการอาบน้ำ	0	1	2	3	4
2. ....	0	1	2	3	4
3. ....	0	1	2	3	4
ในช่วง 1 เดือนที่ผ่านมา คุณมีความลำบากในการที่กิจกรรมที่ต้องออกแรงปานกลาง ดังนี้					
1. เดินหลายช่วงตึก	0	1	2	3	4
2. ....	0	1	2	3	4
3. ....	0	1	2	3	4
4. ....	0	1	2	3	4
5. ....	0	1	2	3	4
6. ทำกิจกรรมที่ต้องใช้กำลัง เช่น การวิ่ง การยกของหนัก หรือการเล่นกีฬาที่ต้องออกแรงมาก	0	1	2	3	4
ด้านจิตใจ:	รู้สึกแบบนี้ ตลอดเวลา (1)	รู้สึกแบบนี้ บ่อยครั้ง (3)	รู้สึกแบบนี้ ในบางครั้ง (4)	รู้สึกแบบนี้ ไม่บ่อยครั้ง (5)	ไม่รู้สึก แบบนี้เลย (6)
ในช่วง 1 เดือนที่ผ่านมา สภาพจิตใจของคุณ คือ ...					
1. รู้สึกประหม่ามาก	1	3	4	5	6
2. ....	1	3	4	5	6
3. ....	1	3	4	5	6
4. ....	1	3	4	5	6
5. รู้สึกหุนหันุนใจจนแทบจะไม่มีอะไรช่วยให้อารมณ์ดีขึ้นได้เลย	1	3	4	5	6

ด้านสังคมและบทบาท:	ทำได้ดีตลอดเวลา (1)	ทำได้ดีบ่อยครั้ง (2)	ทำได้ดีเป็นบางครั้ง (3)	ทำไม่ได้เลย (4)	
ในช่วง / เดือนที่ผ่านมา ความสามรถในการปฏิบัติงานของคุณ คือ...					
1. ทำงานสำเร็จได้ตามที่คนอื่นที่ทำงานคล้ายกัน	1	2	3	4	
2. ....	1	2	3	4	
3. ....	1	2	3	4	
4. ....	1	2	3	4	
5. ....	1	2	3	4	
6. ทำงานด้วยความกลัวว่าจะตกงานเนื่องจากสุขภาพของคุณ	1	2	3	4	
โดยปกติจะไม่ทำ เพราะสาเหตุอื่น (0)	โดยปกติจะไม่ทำ เพราะข้อบกพร่อง (1)	ทำด้วยความลำบากมาก (2)	ทำด้วยความลำบากเป็นบางครั้ง (3)	ทำได้ดีเป็นปกติ ไม่ลำบาก (4)	
ในช่วง / เดือนที่ผ่านมา คุณมีความลำบากที่เกิดจากเรื่องข้างต้น เหล่านี้ .....					
1. การไปเยี่ยมญาติหรือเพื่อน	0	1	2	3	
2. ....	0	1	2	3	
3. การดูแลบุคคลอื่น เช่น สมาชิกในครอบครัว	0	1	2	3	
ในช่วง / เดือนที่ผ่านมา ลักษณะการปฏิบัติงานที่ซับซ้อนของคุณ คือ.....					
1. แยกตัวเองออกจากคนรอบข้าง	ทำแบบที่ 1 (1)	ทำแบบที่ 2 (2)	ทำแบบที่ 3 (3)	ทำแบบที่ 4 (4)	
2. ....	1	2	3	4	
3. ....	1	2	3	4	
4. ....	1	2	3	4	
5. เป็นมิตรกับคนรอบข้าง	1	2	3	4	
ทำแบบที่ 1 (1)	ทำแบบที่ 2 (2)	ทำแบบที่ 3 (3)	ทำแบบที่ 4 (4)	ทำแบบที่ 5 (5)	ทำแบบที่ 6 (6)

## คำถามเดี่ยว

## คำชี้แจง

1) กรุณาอ่านข้อความในข้อ 1, 4, 5, และ 6 แล้วพิจารณาเลือกคำตอบที่ตรงกับความรู้สึกของท่านมากที่สุด โดยทำเครื่องหมายกากบาท (X) บนตัวเลข เพียงข้อเดียว

2) กรุณาอ่านข้อความในข้อ 2 และ 3 แล้วเขียนตัวเลข ที่บ่งบอกถึงจำนวนวันที่ท่านประสบกับปัญหาหรือกระทำในสิ่งที่ข้อความกล่าวถึง

1. ข้อความใดต่อไปนี้ที่บ่งบอกถึงสถานภาพการทำงานของคุณ ในช่วงเวลา 1 เดือนที่ผ่านมา?

( ) 1. ทำงานเต็มเวลา

( ) 4.ว่างงานเพราะปัญหาสุขภาพ

( ) 2.ทำงานนอกเวลา

( ) 5.ออกจากงานเพราะปัญหาสุขภาพ

( ) 3.ว่างงาน กำลังหางาน

( ) 6. ออกจากงานเพราะเหตุผลอื่น

2. ....

3. ....

4. ....

5. ....

6. ในช่วง 1 เดือนที่ผ่านมา คุณรวมตัวกับเพื่อน ๆ หรือญาติ ๆ เช่น ออกไปข้างนอกด้วยกัน ไปพบปะกันที่บ้านของแต่ละคน หรือพูดคุยกันทางโทรศัพท์ บ่อยแค่ไหน?

( ) 0. ไม่เคยเลย

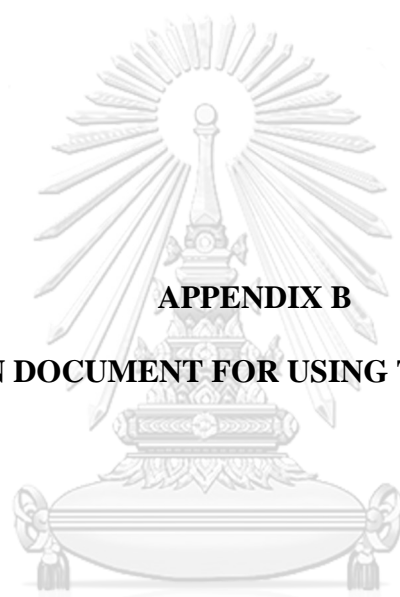
( ) 3. ประมาณสัปดาห์ละครั้ง

( ) 1. ประมาณเดือนละครั้ง

( ) 4. หลายครั้งใน 1 สัปดาห์

( ) 2. 2 หรือ 3 ครั้งต่อเดือน

( ) 5. ทุกวัน



**APPENDIX B**

**PERMISSION DOCUMENT FOR USING THE INSTRUMENTS**

จุฬาลงกรณ์มหาวิทยาลัย  
**CHULALONGKORN UNIVERSITY**

## Functional Status Questionnaire

Dear Professor. Dr. Alan Jette

My name is Mr. Surachai Maninet, a PhD candidate from faculty of nursing, Chulalongkorn university in Thailand. I am conducting a dissertation entitled “A casual model of functional status among persons with liver cirrhosis” as course requirement in the degree of Doctor of Philosophy in nursing science (Ph.D.). My major advisor is Assoc. Prof. Pol. Capt. Dr. Yupin Aunguroch. My co-advisor is Asst. Prof. Dr. Chanokporn Jitpanya.

In connection with this, the concept of functional status is the dependent variable in this study. Therefore, I would like to ask your permission to use and translate the Functional Status Questionnaire (FSQ) from English into Thai language. After that the Thai version will be use to testing reliability, validity, and collecting data. I will use the tool only for my dissertation and not sell or use it with any compensated or curriculum development activities.

If this request is acceptable terms and conditions, please do not hesitate to contact me via e-mail: [surachaimaninet@gmail.com](mailto:surachaimaninet@gmail.com) or Call: +66866008302. I would appreciate your attention to this matter.

Best regards,

Mr. Surachai Maninet

Ph.D. candidate

October 16<sup>th</sup>, 2019



Surachai Maninet &lt;surachaimaninet@gmail.com&gt;

## Seeking Permission to translate the Functional Status Questionnaire (FSQ) from English into Thai Language

4 ข้อความ

Surachai Maninet &lt;surachaimaninet@gmail.com&gt;

22 มกราคม 2563 13:09

ถึง: "ajette@bu.edu" &lt;ajette@bu.edu&gt;

สถานะ: Surachai Maninet &lt;surachaimaninet@gmail.com&gt;

Dear Professor. Dr. Alan Jette

My name is Mr. Surachai Maninet, a PhD candidate from faculty of nursing, Chulalongkorn university, Thailand. I am conducting a dissertation entitled "A casual model of functional status among persons with liver cirrhosis" as course requirement in the degree of Doctor of Philosophy in nursing science (Ph.D.). My major advisor is Assoc. Prof. Pol. Capt. Dr. Yupin Aunguroch. My co-advisor is Asst. Prof. Dr. Chanokporn Jitpanya.

Since the permission is granted by you to use the Functional Status Questionnaire (FSQ), I and my advisors agree that we need to translate this instrument into Thai language before administering to interested population. Therefore, I would love to ask for permission to translate this instrument into Thai language which would be more benefits for research and education in the future.

If this request is acceptable terms and conditions, please do not hesitate to contact me via e-mail: [surachaimaninet@gmail.com](mailto:surachaimaninet@gmail.com) or Call: +66866008302. I would appreciate your attention to this matter.

Best regards,

Mr. SURACHAI MANINET, PhD Student (Nursing)

Tel. 0866008302 Email: [surachaimaninet@gmail.com](mailto:surachaimaninet@gmail.com)

Faculty of nursing, Chulalongkorn University

Borommaratchachonnasri Srisatsaphat building

Flor 11, Rama 1 road, Wangmai, Pathumwan, Bangkok 10330



Surachai Maninet &lt;surachaimaninet@gmail.com&gt;

## Seeking Permission to translate the Functional Status Questionnaire (FSQ) from English into Thai Language

Alan Jette &lt;alanmjette@gmail.com&gt;

22 มกราคม 2563 17:07

ถึง: Surachai Maninet &lt;surachaimaninet@gmail.com&gt;

Permission granted .

Alan Jette

[ข้อความที่เกี่ยวข้องถูกซ่อนไว้]



Surachai Maninet &lt;surachaimaninet@gmail.com&gt;

---

## Seeking Permission to translate the Functional Status Questionnaire (FSQ) from English into Thai Language

---

Surachai Maninet <surachaimaninet@gmail.com>  
 ถึง: Alan Jette <alanmjette@gmail.com>

15 พฤศจิกายน 2563 13:15

Dear Professor. Dr. Alan Jette

Greeting from a PhD candidate from Faculty of Nursing, Chulalongkorn University, Thailand. I would like to inform you that the Functional Status Questionnaire (FSQ) was translated into Thai language using the forward and backward translation method. There was no issue regarding the words used and cultural appropriation. Moreover, I have created the format of this instrument that easier for the sample to be able read and response to the sentences remained in this instrument. I hope you appreciate it.

This FSQ-Thai version (see attached file below) was found valid and reliable when using in a particular group of persons with liver cirrhosis. This instrument help me to understand more about characteristics of functional status among persons with liver cirrhosis.

Again, thank you so much for your kindness.

Best regards,

Mr. Surachai Maninet

Mr. SURACHAI MANINET, PhD Student (Nursing)

Tel. 0866008302 Email: [surachaimaninet@gmail.com](mailto:surachaimaninet@gmail.com)

Faculty of nursing, Chulalongkorn University

Borommaratchachonnani Srisataphat building

Flor 11, Rama 1 road, Wangmai, Pathumwan, Bangkok 10330



Surachai Maninet &lt;surachaimaninet@gmail.com&gt;

---

## Seeking Permission to translate the Functional Status Questionnaire (FSQ) from English into Thai Language

---

Alan Jette <alanmjette@gmail.com>  
 ถึง: Surachai Maninet <surachaimaninet@gmail.com>

15 พฤศจิกายน 2563 18:16

I am glad you found it useful in your research. Thanks for letting me know.

Get [Outlook for iOS](#)

---

**From:** Surachai Maninet <[surachaimaninet@gmail.com](mailto:surachaimaninet@gmail.com)>

**Sent:** Sunday, November 15, 2020 1:15:36 AM

**To:** Alan Jette <[alanmjette@gmail.com](mailto:alanmjette@gmail.com)>

**Subject:** Re: Seeking Permission to translate the Functional Status Questionnaire (FSQ) from English into Thai Language

### **Brief Illness Perception Questionnaire**

Dear Elizabeth Broadbent

I am a PhD candidate from faculty of nursing, Chulalongkorn university in Thailand. I am conducting a dissertation entitled “**A casual model of functional status among persons with liver cirrhosis**” as course requirement in the degree of Doctor of Philosophy in nursing science (Ph.D.). My major advisor is Assoc. Prof. Pol. Capt. Dr. Yupin Aunguroch. My co-advisor is Asst. Prof. Dr. Chanokporn Jitpanya.

In connection with this, the concept of illness perception is one of independent variable in this study. Therefore, I would like to ask your permission to use the **Brief Illness Perception Questionnaire (Brief-IPQ)** both English and Thai version for testing reliability, validity, and collecting data. I will use the tool only for my dissertation and not sell or use it with any compensated or curriculum development activities.

If this request is acceptable terms and conditions, please do not hesitate to contact me via e-mail: [surachaimaninet@gmail.com](mailto:surachaimaninet@gmail.com) or Call: +66866008302. I would appreciate your attention to this matter.

Best regards,

Mr. Surachai Maninet

Ph.D. candidate

October 16<sup>th</sup>, 2019





Surachai Maninet &lt;surachaimaninet@gmail.com&gt;

---

## Letter Seeking Permission to Use Questionnaire Tool

---

**Elizabeth Broadbent** <e.broadbent@auckland.ac.nz>

16 ตุลาคม 2562 03:11

ถึง: Letter Seeking Permission to Use Questionnaire Tool &lt;surachaimaninet@gmail.com&gt;

Dear Mr Maninet

Yes you may use the questionnaire for this research

Kind regards

Liz

Elizabeth Broadbent  
Professor of Health Psychology  
Department of Psychological Medicine  
Faculty of Medical and Health Sciences  
The University of Auckland  
New Zealand  
[e.broadbent@auckland.ac.nz](mailto:e.broadbent@auckland.ac.nz)  
[google scholar](#)



จุฬาลงกรณ์มหาวิทยาลัย  
CHULALONGKORN UNIVERSITY

## Letter Seeking Permission to use the Tool

### Multidimensional Scale of Perceived Social Support

Dear Professor Dr. Gregory Zimet

My name is Mr. Surachai Maninet, a PhD candidate from faculty of nursing, Chulalongkorn university in Thailand. I am conducting a dissertation entitled “**A casual model of functional status among persons with liver cirrhosis**” as course requirement in the degree of Doctor of Philosophy in nursing science (Ph.D.). My major advisor is Assoc. Prof. Pol. Capt. Dr. Yupin Aunguroch. My co-advisor is Asst. Prof. Dr. Chanokporn Jitpanya.

In connection with this, the concept of social support is one of independent variable in this study. Therefore, I would like to ask your permission to use the **Multidimensional Scale of Perceived Social Support (MSPSS)** both English and Thai version for testing reliability, validity, and collecting data. I will use the tool only for my dissertation and not sell or use it with any compensated or curriculum development activities.

If this request is acceptable terms and conditions, please do not hesitate to contact me via e-mail: [surachaimaninet@gmail.com](mailto:surachaimaninet@gmail.com) or Call: +66866008302. I would appreciate your attention to this matter.

Best regards,

Mr. Surachai Maninet

Ph.D. candidate

October 16th, 2019



Surachai Maninet &lt;surachaimaninet@gmail.com&gt;

---

**Letter Seeking Permission to Use the Multidimensional Scale of Perceived Social Support**

---

Zimet, Gregory D &lt;gzimet@iu.edu&gt;

25 ตุลาคม 2562 20:27

ถึง: Surachai Maninet &lt;surachaimaninet@gmail.com&gt;

Dear Mr. Surachai Maninet,

You have my permission to use the Multidimensional Scale of Perceived Social Support (MSPSS) in your research. I have attached the original English language version of the scale (with scoring information on the 2<sup>nd</sup> page), a document listing several of the articles that have reported on the reliability and validity of the MSPSS, and a chapter that I wrote about the scale. Also attached is a Thai translation, which you may find helpful (and 2 published papers about the translation).

I hope your research goes well.

Best regards,

Greg Zimet

---

**Gregory D. Zimet, PhD, FSAHM**

Professor of Pediatrics & Clinical Psychology

Co-Director, IUPUI Center for HPV Research

Division of Adolescent Medicine | Department of Pediatrics

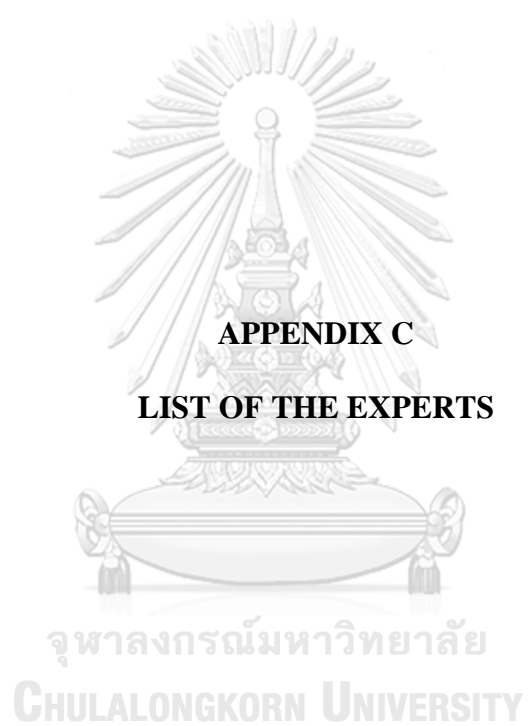
410 W. 10<sup>th</sup> Street | HS 1001

Indianapolis, IN 46202

317.274.8812 tel

317.274.0133 fax

gzimet@iu.edu



### **List of Experts for Content Validity Testing**

1. Dr. Manit Khamhaeng, MD, a surgeon, Surgical department,  
Sunpasithiprasong Hospital, Ubonratchathani
2. Dr. Sakkarin Chirapongsathorn, MD, a hepatologist  
Surgical department, Phramongkutklo Hospital, Bangkok
3. Asst. Prof. Dr. Busaba Somjaiwong,  
Nursing Department, Faculty of Medicine, Khon Kaen University
4. Mrs. Ubol Juangpanich, MSN, RN  
Nursing Department, Faculty of Medicine, Khon Kaen University
5. Mrs. Thippawan Buathong, MSN, RN  
Surgical department, Sunpasithiprasong Hospital, Ubonratchathani



**APPENDIX D**  
**DOCUMENTARY PROOF OF ETHICAL CLEARANCE**

จุฬาลงกรณ์มหาวิทยาลัย  
**CHULALONGKORN UNIVERSITY**

CA code 024/2563



คณะกรรมการจริยธรรมการวิจัยในมนุษย์  
โรงพยาบาลสรรพสิทธิประสงค์ จ.อุบลราชธานี

เอกสารรับรองจริยธรรมการวิจัยในมนุษย์

ชื่อโครงการ โมเดลเชิงสาเหตุของภาวะการไม่ทำหน้าที่ของบุคคลที่เป็นโรคตับแข็ง  
A casual model of functional status among persons with liver cirrhosis

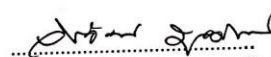
รหัสโครงการ 003/63 C


ผู้วิจัยหลัก นายสุรชัย มณีเนตร และคณะ

หน่วยงาน/สถาบัน คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

คณะกรรมการจริยธรรมการวิจัยในมนุษย์ โรงพยาบาลสรรพสิทธิประสงค์ อุบลราชธานี ได้พิจารณารายละเอียดของโครงการวิจัย เอกสารข้อมูลสำหรับอาสาสมัคร เอกสารแสดงความยินยอม เข้าร่วมการวิจัยภาษาไทยแล้ว มีมติสมควรให้ดำเนินการวิจัยในขอบเขตของโครงการที่เสนอได้

การรายงานความก้าวหน้า ส่งรายงานความก้าวหน้าอย่างน้อย 1 ครั้ง/ปี

  
(นายแพทย์จิรวัดน์ มุลศาสตร์)  
ประธานคณะกรรมการการวิจัยในมนุษย์  
โรงพยาบาลสรรพสิทธิประสงค์

  
(นายแพทย์มนต์ชัย วิวัฒนาสิทธิพงศ์)  
ผู้อำนวยการโรงพยาบาลสรรพสิทธิประสงค์

วันที่รับรอง : 13 ส.ค. 2563

วันหมดอายุของการรับรอง:

12 ส.ค. 2564

เอกสารที่รับรองรวมถึง

1. โครงการวิจัย ฉบับแก้ไขครั้งที่ 1 วันที่ 17 กุมภาพันธ์ 2563
2. ใบยินยอมและเอกสารชี้แจงอาสาสมัคร ฉบับแก้ไขครั้งที่ 1 วันที่ 17 กุมภาพันธ์ 2563
3. ผู้วิจัย/คณะผู้วิจัย ฉบับแก้ไขครั้งที่ 1 วันที่ 17 กุมภาพันธ์ 2563
4. แบบสอบถาม/แบบบันทึกข้อมูล ฉบับแก้ไขครั้งที่ 1 วันที่ 17 กุมภาพันธ์ 2563



ผู้วิจัยที่ได้รับการรับรองต้องปฏิบัติตามเงื่อนไขดังต่อไปนี้

1. ผู้วิจัยรับทราบว่าเป็นการวิจัยที่รวบรวมข้อมูลที่ศึกษาก่อนโครงการได้รับการรับรองโดยคณะกรรมการจริยธรรมการวิจัยในมนุษย์ โรงพยาบาลสรรพสิทธิประสงค์ อุบลราชธานี
2. กิจกรรมของโครงการวิจัยต้องจบลงภายในวันหมดอายุของการรับรอง ถ้าต้องการขยายเวลา ต้องยื่นแสดงความจำนงก่อนวันหมดอายุ 30 วัน
3. ผู้วิจัยต้องทำการศึกษาตรงตามที่ระบุไว้ในโครงการวิจัยอย่างเคร่งครัด
4. ใบยินยอมแบบฟอร์มที่คณะกรรมการจริยธรรมฯ ได้รับรอง (ใบยินยอมและเอกสารชี้แจงอาสาสมัคร, แผ่นประชาสัมพันธ์ เป็นต้น) และ คณะกรรมการจริยธรรมฯ มีสิทธิ์ตรวจสอบเอกสารดังกล่าวได้ทุกครั้งเมื่อต้องการ
5. ในกรณีที่เกิดเหตุการณ์ข้างเคียงร้ายแรง ต้องรายงานคณะกรรมการจริยธรรมฯ ภายใน 5 วันทำการ
6. ในกรณีที่มีการเปลี่ยนแปลงกิจกรรมไปจากเดิมที่รับรองไว้ ต้องรายงานคณะกรรมการจริยธรรมฯ ก่อนที่จะเริ่มทำกิจกรรมนั้นๆ
7. ส่งรายงานการวิจัยฉบับสมบูรณ์หลังโครงการวิจัยเสร็จสิ้นแล้ว จำนวน 1 ฉบับ

สถานที่ติดต่อ: คณะกรรมการจริยธรรมการวิจัยในมนุษย์ รพ.สรรพสิทธิประสงค์ ถ.สรรพสิทธิ์ ต.ในเมือง อ.เมือง จ.อุบลราชธานี  
34000 โทรศัพท์ 045-319200 ต่อ 1395

รพ.นย. REC No 02/2563

สำนักงานปลัดกระทรวงสาธารณสุข  
กรุงเทพฯ 10110

คณะกรรมการจริยธรรมการวิจัยในมนุษย์โรงพยาบาลนครนายก  
ที่อยู่ 1/100 ต. นครนายก อ. เมือง จ. นครนายก โทร. 037-314549

คณะกรรมการจริยธรรมการวิจัยในมนุษย์โรงพยาบาลนครนายก ดำเนินการให้การรับรองโครงการวิจัยตามแนวทางหลักจริยธรรมการวิจัยในมนุษย์ที่เป็นมาตรฐานสากลได้แก่ Declaration of Helsinki, The Belmont Report, CIOMS Guideline และ International Conference on Harmonization in Good Clinical Practice หรือ ICH-GCP

ชื่อโครงการ (ภาษาไทย) : โมเดลเชิงสาเหตุของภาวะการทำหน้าที่ของบุคคลที่เป็นโรคตับแข็ง  
(ภาษาอังกฤษ) : A Casual Model of Functional Status among Persons with Liver Cirrhosis.

เลขที่โครงการวิจัย : รพ. นย. REC No 02/2563

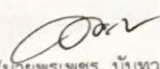
ผู้วิจัยหลัก : นายสุรชัย มณีเนตร


สังกัดหน่วยงาน : คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

วิธีทบทวน : คณะกรรมการเต็มชุด (Full board)

รายงานความก้าวหน้า : ส่งรายงานฉบับสมบูรณ์หากดำเนินโครงการเสร็จสิ้นก่อน 1 ปี

- เอกสารรับรอง
1. แบบเสนอโครงการวิจัย
  2. เอกสารคำชี้แจงและเอกสารให้ความยินยอมเข้าร่วมในโครงการวิจัย
  3. แบบบันทึกข้อมูลส่วนบุคคลของผู้ป่วยโรคตับแข็ง
  4. แบบสอบถามปัญหาการดื่มสุราของบุคคลที่เป็นโรคตับแข็ง
  5. แบบสอบถามการรับรู้เกี่ยวกับความเจ็บป่วยของบุคคลที่เป็นโรคตับแข็ง
  6. แบบสอบถามความรู้สึกหลากหลายมิติเกี่ยวกับความช่วยเหลือทางสังคม
  7. แบบสอบถามความเหนื่อยล้าของบุคคลที่เป็นโรคตับแข็ง
  8. แบบสอบถามภาวะการทำหน้าที่

ลงนาม   
(นายพรเพชร นันทวุฒิพันธุ์)  
ผู้อำนวยการโรงพยาบาลนครนายก

ลงนาม   
(นายสุภาพ มะเคื้อลี)  
ประธานคณะกรรมการจริยธรรมการวิจัยในมนุษย์  
โรงพยาบาลนครนายก

วันที่รับรอง 24 มีนาคม 2563

วันหมดอายุ 23 มีนาคม 2564

ทั้งนี้ การรับรองนี้มีเงื่อนไขซึ่งระบุไว้ด้านหลังทุกข้อ (ดูด้านหลังของเอกสารรับรองโครงการวิจัย)





NO. 22/63

แบบรับรองการดำเนินการวิจัยในโรงพยาบาลลำปาง  
คณะกรรมการจริยธรรมการวิจัยเกี่ยวกับมนุษย์ โรงพยาบาลลำปาง

1.ชื่อโครงการวิจัย (ภาษาไทย) โมเดลเชิงสาเหตุของภาวะการทำหน้าที่ของบุคคลที่เป็นโรคตับแข็ง  
(ภาษาอังกฤษ) A Casual Model of Functional Status among Persons with Liver Cirrhosis

2.ชื่อหัวหน้าโครงการวิจัย นายสุรัชย์ มณีเนตร  
หน่วยงานที่สังกัด นิติระดับคหบดีบัณฑิต คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย  
ชื่อผู้วิจัยร่วม 1.รองศาสตราจารย์ ร.ต.อ.หญิง ดร.ยุพิน อังสุโรจน์  
2.ผู้ช่วยศาสตราจารย์ ดร.ชนกพร จิตปัญญา  
หน่วยงานที่สังกัด คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

ความคิดเห็นของคณะกรรมการจริยธรรมการวิจัยเกี่ยวกับมนุษย์ โรงพยาบาลลำปาง

- อนุมัติ  
 ไม่อนุมัติ เหตุผล..

วันที่รับรอง 23 มีนาคม 2563 – 22 มีนาคม 2564

( พญ.กนกศรี สมิทรปัญญา )

ประธานคณะกรรมการจริยธรรมการวิจัยเกี่ยวกับมนุษย์  
โรงพยาบาลลำปาง  
วันที่ 23 เดือน มีนาคม พ.ศ. 2563



คณะกรรมการพิจารณาการศึกษาวิจัยในคน โรงพยาบาลนครพนม

ใบรับรองการอนุมัติ

NP - EC11 - No. 3/2563

ชื่อโครงการวิจัย : โมเดลเชิงสาเหตุของภาวะการทำหน้าที่ของบุคคลที่เป็นโรคตับแข็ง

ชื่อโครงการวิจัย (ภาษาอังกฤษ) : A casual model of functional status among persons with liver cirrhosis.

ผู้วิจัยหลัก : นายสุรชัย มณีเนตร

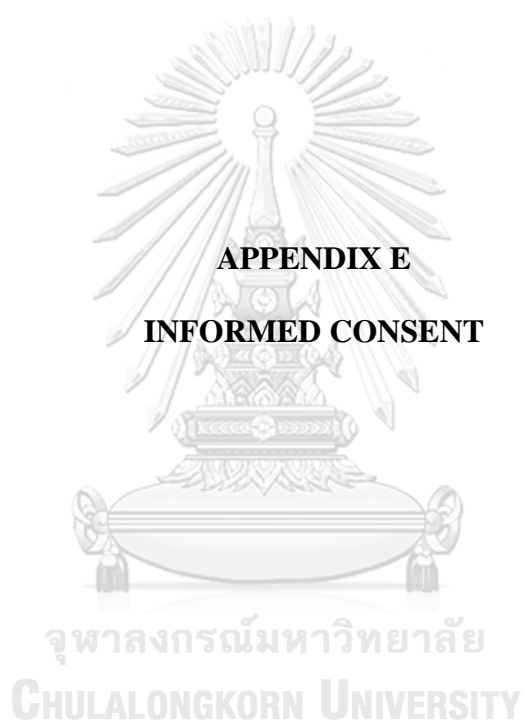
สถานที่ทำการวิจัย : โรงพยาบาลนครพนม

วิธีทบทวน : แบบเร่งด่วน (Expedited review)

ทั้งนี้ข้อเสนอการวิจัย ได้รับการพิจารณาและให้ความเห็นชอบจากคณะกรรมการพิจารณาการศึกษาวิจัยในคน โรงพยาบาลนครพนม และอนุมัติในด้านจริยธรรมให้ดำเนินการศึกษาวิจัยเรื่องข้างต้นได้บนพื้นฐานของโครงร่างงานวิจัยที่คณะกรรมการฯ ได้รับและพิจารณาหากมีการเปลี่ยนแปลงใดๆ ในโครงการวิจัย ผู้วิจัยจักต้องยื่นขอรับการพิจารณาใหม่

วันที่ให้การรับรอง : 18 กุมภาพันธ์ 2563  
วันหมดอายุใบรับรอง : 17 กุมภาพันธ์ 2564

(นายสุรจิตร์ คูสกุล)  
ประธานคณะกรรมการพิจารณาการศึกษาวิจัยในคน  
โรงพยาบาลนครพนม



**เอกสารแสดงความยินยอมสำหรับอาสาสมัคร  
(Informed Consent Form)**

ทำที่.....

วันที่.....เดือน.....พ.ศ. ....

**ชื่อโครงการ** โมเดลเชิงสาเหตุของภาวะการทำหน้าที่ของบุคคลที่เป็นโรคตับแข็ง

**ชื่อผู้วิจัย** นายสุรชัย มณีเนตร (นิสิต)

**ที่อยู่** 234/1 เสนาภิรมย์รังสรรค์พาร์ทเมนท์ ซอยเสนานิคม ๓. พญาไท แขวงทุ่งพญาไท เขตราชเทวี กรุงเทพมหานคร 10400

**หมายเลขโทรศัพท์** 086-6008302

ข้าพเจ้าได้รับทราบรายละเอียดจากผู้วิจัยถึงวัตถุประสงค์ ลักษณะและแนวทางการศึกษาวิจัย รวมทั้งทราบถึงผลดี ความไม่สะดวกที่อาจเกิดขึ้น ข้าพเจ้าได้ซักถาม อ่านรายละเอียด และทำความเข้าใจเกี่ยวกับการศึกษาดังกล่าวนี้ รวมถึงได้รับคำชี้แจงและคำอธิบายจากผู้วิจัย จนเข้าใจเป็นอย่างดีแล้ว

ข้าพเจ้ายินดีเข้าร่วมในโครงการวิจัยนี้ด้วยความสมัครใจและยินดีให้ข้อมูลของข้าพเจ้าแก่ผู้วิจัยครั้งนี้ ตามที่ระบุไว้ในเอกสารชี้แจงผู้เข้าร่วมวิจัย ข้าพเจ้ามีสิทธิถอนตัวออกจากการวิจัยเมื่อใดก็ได้ตามความประสงค์ โดยไม่ต้องแจ้งเหตุผล ซึ่งการถอนตัวออกจากการวิจัยนั้นจะไม่มีผลกระทบใดๆ ต่อข้าพเจ้า รวมถึงการได้รับบริการหรือการรักษาที่ข้าพเจ้าจะได้รับแต่ประการใด

ข้าพเจ้าได้รับคำรับรองว่า ผู้วิจัยจะปฏิบัติต่อข้าพเจ้าตามข้อมูลที่ระบุไว้ในเอกสารชี้แจงผู้เข้าร่วมการวิจัย หากผู้วิจัยมีข้อมูลเพิ่มเติมทั้งทางด้านประโยชน์และผลข้างเคียงที่เกี่ยวข้องกับการวิจัยนี้ ผู้วิจัยจะแจ้งให้ข้าพเจ้าทราบอย่างรวดเร็วโดยไม่ขัดข้อง และข้อมูลใดๆ ที่เกี่ยวข้องกับข้าพเจ้า ผู้วิจัยจะเก็บรักษาเป็นความลับ โดยจะเสนอข้อมูลการวิจัยเป็นภาพรวมเท่านั้น ไม่มีข้อมูลใดในการรายงานที่จะนำไปสู่การระบุตัวข้าพเจ้า

หากข้าพเจ้าไม่ได้รับการปฏิบัติตรงตามที่ได้ระบุไว้ในเอกสารชี้แจงผู้เข้าร่วมการวิจัย ข้าพเจ้าสามารถร้องเรียนได้ที่คณะกรรมการพิจารณาจริยธรรมการวิจัยในคน กลุ่มสหสถาบัน ชุดที่ 1 จุฬาลงกรณ์มหาวิทยาลัย ชั้น 4 อาคารสถาบัน 2 ซอยจุฬาลงกรณ์ 62 ถนนพญาไท เขตปทุมวัน กรุงเทพฯ 10330 โทรศัพท์ 0-2218-8147, 0-2218-8141 โทรสาร 0-2218-8147 E-mail: eccu@chula.ac.th

ข้าพเจ้าได้ลงลายมือชื่อไว้เป็นสำคัญต่อหน้าพยาน ทั้งนี้ข้าพเจ้าได้รับสำเนาเอกสารชี้แจง  
ผู้เข้าร่วมการวิจัย และสำเนานั่งสื่อแสดงความยินยอมไว้แล้ว

ลงชื่อ.....

(นายสุรชัย มณีเนตร)

ผู้วิจัยหลัก

ลงชื่อ.....

(.....)

อาสาสมัครในการวิจัย

ลงชื่อ.....

(.....)

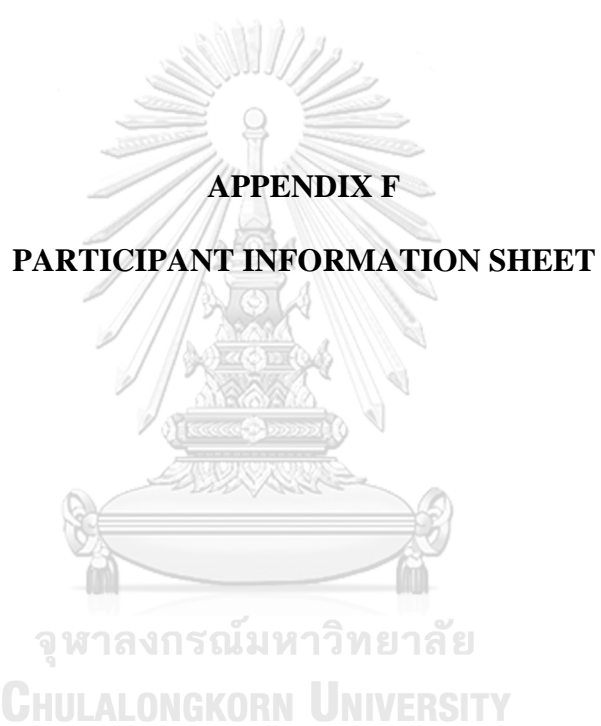
พยาน

ลงชื่อ.....

(.....)

พยาน





**เอกสารคำชี้แจงสำหรับอาสาสมัคร**  
**(Patient/ Participant Information Sheet)**

<b>ชื่อโครงการวิจัย</b>	โมเดลเชิงสาเหตุของภาวะการทำหน้าที่ของบุคคลที่เป็นโรคตับแข็ง
<b>ชื่อผู้วิจัย</b>	นายสุรชัย มณีเนตร
<b>สถานศึกษา</b>	คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
<b>โทรศัพท์เคลื่อนที่</b>	086-6008302
<b>E-mail :</b>	surachaimaninet@gmail.com

ข้อมูลที่เกี่ยวข้องกับการให้คำยินยอมในการวิจัยประกอบด้วย คำอธิบายดังต่อไปนี้

1. โครงการนี้เกี่ยวข้องกับการศึกษาโมเดลเชิงสาเหตุของภาวะการทำหน้าที่ของบุคคลที่เป็นโรคตับแข็ง ประเทศไทย
2. วัตถุประสงค์ของการวิจัย คือ เพื่อศึกษาความสัมพันธ์ระหว่างการดื่มเครื่องดื่มแอลกอฮอล์ การสนับสนุนทางสังคม การรับรู้เกี่ยวกับความเจ็บป่วย ความเหนื่อยล้า และภาวะการทำหน้าที่ของบุคคลที่เป็นโรคตับแข็ง และเพื่อพัฒนาและตรวจสอบความสอดคล้องของโมเดลเชิงสาเหตุ ได้แก่ การดื่มเครื่องดื่มแอลกอฮอล์ การสนับสนุนทางสังคม การรับรู้เกี่ยวกับความเจ็บป่วย ความเหนื่อยล้า ต่อภาวะการทำหน้าที่ของบุคคลที่เป็นโรคตับแข็งที่สร้างขึ้นกับข้อมูลเชิงประจักษ์
3. การศึกษาครั้งนี้เป็นการวิจัยเชิงบรรยายโดยใช้แบบสอบถามเกี่ยวกับการดื่มเครื่องดื่มแอลกอฮอล์ การสนับสนุนทางสังคม การรับรู้เกี่ยวกับความเจ็บป่วย ความเหนื่อยล้า และภาวะการทำหน้าที่ของบุคคลที่เป็นโรคตับแข็ง โดยบุคคลที่เป็นโรคตับแข็งเป็นผู้ตอบแบบสอบถามเอง และผู้เข้าร่วมเป็นกลุ่มตัวอย่างจะได้รับการพิทักษ์สิทธิไม่เปิดเผยข้อมูลของกลุ่มตัวอย่าง
4. ประชากรและกลุ่มตัวอย่างที่ใช้ในการศึกษาครั้งนี้คือ บุคคลที่ได้รับการวินิจฉัยว่าเป็นโรคตับแข็งทุกระยะของโรค ทั้งเพศชายและหญิง อายุตั้งแต่ 18 ปีขึ้นไป ที่มาติดตามการรักษาตามแพทย์นัด ในแผนกผู้ป่วยนอกอายุรกรรมและศัลยกรรมทั่วไปของโรงพยาบาลสรรพสิทธิประสงค์ จังหวัดอุบลราชธานี โรงพยาบาลนครพนม จังหวัดนครพนม โรงพยาบาลนครนายก จังหวัดนครนายก และโรงพยาบาลลำปาง จังหวัดลำปาง เลือกลุ่มตัวอย่างโดยวิธีการสุ่มหลายขั้นตอน ขนาดกลุ่มตัวอย่างที่ต้องการในการศึกษาครั้งนี้ คือ 400 คน
5. เครื่องมือที่ใช้ในการเก็บรวบรวมข้อมูลได้แก่ 1) แบบประเมินข้อมูลส่วนบุคคล 2) แบบสอบถามปัญหาการดื่มเครื่องดื่มแอลกอฮอล์ 3) แบบสอบถามการรับรู้เกี่ยวกับความเจ็บป่วย 4) แบบสอบถามความรู้สึกหลากหลายมิติเกี่ยวกับความช่วยเหลือทางสังคม 5) แบบสอบถามความเหนื่อยล้า และ 6) แบบสอบถามภาวะการทำหน้าที่ ของบุคคลที่เป็นโรคตับแข็ง

#### 6. ขั้นตอนการวิจัยและดำเนินการเก็บข้อมูล ประกอบไปด้วย

- การทำหนังสือเพื่อความร่วมมือในการเก็บรวบรวมข้อมูลจากคณบดี คณะพยาบาลศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย เสนอผู้อำนวยการ โรงพยาบาลที่จะทำการเก็บข้อมูลทั้ง 5 โรงพยาบาล เพื่อชี้แจงวัตถุประสงค์ของการวิจัย ขออนุมัติจริยธรรมการวิจัยขออนุญาตเก็บข้อมูล และขอความร่วมมือในการทำวิจัยพร้อมทั้งขออนุญาตศึกษาข้อมูลของกลุ่มตัวอย่างจากเวชระเบียน เพื่อคัดกรองผู้ป่วยเข้าร่วมการวิจัย
- ผู้วิจัยเข้าพบและติดต่อประสานงานกับหัวหน้าฝ่ายการพยาบาล หัวหน้าแผนกผู้ป่วยนอกอายุรกรรมและศัลยกรรมทั่วไปของแต่ละโรงพยาบาลเพื่อชี้แจงวัตถุประสงค์ของการวิจัย ขั้นตอนการดำเนินงาน พร้อมทั้งขอความร่วมมือในการทำงานวิจัย กำหนดวัน เวลา และสถานที่ในการเก็บรวบรวมข้อมูล
- วันที่เก็บข้อมูล ผู้วิจัยแนะนำตนเอง สร้างสัมพันธภาพกับกลุ่มตัวอย่าง ชี้แจงวัตถุประสงค์ การวิจัยขอความร่วมมือในการวิจัย ขั้นตอนการดำเนินการวิจัย ระยะเวลาที่เข้าร่วมการวิจัยและเพื่อเป็นการพิทักษ์สิทธิของกลุ่มตัวอย่าง ผู้วิจัยชี้แจงประโยชน์ที่จะเกิดขึ้นจากการวิจัย พร้อมทั้งให้กลุ่มตัวอย่างอ่านเอกสารชี้แจงข้อมูลและขอความร่วมมือในการเข้าร่วมการวิจัย เมื่อกลุ่มตัวอย่างยินดีเข้าร่วมการวิจัยให้กลุ่มตัวอย่างลงชื่อในใบยินยอมเข้าร่วมวิจัย
- ผู้วิจัยอธิบายให้กลุ่มตัวอย่างทราบเกี่ยวกับรายละเอียดของแบบประเมินพร้อมทั้งอธิบายวิธีตอบแบบประเมินให้กลุ่มตัวอย่างเข้าใจ จากนั้นให้เวลาในการทำแบบสอบถามประมาณ 30 – 40 นาที หรือจนกว่ากลุ่มตัวอย่างจะทำเสร็จ และสามารถสอบถามข้อสงสัยกับผู้วิจัยได้ ตลอดเวลาที่ทำแบบสอบถาม ในกรณีที่กลุ่มตัวอย่างไม่สามารถอ่านแบบประเมินได้ด้วยตนเอง เนื่องจากมีปัญหาด้านสายตา ผู้วิจัยจะอ่านข้อคำถามให้
- ผู้วิจัยตรวจสอบความถูกต้อง ความครบถ้วนของข้อคำถาม หากพบว่ากลุ่มตัวอย่างตอบไม่ครบถ้วนจะแจ้งให้ทราบและซักถามเพิ่มเติม
- ผู้วิจัยดำเนินการเก็บข้อมูลจนได้กลุ่มตัวอย่างครบในแต่ละโรงพยาบาล ซึ่งรวมทั้งรวมทั้งหมด 400 คน แล้วนำข้อมูลที่ได้นำมาทำการวิเคราะห์ข้อมูลตามวิธีการทางสถิติ



7. ผู้กำกับดูแลการวิจัย ผู้ตรวจสอบ คณะกรรมการพิจารณาจริยธรรม และคณะกรรมการที่เกี่ยวข้องสามารถเข้าไปตรวจสอบบันทึกข้อมูลทางการแพทย์ของประชากรตัวอย่าง หรือผู้มีส่วนร่วมในการวิจัยเพื่อเป็นการยืนยันการวิจัยทางคลินิกและข้อมูลอื่น ๆ โดยไม่ล่วงละเมิดเอกสิทธิ์ในการปกป้องข้อมูลของประชากรตัวอย่าง หรือผู้มีส่วนร่วมในการวิจัยตามกรอบที่กฎหมายและกฎระเบียบได้อนุญาตไว้ นอกจากนี้ในการเซ็นให้ความยินยอมของประชากรตัวอย่างหรือผู้มีส่วนร่วมในการวิจัยหรือผู้แทนตามกฎหมายจะมีสิทธิ์ในการตรวจสอบและมีสิทธิ์ได้รับข้อมูลเช่นกัน

8. กรณีมีปัญหาสามารถติดต่อกับผู้วิจัย คือ นายสุรัชย์ มณีเนตร ได้ตลอดเวลา (24 ชั่วโมง) ที่เบอร์โทรศัพท์มือถือ 086-6008302

9. ผลการวิจัยจะนำเสนอในภาพรวม ส่วนชื่อและที่อยู่หรือข้อมูลที่เกี่ยวข้องกับท่านจะเก็บเป็นความลับ หากมีการเสนอผลงานวิจัยจะเสนอเป็นภาพรวม

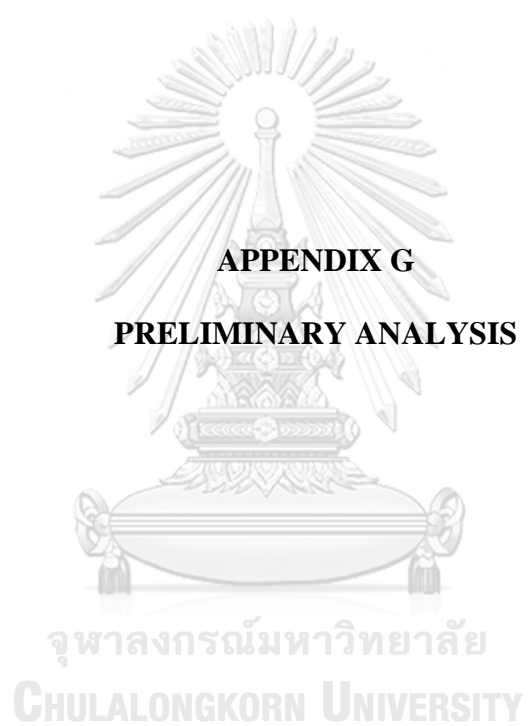
10. การเข้าร่วมเป็นกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัยนั้น เป็นโดยสมัครใจ และสามารถปฏิเสธที่จะเข้าร่วมหรือถอนตัวจากการวิจัยได้ทุกขณะ โดยไม่สูญเสียผลประโยชน์ที่พึงได้รับ

11. หากท่านมีข้อสงสัยให้สอบถามเพิ่มเติมได้โดยสามารถติดต่อผู้วิจัยได้ตลอดเวลา และหากมีข้อมูลเพิ่มเติมที่เป็นประโยชน์หรือเป็นโทษเกี่ยวกับการวิจัย ผู้วิจัยจะแจ้งให้ท่านทราบอย่างรวดเร็ว

12. ในการเข้าร่วมโครงการวิจัยครั้งนี้ ไม่มีการจ่ายค่าตอบแทนให้แก่กลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย

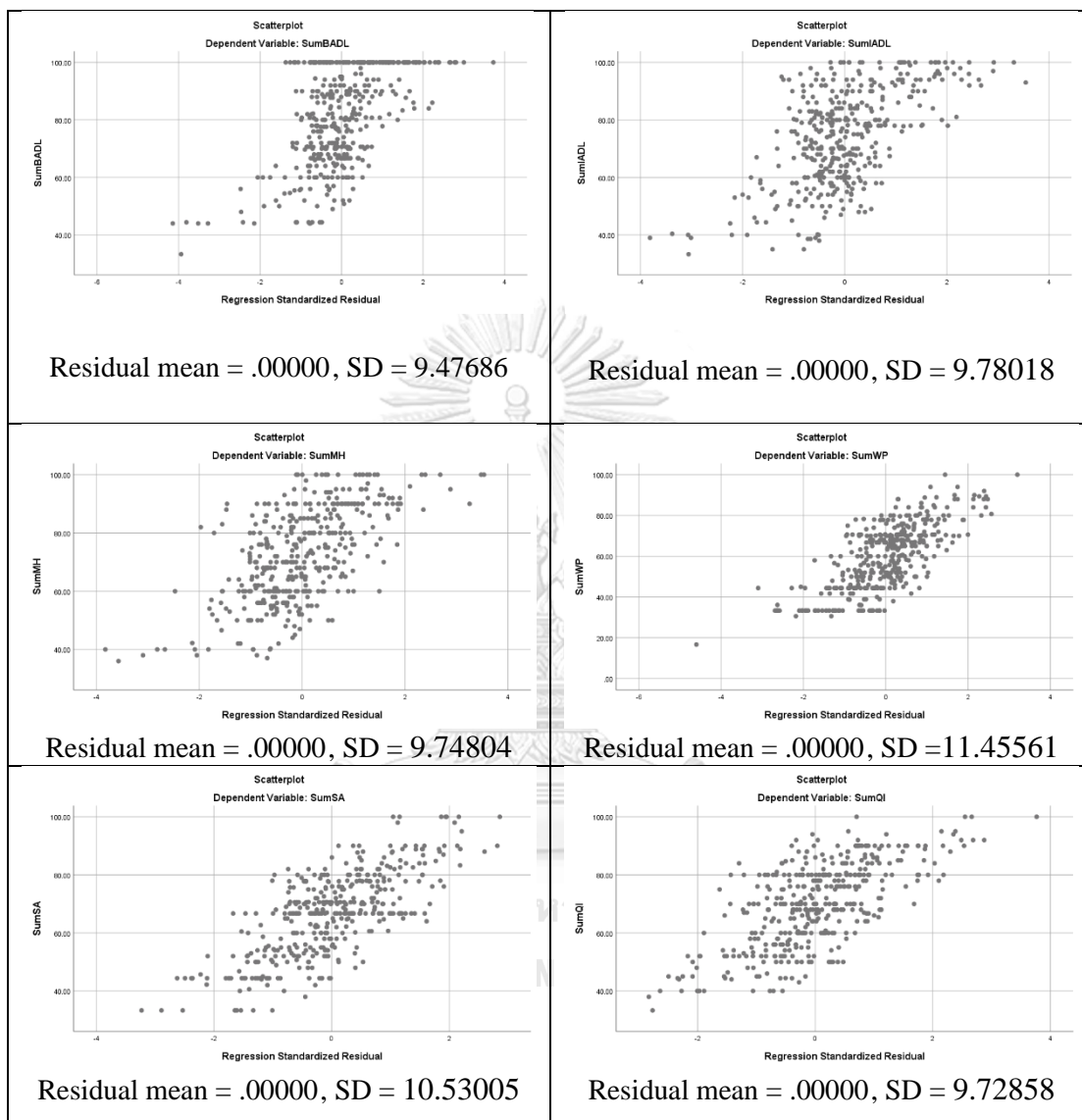
13. หากท่านไม่ได้รับการปฏิบัติตามข้อมูลดังกล่าว สามารถร้องเรียนได้ที่คณะกรรมการพิจารณาจริยธรรมการวิจัยในคน กลุ่มสหสถาบันชุดที่ 1 จุฬาลงกรณ์มหาวิทยาลัย ชั้น 4 อาคารสถาบัน 2 ซอยจุฬาลงกรณ์ 62 ถนนพญาไท เขตปทุมวัน กทม. 10330 โทรศัพท์ 0-2218-8147

E-mail: eccu@chula.ac.th



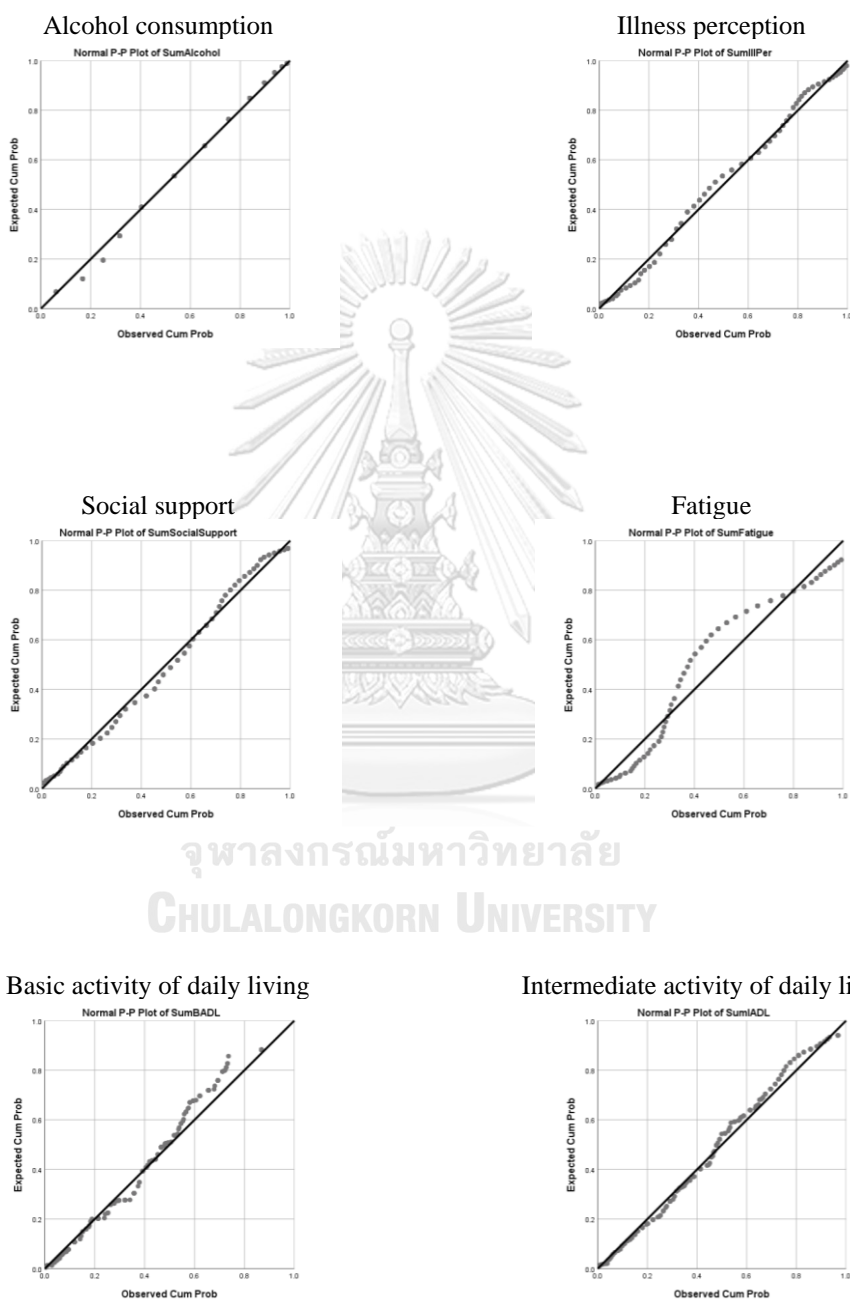
## APPENDIX G 1: Homoscedasticity testing

### Scatter plots of the main studied variables

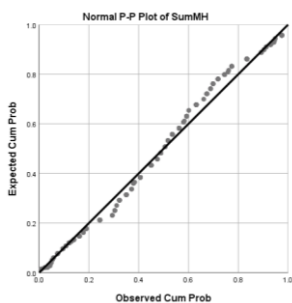


## APPENDIX G 2: Linearity testing

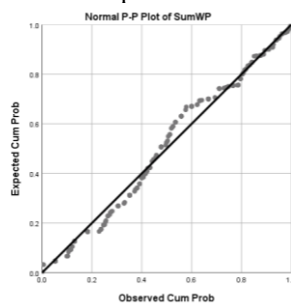
### P-P plots of regression standardized residual



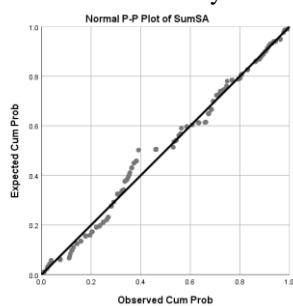
### Mental health



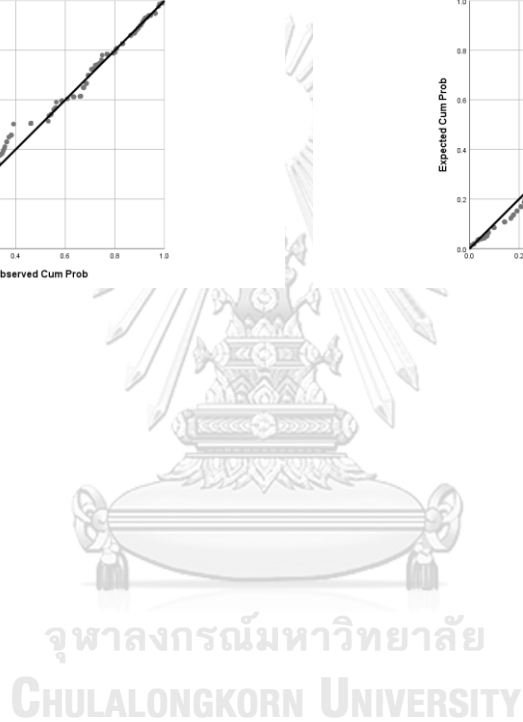
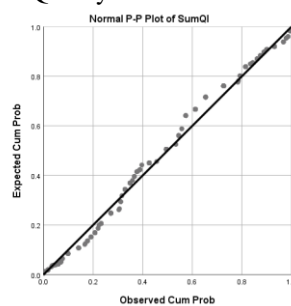
### Work performance

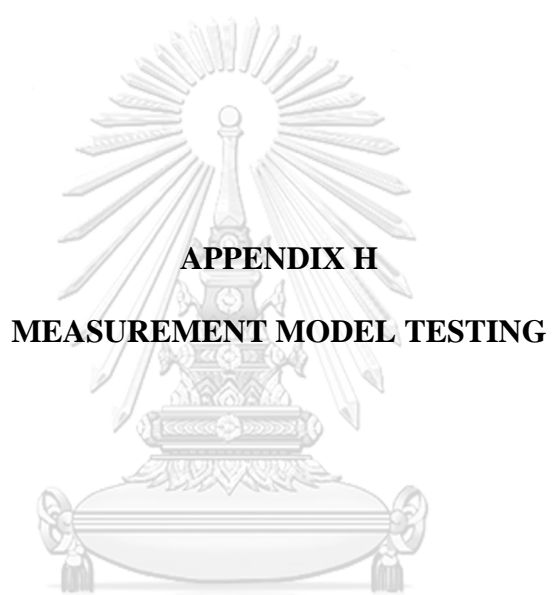


### Socail activity



### Quality of interactions



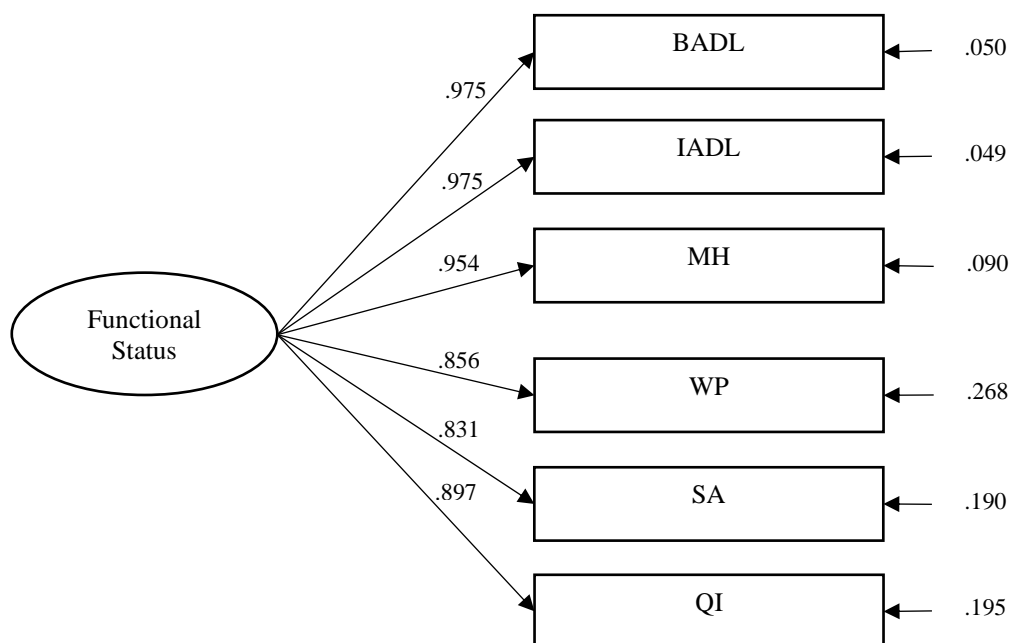


**APPENDIX H**  
**MEASUREMENT MODEL TESTING**

จุฬาลงกรณ์มหาวิทยาลัย  
**CHULALONGKORN UNIVERSITY**

## APPENDIX H 1

## Functional Status Questionnaire (FSQ) measurement model



Chi-Square (df = 5) = 9.077,  $p = 0.106$ ,  $\chi^2/df = 1.815$ , CFI = .999, TFI = .957,  
 RMSEA = .045, SRMR = .003, \*\* $p < .01$

## Fit indices of the functional status questionnaire

### Syntax used for analyzing confirmatory factor analysis of the FSQ

#### INPUT INSTRUCTIONS

TITLE: A structural equation model test (FS)

#### DATA:

FILE IS FILE IS C:\Users\TUM\Desktop\SEM2\full SEM2-BYTUM.CSV;

#### VARIABLE:

names are a1 a2 a3  
          b1 b2 b3 b4 b5 b6 b7 b8 b9  
          c1 c2 c3 c4 c5 c6 c7 c8  
          d1 d2 d3  
          e1 e2 e3 e4 e5 e6;  
usevariables are e1-e6;

#### Model:

functions by e1-e6;  
E5 WITH E4;  
E2 WITH E1;  
E6 WITH E5;  
E6 WITH E4;

OUTPUT: STDY, MOD(10);





**Printout of final model testing of the FSQ**

## MODEL FIT INFORMATION

Number of Free Parameters	22
---------------------------	----

## Loglikelihood

H0 Value	-8190.829
H1 Value	-8186.291

## Information Criteria

Akaike (AIC)	16425.658
Bayesian (BIC)	16513.471
Sample-Size Adjusted BIC	16443.663
(n* = (n + 2) / 24)	

## Chi-Square Test of Model Fit

Value	9.077
Degrees of Freedom	5
P-Value	0.1060

## RMSEA (Root Mean Square Error Of Approximation)

Estimate	0.045	
90 Percent C.I.	0.000	0.091
Probability RMSEA <= .05	0.502	

## CFI/TLI

CFI	0.999
TLI	0.997

## Chi-Square Test of Model Fit for the Baseline Model

Value	3664.727
Degrees of Freedom	15
P-Value	0.0000

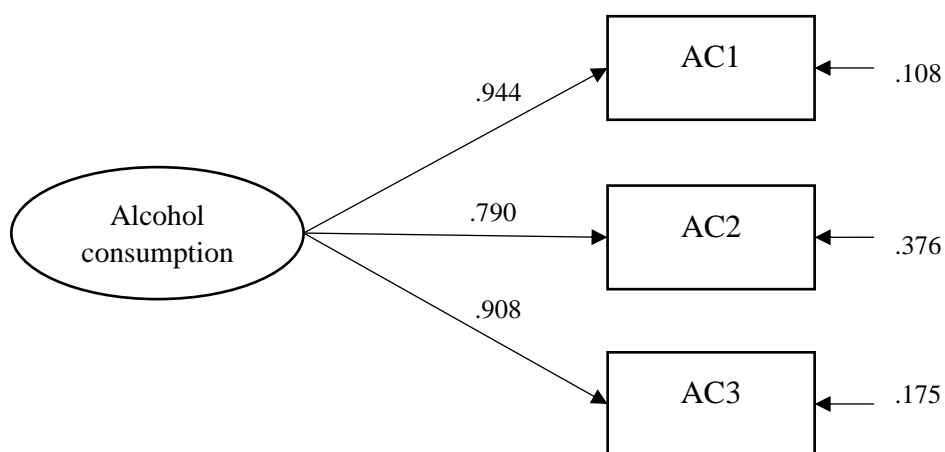
## SRMR (Standardized Root Mean Square Residual)

Value	0.003
-------	-------

## APPENDIX H 2

## The Alcohol Use Disorders Identification Test Consumption (AUDIT-C)

## measurement model



Chi-Square (df = 1) = 3.734,  $p = 0.053$ ,  $\chi^2/df = 3.734$ , CFI = .997, TFI = .950,  
RMSEA = .083, SRMR = .008, \*\* $p < .01$

## Fit indices of the AUDIT-C

### Syntax used for analyzing confirmatory factor analysis of the AUDIT-C

INPUT INSTRUCTIONS

TITLE: A structural equation model test (Alcohol)

DATA:

FILE IS FILE IS C:\Users\TUM\Desktop\SEM2\full SEM2-BYTUM.CSV;

VARIABLE:

names are a1 a2 a3

b1 b2 b3 b4 b5 b6 b7 b8 b9

c1 c2 c3 c4 c5 c6 c7 c8

d1 d2 d3

e1 e2 e3 e4 e5 e6;

usevariables are a1-a3;

Model:

alcohol by a1-a3;

a1@.2;

OUTPUT: STDY, MOD(0);

**Printout of final model testing of the AUDIT-C**

## MODEL FIT INFORMATION

Number of Free Parameters 8

## Loglikelihood

H0 Value -1572.489  
H1 Value -1570.622

## Information Criteria

Akaike (AIC) 3160.978  
Bayesian (BIC) 3192.910  
Sample-Size Adjusted BIC 3167.525  
( $n^* = (n + 2) / 24$ )

## Chi-Square Test of Model Fit

Value 3.734  
Degrees of Freedom 1  
P-Value 0.0533

## RMSEA (Root Mean Square Error Of Approximation)

Estimate 0.083  
90 Percent C.I. 0.000 0.17  
Probability RMSEA  $\leq$  .05 0.177

## CFI/TLI

CFI 0.997  
TLI 0.990

## Chi-Square Test of Model Fit for the Baseline Model

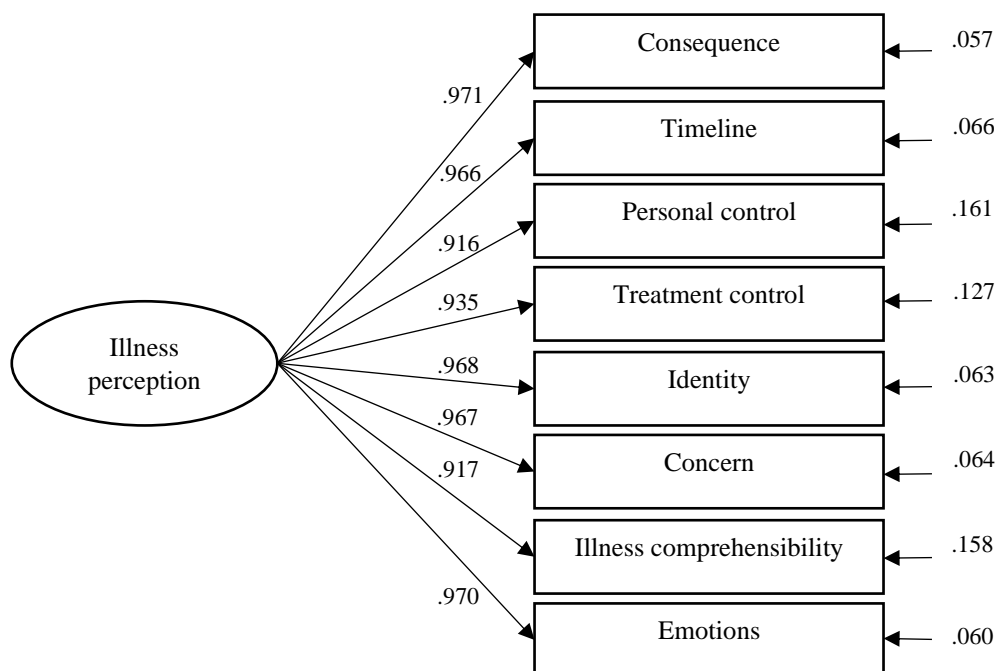
Value 865.025  
Degrees of Freedom 3  
P-Value 0.0000

## SRMR (Standardized Root Mean Square Residual)

Value 0.008

## APPENDIX H 3

## The Brief–Illness Perception Questionnaire (Brief-IPQ) measurement model



Chi-Square (df = 15) = 31.435,  $p = 0.077.$ ,  $\chi^2/df = 2.10$ , CFI = .997,

TFI = .995, RMSEA = .052, SRMR = .004,  $**p < .01$

CHULALONGKORN UNIVERSITY

### Fit indices of the Brief-IPQ

#### Syntax used for analyzing confirmatory factor analysis of the Brief-IPQ

##### INPUT INSTRUCTIONS

TITLE: A structural equation model test (illness)

##### DATA:

FILE IS FILE IS C:\Users\TUM\Desktop\SEM2\full SEM2-BYTUM.CSV;

##### VARIABLE:

names are a1 a2 a3  
          b1 b2 b3 b4 b5 b6 b7 b8 b9  
          c1 c2 c3 c4 c5 c6 c7 c8  
          d1 d2 d3  
          e1 e2 e3 e4 e5 e6;  
usevariables are c1-c8;

##### Model:

illness by c1-c8;  
C4       WITH C3;  
C7       WITH C3;  
C7       WITH C4;  
C7       WITH C6;  
C5       WITH C4;

OUTPUT: STDY, MOD(10);

### Printout of final model testing of the Brief-IPQ

#### MODEL FIT INFORMATION

Number of Free Parameters 29

#### Loglikelihood

H0 Value -3758.679  
H1 Value -3742.961

#### Information Criteria

Akaike (AIC) 7575.357  
Bayesian (BIC) 7691.110  
Sample-Size Adjusted BIC 7599.091  
( $n^* = (n + 2) / 24$ )

#### Chi-Square Test of Model Fit

Value 31.435  
Degrees of Freedom 15  
P-Value 0.0770

#### RMSEA (Root Mean Square Error Of Approximation)

Estimate 0.052  
90 Percent C.I. 0.026 0.078  
Probability RMSEA  $\leq$  .05 0.404

#### CFI/TLI

CFI 0.997  
TLI 0.995

#### Chi-Square Test of Model Fit for the Baseline Model

Value 6522.271  
Degrees of Freedom 28  
P-Value 0.0000

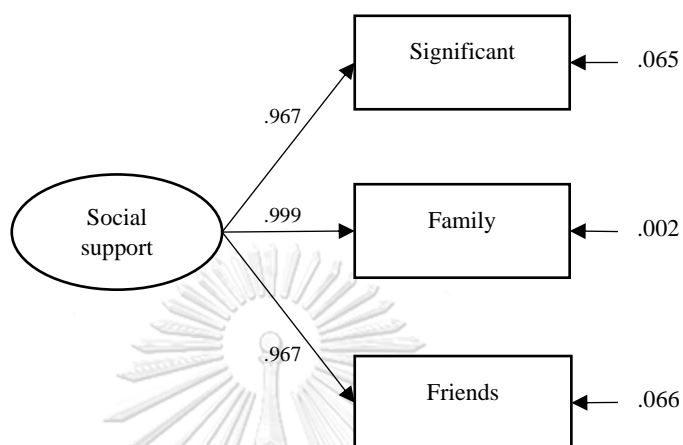
#### SRMR (Standardized Root Mean Square Residual)

Value 0.004

## APPENDIX H 4

## The Multidimensional Scale of Perceived Social Support (MSPSS)

## measurement model



Chi-Square (df =1) = 0.033,  $p = 0.855$ ,  $\chi^2/df = 0.033$ , CFI = 1.000, TLI = 1.000, RMSEA = 0.000, and SRMR = 0.001



**Fit indices of the MSPSS****Syntax used for analyzing confirmatory factor analysis of the MSPSS**

## INPUT INSTRUCTIONS

TITLE: CFA social support

DATA:

FILE IS \\Mac\Home\Desktop\ss1st order.CSV;

VARIABLE:

names are signi fam friend;

Model:

ssupport by signi fam friend;  
signi@.05;  
FAM@1.513;  
FRIEND WITH FAM;

OUTPUT: STDY, MOD(0);

**Printout of final model testing of the MSPSS**

## MODEL FIT INFORMATION

Number of Free Parameters	8
---------------------------	---

## Loglikelihood

H0 Value	-2599.276
H1 Value	-2599.260

## Information Criteria

Akaike (AIC)	5214.553
Bayesian (BIC)	5246.484
Sample-Size Adjusted BIC	5221.100
(n* = (n + 2) / 24)	

## Chi-Square Test of Model Fit

Value	0.033
Degrees of Freedom	1
P-Value	0.8550

## RMSEA (Root Mean Square Error Of Approximation)

Estimate	0.000	
90 Percent C.I.	0.000	0.073
Probability RMSEA <= .05	0.912	

## CFI/TLI

CFI	1.000
TLI	1.001

## Chi-Square Test of Model Fit for the Baseline Model

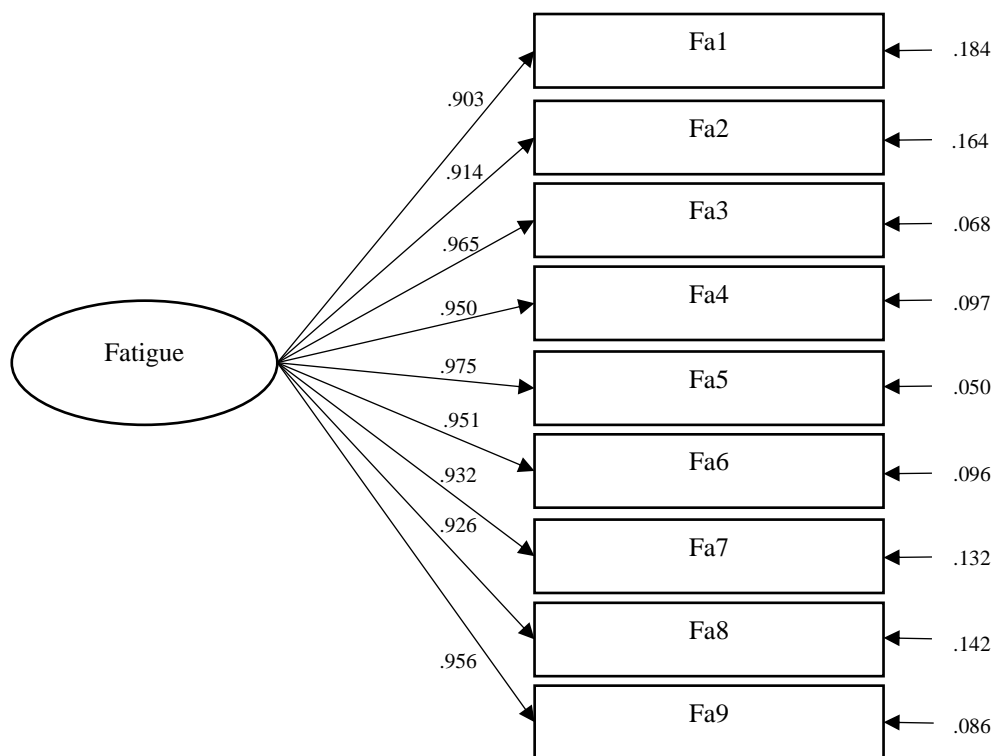
Value	2179.941
Degrees of Freedom	3
P-Value	0.0000

## SRMR (Standardized Root Mean Square Residual)

Value	0.001
-------	-------

## APPENDIX H 5

## The Fatigue Severity Scale (FSS) measurement model



Chi-Square (df = 10) = 16.841,  $p = 0.078$ ,  $\chi^2/df = 1.684$ , CFI = .999,

TFI = .996, RMSEA = .041, SRMR = .005, \*\* $p < .01$

## Fit indices of the FSS

### Syntax used for analyzing confirmatory factor analysis of the FSS

#### INPUT INSTRUCTIONS

TITLE: A structural equation model test (fatigue)

#### DATA:

FILE IS FILE IS C:\Users\TUM\Desktop\SEM2\full SEM2-BYTUM.CSV;

#### VARIABLE:

names are a1 a2 a3  
           b1 b2 b3 b4 b5 b6 b7 b8 b9  
           c1 c2 c3 c4 c5 c6 c7 c8  
           d1 d2 d3  
           e1 e2 e3 e4 e5 e6;

usevariables are b1-b9;

#### Model:

fatigue by b1-b9;  
 b9@.3;  
 B9 WITH B4;  
 B9 WITH B5;  
 B9 WITH B6;  
 B9 WITH B2;  
 B9 WITH B3;  
 B9 WITH B7;  
 B9 WITH B8;  
 B8 WITH B7;  
 B9 WITH B1;  
 B2 WITH B1;  
 B6 WITH B4;  
 B8 WITH B6;  
 B7 WITH B6;  
 B5 WITH B3;  
 B4 WITH B1;  
 B4 WITH B2;  
 B7 WITH B2;  
 B3 WITH B1;

OUTPUT: STDY, MOD(10);

**Printout of final model testing of the FSS**

## MODEL FIT INFORMATION

Number of Free Parameters	44
---------------------------	----

## Loglikelihood

H0 Value	-4256.800
H1 Value	-4248.380

## Information Criteria

Akaike (AIC)	8601.600
Bayesian (BIC)	8777.225
Sample-Size Adjusted BIC	8637.610
(n* = (n + 2) / 24)	

## Chi-Square Test of Model Fit

Value	16.841
Degrees of Freedom	10
P-Value	0.0780

## RMSEA (Root Mean Square Error Of Approximation)

Estimate	0.041	
90 Percent C.I.	0.000	0.075
Probability RMSEA <= .05	0.621	

## CFI/TLI

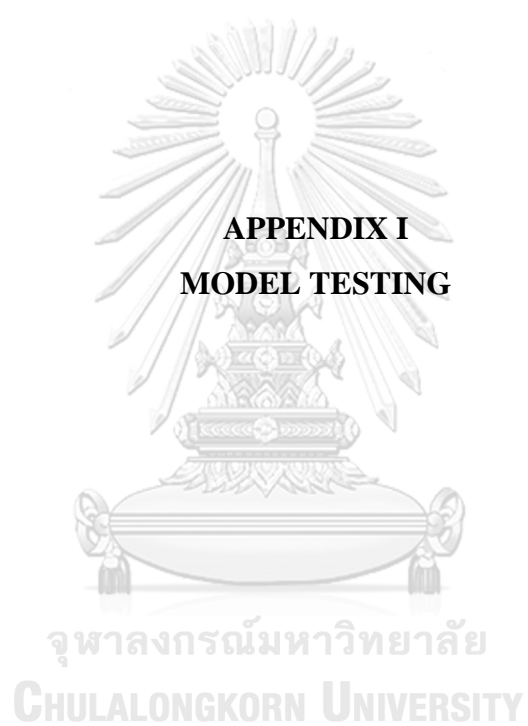
CFI	0.999
TLI	0.996

## Chi-Square Test of Model Fit for the Baseline Model

Value	6357.697
Degrees of Freedom	36
P-Value	0.0000

## SRMR (Standardized Root Mean Square Residual)

Value	0.005
-------	-------



**Fit indices of the causal model of functional status  
among persons with liver cirrhosis**

**Syntax used for analyzing**

INPUT INSTRUCTIONS

TITLE: A structural equation model test

DATA:

FILE IS FILE IS C:\Users\TUM\Desktop\SEM2\full SEM2-BYTUM.CSV;

VARIABLE:

names are a1 a2 a3  
          b1 b2 b3 b4 b5 b6 b7 b8 b9  
          c1 c2 c3 c4 c5 c6 c7 c8  
          d1 d2 d3  
          e1 e2 e3 e4 e5 e6;

Model:

alcohol by a1-a3;  
fatigue by b1-b9;  
illness by c1-c8;  
ssupport by d1-d3;  
funtions by e1-e6;  
funtions on ssupport alcohol illness fatigue;  
fatigue on illness;  
illness on ssupport;  
fatigue on alcohol;  
alcohol on ssupport;  
D1@.2;

B8 WITH B7;

B2 WITH B1;

E5 WITH E4;

C7 WITH C3;

C7 WITH C4;

C4 WITH C3;

B8 WITH B6;

B7 WITH B6;

D3 WITH D1;

D3 WITH D2;

Model indirect:

funtions ind alcohol;  
funtions ind illness;  
funtions ind ssupport;

OUTPUT: STDYX, MOD(10);

**Printout of the causal model of functional status among persons with liver cirrhosis**

MODEL FIT INFORMATION

Number of Free Parameters 80

Loglikelihood

H0 Value -16586.477  
H1 Value -16393.249

Information Criteria

Akaike (AIC) 33332.955  
Bayesian (BIC) 33652.272  
Sample-Size Adjusted BIC 33398.427  
( $n^* = (n + 2) / 24$ )

Chi-Square Test of Model Fit

Value 386.458  
Degrees of Freedom 172  
P-Value 0.0614

RMSEA (Root Mean Square Error Of Approximation)

Estimate 0.056  
90 Percent C.I. 0.048 0.063  
Probability RMSEA  $\leq$  .05 0.096

CFI/TLI

CFI 0.985  
TLI 0.981

Chi-Square Test of Model Fit for the Baseline Model

Value 14233.346  
Degrees of Freedom 210  
P-Value 0.0000

SRMR (Standardized Root Mean Square Residual)

Value 0.048



## VITA

**NAME** Mr. Surachai Maninet

**DATE OF BIRTH** 2 March 1980

**PLACE OF BIRTH** Ubonratchathani province

**INSTITUTIONS ATTENDED**

- Certificate in Nursing Science (Technical level) from Boromarajonani college of nursing, Nakhon Phanom (1999 – 2001)
- Bachelor of Nursing Science, Affiliated to Khon Kaen university; Borommarajonani college of nursing, Sanpasithiprasong (2005 – 2007)
- Bachelor of Nursing from Australian Catholic University, Australia (2008 – 2010)
- Master of Nursing Science from Chulalongkorn University (2011 – 2013)

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**PUBLICATION**

- Surachai Maninet and Chanokporn Jitpanya. (2014). Factors related to quality of life in patients with hepatobiliary carcinoma: A systematic review of literature. Princes of Naradhiwas university journal. 6(2), 24 – 35.
- Surachai Maninet and Chanokporn Jitpanya. (2015). Relationship among symptoms, sense of coherence, and quality of life in patients with hepatobiliary carcinoma. Kuakarun Journal of Nursing. 23(21), 125 – 137.

**AWARD RECEIVED**

- Outstanding student award given by The Nurses' Association of Thailand, 2001
- Outstanding student award given by Chulalongkorn University, 2013.
- Outstanding student award given by Faculty of Nursing, Chulalongkorn University, 2013.