THE RELATIONSHIP BETWEEN HEALTH STATUS, SOCIAL SUPPORT, PSYCHOLOGICAL SYMPTOMS AND COPING SKILLS IN PATIENTS RECEIVING CHEMOTHERAPY IN A THAI CONTEXT

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The relationship between
health status, social
support, psychological

For my Dad and Mom

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DECLARATION

I certify that this Thesis contains no material which has been accepted for the award of any other degree or diploma in any institute, college or university, and that, to the best of my knowledge and belief, it contains no material previously published or written by another person, except where due reference is made in the text of the Thesis.

[redacted]

Vatinee Sukmak

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ABSTRACT

This study examined the relationship between health status, social support, psychological symptoms and coping skills in patients receiving chemotherapy and/or radiotherapy in Thailand. The convenience sample consisted of 249 patients receiving chemotherapy in the initial test and 158 receiving chemotherapy in the second test. Also, a total of 209 patients receiving radiotherapy participated in the study. The model and hypotheses were guided by the attribution theory. The hypothesised model was analysed using structural modelling with LISREL (Jöreskog & Sörbom, 1985). In the model, health status was proposed as an exogenous variable. Endogenous variables were social support, psychological symptoms and coping skills. Demographic variables were measured to answer the research questions. Based on chi-square, degree of freedom ratios and goodness of fit indices, the proposed model fit the data. The results indicated that patients who experienced high levels of health problems have low levels of social support as well as high levels of psychological symptoms and problem-focused coping. However, no significant relationship was found between satisfaction with support and psychological symptoms. The analysis revealed that the hypothesised model was consistent across time and treatments. It also established that health status, psychological symptoms and the number of support persons were stable over time, whereas satisfaction with support and coping skills were not. The demographic variables indicated that there were significant differences in psychological symptoms due to religion and occupation as well as significant differences in social support and problem-focused coping due to occupation and side-effects. The findings from this model indicate the need for improved educational programs, social support interventions and health management for patients receiving chemotherapy and radiotherapy, in order to further improve health outcomes in Thailand.

Introduction

This study investigated the relationship between health status, social support, psychological symptoms and coping skills using the attribution model as a theoretical framework in patients receiving chemotherapy or radiotherapy in Thailand. Chemotherapy is the treatment of disease with chemicals or cytotoxic drugs. Usually the term refers to treatment with anti-malignancy drugs. Radiotherapy is the treatment using high-energy rays. Radiotherapy is commonly used for the treatment of local or regional disease whereas chemotherapy is used for the treatment of disease that is no longer confined to one site or region and has spread systematically (Bruning, 1985).

Chemotherapy and radiotherapy are often used, intermittently and/or over an extended period of time, to treat patients suffering malignancies in developed countries such as the United States (Carey & Burish, 1988; Judson, 1993) and England (Bottomley, 1997), and developing countries such as Thailand (Jirojwong, Thassri & Skolnik, 1994). Moreover, in recent times chemotherapy and radiotherapy have become more common and more effective in treating various malignancies in contrast to other procedures such as surgery, immunotherapy and hormone therapy (Carey & Burish, 1988; Cull, 1990; Judson, 1993; Nerenz, Leventhal & Love, 1982; Nerenz, Leventhal, Love & Ringler, 1984).

The goal of chemotherapy and radiotherapy has evolved from palliation to cure (Judson, 1993). As more patients survive therapeutic treatments, the emphasis is on minimising the effects of the illness while promoting adaptive strategies to cope with these types of therapies (Cull, 1990; Nerenz et al., 1982). The survival rate among patients is continually improving (Nerenz et al., 1984). However, this increasing survival rate comes with considerable short-term costs (Judson, 1993; Nerenz et al., 1984) and is associated with debilitating physical effects (Carey & Burish, 1988). Among the chemotherapy side-effects are alopecia, stomatitis, immunosuppression, anorexia, nausea and vomiting (Carey & Burish, 1988; Cull, 1990; Judson, 1993; Nerenz et al., 1982; Nerenz et al., 1984) and among the radiotherapy side-effects are fatigue, skin irritations and anorexia (Dodd, 1984; Judson, 1993). In addition, patients receiving both treatments may also experience anxiety and tension (Carey & Burish, 1988; Cull, 1990; Nerenz et al., 1982; Nerenz et al., 1984).

Chemotherapy and radiotherapy side-effects are directly related to the health status of patients and influence their psychological well-being and ability to cope on a day-to-day basis (Cull, 1990; Nerenz et al., 1984). Furthermore, patients are required to deal with changes in life-style and are subjected to emotional distress (Heim, 1991; Manuel, Roth, Keefe & Brantley, 1987; Meyerowitz, Watkins & Sparks, 1983; Roth & Cohen, 1986). In order to deal with these changes, social support mechanisms are of increasing importance (Bloom, Kang & Romano, 1991b; Cohen & Wills, 1985; Folkman & Lazarus, 1985; Lefcourt, Martin & Saleh, 1984). Consequently, under these circumstances understanding factors which influence patients' health is of importance and in recent years has been the subject of an increasing amount of research (e.g., Bloom, Fobair, Spiegel, Cox, Varghese & Hoppe, 1991a; Leventhal, Nerenz & Steele, 1984; Willey & Silliman, 1990).

The range of reported chemotherapy and radiotherapy side-effects is large and there are an enormous range of studies that deal with patients receiving chemotherapy and radiotherapy. Although several research studies in developed countries indicate that perceived health problems are related to social support and coping skills, few studies attend to the relationships between physical health problems, social support, psychological symptoms and coping skills. Additionally, no systematic investigation of this relationship has been conducted in Thailand. Cross-cultural research has the potential to extend our understanding of the variables of interest, and tests the general ability of the proposed explanations to account for a phenomenon. If the variables develop viable explanations, they should be broad in scope and ideally not culture-bound.

In other Western countries most studies that assess the relationships between health and behaviours or coping skills utilise cross-sectional and/or correlational designs and small sample sizes. While useful for descriptive analyses, a more rigorous design is needed to make causal inferences from the data. The current study applies a structural equation model as an effective strategy for testing causal linkages between the variables of interest as well as using data from a large, representative sample of chemotherapeutic and radiotherapeutic patients. Based on attribution theory, the study provides an effective means of analysing behavioural processes for patients receiving chemotherapy and radiotherapy within the culture of Thailand.

The essential aspects of attribution offer explanations of illness and treatment that provide personal and social meaning to the experiences of illness in the Thai context. By applying conceptual and methodological frameworks for understanding patients' health status, social support, psychological symptoms and coping skills, it helps to further understand the underlying reasons behind patients' experiences while undergoing chemotherapy or radiotherapy regimes in a Thai culture. It is anticipated that the understanding of this experience would serve a useful purpose in improving future care.

On a more applied level, this study tested antecedents leading to patients' coping strategies which would assist health care providers in targeting responsive patients receiving chemotherapy and radiotherapy. Once those patient groups were identified, applications of the present study would help health care providers in promoting psychosocial intervention strategies to encourage patients to pursue medical advice or regimens. Also, categories derived from analysing socio-demographic variables would provide health care providers with strategies for targeting responsive patients receiving chemotherapy and radiotherapy.

This thesis consists of five chapters. Chapter one provides general background information about Thailand and Songkla, the principal study areas is provided. Information relating to society and health is discussed. Existing health systems and beliefs about health are also described. The chapter gives the theoretical framework of attribution theory and its related studies, as well as culture and attribution. Issues about chemotherapy, radiotherapy, health status, social support, psychological symptoms and coping skills are discussed.

Chapter two proposes the model to be tested. It covers the proposed model and research questions. Chapter three presents information regarding study methods and discusses characteristics of the participants. The results of pre-test of instruments are also reported. Additionally, the validity of the method employed and data analyses are discussed.

The results of the study are presented in Chapter four which is composed of three sections. Section one reports the descriptive analysis. Section two provides the result of the model testing and some research questions. Section three covers the research questions related to socio-economic variables. The results are also discussed. In the final chapter, Chapter five, a summary of the procedure and findings is presented. Discussion and implications as well as recommendations are provided.

Chapter 1

Characteristics of Culture, Treatment and Review of Related Literature

This chapter reviews the literature examining the relationship of chemotherapy and radiotherapy to health status, psychological symptoms, social support and coping skills. Because the present study was conducted in Thailand, it is necessary, at the outset, to provide some details about Thailand. Also, it includes brief descriptions relating to geography, population and health care systems, as well as some beliefs regarding health perceptions. The next section presents the important aspects of chemotherapy and radiotherapy. The attribution theory using as the theoretical framework is also discussed. The variables of interest are also discussed. Then, the follow pages are organised into seven sections including, (1.1) the Thai context, (1.2) chemotherapy and radiotherapy, (1.3) attribution theory, (1.4) health status, (1.5) psychological symptoms, (1.6) social support and (1.7) coping skills.

1.1 The Thai Context

There are two main sections to this part. The first section describes the general background in Thailand The second section presents information about Songkla, the principal area of study.

1.1.1 Thailand

Thailand is a developing country and considered one of the most cohesive and integrated societies in Southeast Asia (Armstrong, 1986). Stretching for more than 1600 kilometres from North to South, Thailand is a country of just over half a million square kilometres.

On the basis of the last official census in 1998, the population of Thailand is estimated to be 62 million, (Bureau of Health Policy and Plan, 2000). The national population is made up of various ethnic groups. The Chinese are the largest ethnic minority, comprising 14% of the population while the second largest minority is Thai Malay or Thai Islam (Armstrong, 1986). Thirty per cent of the population live in urban areas, and the remainder in rural areas. The urban sector has more advantage than the rural sector in terms of the provision of infrastructure, financial services, educational and health facilities, and so forth. The resultant widening disparity between the rural and urban populations is reflected in the major social and economic indices, such as income distribution, employment, public services, health care and education.

Bangkok is the capital of Thailand and the centre of commerce, finance, manufacturing and trade, as well as religion and education. The Bangkok population now exceeds 7.0 million (Fuller, Edwards, Vorakitphokatorn & Sermsri, 1996). While economic development has been concentrated in Bangkok, living conditions have improved for most people in the country, as evidenced by a life expectancy estimated to be 69.9 years for male and to be 74.9 years for female (Bureau of Health Policy and Plan, 2000).

The state religion is Buddhism in its Theravada or Hinayana form (Humphreys, 1990). More than 90% of Thais are Buddhist and around four percent are Muslim (Hat-Yai hospital, 1997). The majority of Muslims live in five provinces: Narathiwat, Pattani, Yala, Satun and Songkla. Because most Thai people are Buddhists, the general view of individuals strongly relates to how they perceive the Buddhist religion. Buddhism presents Thai believers with a clearly defined moral code that guides them away from perceived evil and self-damaging behaviour. Therefore, the majority of Thai people believe intensely that they are able to control their future lives (Golomb, 1985). Also, Thai people believe in Karma or previous lives (Chirawathkul, 1995). In communities where there are contacts between Buddhists and Muslims, beliefs regarding health perceptions have been culturally exchanged. That is, some Muslims also believe in Buddhism (Golomb, 1985).

The Thai Buddhists have played an important role in the development of education. Modern education was introduced between 1868 and 1910. Schools are now based on the Western model so an education system has been developed which is very different from that of the pre-existing Buddhist monastery education. Thai people normally place emphasis on the value of education and achievement and this can be seen in the high literacy rate (over 90%) compared to Indonesia (81.6%) and Malaysia (69.6%) (Statistical Yearbook, 1997).

Even though most Thai people can read, due to a limited health education, they often lack knowledge about the specific causes, diagnoses and treatments of the illnesses they experience. More specifically, the majority of Thais do not know about the causes, diagnoses and treatment of malignancy (Thanaprasertgorn & Nilchaikovit, 1997). Additionally, literature on the aspects of illness in Thailand is restricted to short references in articles on malignancy epidemiology, pathology, clinical medicine and psychosocial aspects. Information on malignancy incidence and mortality for Thailand is quite limited and what is available is not representative of the population. The National Cancer Institute of Thailand established a hospital-based national registry and has been compiling data from 125 collaborating hospitals since 1974 (Armstrong, 1986). Furthermore, cancer is currently ranked as the second leading cause of death in Thailand (Bureau of Health Policy and Plan, 2000).

In terms of the cultural influences on health perceptions, most Thai cancer patients search for what they feel is an acceptable explanation of their suffering. For instance, Jirojwong et al. (1994) reported that 25% of women with cervical cancer did not know what caused their illness and 12% perceived that previous actions were the cause of their illness. Meanwhile, others perceived that it was caused by blood. Also, most women could not explain how the disease would spread if it remained untreated. Neither could the women suggest which organs were likely to be affected if the disease was untreated. Nearly 35% would accept any form of treatment and 10.8% would accept radiotherapy treatment, while the rest preferred to have surgery. Most women had a positive attitude about the illness as supported by Jirojwong et al. (1994) and reported that 80.8% of patients perceived that their illnesses could be cured.

During the period of illness, the patients seek care from different categories of health care systems. A major criterion for selecting a health care system has been the tendency of people to preserve their physical and financial integrity by attempting to control their choice and course of treatment as much as possible (Golomb, 1985; Weisberg, 1982). The typical health care systems are both traditional and modern.

The traditional Thai medicine is known as Ayurvedic medicine which comes from India but has been influenced by Chinese approaches. The basic principle is that the body is composed of four elements. These elements are earth, water, wind and fire, and that an imbalance of hot and cold may cause an illness. Traditional medicine has been used by Thai people for treatment of illnesses before the Sukhothai period (before 1238 A.D.) (Subcharoen & Pechprai, 1995). The traditional caregivers include herbalists, spirit-mediums, masseurs, exorcists, supernatural cures and amulet makers

(Golomb, 1985; Jirojwong et al., 1994; Weisberg, 1982). The number of caregivers used range from one to eight persons (Golomb, 1985).

The traditional caregivers provide care to those who suffer from physical or psychological illnesses. Many people prefer traditional caregivers because they can confide their troubles to them, and receive psychosocial support (Golomb, 1985; Weisberg, 1982). People may also negotiate with the traditional caregivers in order to obtain a certain service, or indicate that they do not desire the proposed treatment by suggesting that the caregivers come again at a different time, or wait until they are called when a real need arises (Weisberg, 1982).

It is likely that cancer patients have used this type of caregivers from as early as 1924 (Weisberg, 1982). Therefore, traditional caregivers may be used in curative roles for those suffering from symptoms of cancer. While caregivers are unable to alleviate a patient's physical discomfort, they may be successful in reducing their psychological distress by identifying metaphysical causes consistent with the patient's own beliefs and fears, or by referring them to a modern care system (Golomb, 1985).

The techniques, medicines and institutions associated with modern or Western medicines were introduced to Thailand in the 19th century (Golomb, 1985) and are now widely accepted. Many types and subtypes of both physical and psychological illnesses as discussed in Western literature and textbooks have been used to describe the illnesses of Thai people (Weisberg, 1982). To this extent, Western health beliefs and associated health models can be readily applied to Thailand. Availability of modern health care is mainly in Bangkok and the big provinces such as Chiang Mai, Khon Kaen and Songkla.

In Thailand, 77.3% of hospitals are state-run, 2.8% are run by private non-profit agencies and 19.9% are run by private (for profit) agencies (Armstrong, 1986). Charges for health care in Thailand are widespread. Included in these charges are services provided at government health facilities, from health centres at a village level to public hospitals at provincial and national levels (Pannarunothai & Mills, 1997). Civil servants automatically belong to the non-contributory civil servant medical benefit scheme. User fees are an important source of income at the health facility level and contribute to 40% of provincial hospital income, the remainder coming from general taxation and third-party payers. About 49% of the patients seek care exclusively from Western-trained caregivers and around 28% of the patients seek care from both Western-trained and traditionally-trained caregivers (Jirojwong et al., 1994).

Despite their dominance, modern Western-trained medical personnel seldom have the time or patience to provide people with adequate explanations of their illnesses. They normally concentrate on treating symptoms rather than providing explanations of the cause of illness and their diagnoses (Fuller, Edwards, Sermsri & Vorakitphokatorn, 1993; Weisberg, 1982). Furthermore, in Thailand, most patients typically do not request to be informed of the diagnosis (Fuller et al., 1993). On average, chemotherapeutic patients do not know their diagnoses while most radiotherapeutic patients are aware that they are cancer patients. Most patients do not know what chemotherapy is (Jirojwong et al., 1994; Thanaprasertgorn & Nilchaikovit, 1997).

Patients tend to talk about their illnesses in terms of physical symptoms rather than psychological symptoms. Even though psychological support services, psychiatrists and psychiatric nurses are available, people with psychological problems often do not seek such services because of the stigma associated with the term "psychological patients" which makes them reluctant to seek support (Thanaprasertgorn & Nilchaikovit. 1997). Thais' reluctance to express or discuss their feelings, especially to anyone outside of their family, most probably inhibit their seeking of support. Specifically, most Thai cancer patients avoid expressing or discussing their feelings regarding to their illnesses and treatments. Additionally, in the modern medical system or hospital, family and friends are usually excluded by institutional routines (Weisberg, 1982). Thus, selection of health care alternatives in the Thai environment not only brings an ill individual in contact with a potential cure but also shapes the medical system by repeating certain styles of interaction between the patient and a wide variety of health caregivers.

1.1.2 Songkla

Songkla is the province in the Southern part of Thailand and is located 950 kilometres from Bangkok. Songkla was selected as a study site because it is the principal medical centre in the Southern Region and one of the country's largest provinces. It is the political and economic centre of the Southern Region and is well supplied with social and health resources. Within the province there are good schools, a university and a number of well-equipped hospitals. Songkla has a higher proportion of Muslims compared to the national average. About 66% of the population in Songkla are Buddhists and 33% are Muslims. Songkla is well supplied with health facilities. Compared to the national average, the number of physicians per 10,000 population of Songkla is about six times that of the national average. In addition, the proportion of nurses per 10,000 population of Songkla is about twice the national average.

This study was conducted in two selected hospitals located in Songkla. The designated hospitals were Hat-Yai hospital and Songklanagarind hospital, located within six kilometres of each other. These two hospitals are referral centres for cancer clients in the Southern Region. They are also well equipped (only Songklanagarind hospital has radiation machines in the Southern Region) and have qualified personnel. Furthermore, the hospitals were selected because the investigator is familiar with the local language, cultures and organisations.

Hat-Yai hospital with 700 beds is the Southern Public Health Centre and is under the control of the Ministry of Public Health. It is a referral hospital in the Southern Region and has provided care for more than 40 years. Data from Hat-Yai hospital in 1996 indicated that 4,498 cancer patients treated were over the age of 20 years and were predominantly from a low socio-economic background.

Songklanagarind hospital with 750 beds is the University Medical Centre and was opened in 1982. It is under the control of the office of University Affairs, Prince of Songkla University. The number of out-patients who receive chemotherapy range from 10 to 20 per day, while patients who receive radiotherapy each day range from 60-100. In 1996, this hospital treated 4,738 cancer patients over 20 years of age. Patients who seek care in Songklanagarind hospital are likely to be from a higher socio-economic background, compared to patients who seek care from Hat-Yai hospital. Oncological patients in both hospitals are treated across clinics depending upon their diagnosis. For instance, cervical cancer patients are treated in gynaecological clinics while colon cancer patients are treated in surgical clinics.

1.2 Chemotherapy and Radiotherapy

The present study examined the relationship between health status, psychological symptoms, social support and coping skills in patients receiving chemotherapy and radiotherapy. Chemotherapy and radiotherapy groups of patients were selected for comparison because these treatments were widely used to treat neoplastic disease. These treatment also produced similar number and types of side-effects.

1.2.1 Chemotherapy

Chemotherapy is the use of chemical agents or cytotoxic drugs to destroy cancerous cells (Dodd, 1987). It is used predominantly to treat metastatic or disseminated malignant neoplastic disease (Carter, Bakowski & Hellmann, 1987). It is the only current method that is able to penetrate the blood-brain barrier because it circulates throughout the body by flowing through the blood stream (Halnan & Sikora, 1990). Chemotherapy involves approximately forty drugs either used in standard singular form or in various combinations (Bruning, 1985).

Chemotherapy is appropriate for certain tumours depending on the primary site and stage of disease (Carter et al., 1987). It can be curative or palliative. Additionally, chemotherapy can be administered as a single agent treatment, a combination, or within a combined modality setting with radiation and/or surgery. Generally, chemotherapy is given intermittently over an extended period of time (Carter et al., 1987). The concentration of a cytotoxic drug at the tumour site, and the duration and intensity of its action is determined by several factors including drug absorption, binding, distribution, metabolism and excretion, as well as tumour size and vascularity.

The concentration of drugs at the tumour site and time is the most important determinant of cytotoxic effect and is more important than absolute concentration alone (Rankin & Kaye, 1990).

Chemotherapy is an imperfect modality with an ability to cause damage to both cancerous and normal cells. This accounts for the negative drug induced side-effects other than the destruction of cancerous cells. The severity of chemotherapy side-effects is influenced by the overall physical condition of the patient as well as their age, prior therapy and nutritional status (Judson, 1993). Even though not all chemotherapeutic agents produce the same adverse effects, the common side-effects of commonly used therapeutic dosages are nausea, vomiting and hair loss (Judson, 1993; Rankin & Kaye, 1990), with reported incidence of nausea ranging from 67% to 100% (Buckingham, Fitt & Sitzif, 1997). The precise cause of nausea and vomiting linked to chemotherapy is uncertain while hair loss is influenced by the damage to hair follicles because of their high rate of cell turnover (Rankin & Kaye, 1990).

Severe inflammation and ulceration of the oral or esophageal mucosa caused by chemotherapy may prevent patients from eating or even drinking (Jansen, Halliburton, Dibble & Dodd, 1993; Judson, 1993). Loss of taste may be associated with damage to taste buds and may further exacerbate existing eating difficulties associated with poor appetite and chemotherapy induced nausea (Dodd, 1984; Judson, 1993). High dose chemotherapy may cause severe damage to the gut lining, leading to diarrhoea, blood loss and poor absorption (Dodd, 1984).

The most common and potentially serious side-effect is the suppression of the immune system relating to bone marrow (Jansen et al., 1993; Judson, 1993). Patients may become tired quickly (Jansen et al., 1993) and experience dizziness when standing, feel light-headed, become upset easily, feel chilly, or suffer shortness of breath (Bruning, 1985; Judson, 1993). Chemotherapy may cause a variety of non-specific toxicities which include anorexia, lethargy, altered taste sensation and impaired sexual activity (Judson, 1993). Headache, puffiness at the ankles, and hands, as well as flank pain may occur (Bruning, 1985). Besides, many chemotherapeutic agents produce specific organ toxicities, for example, renal and cardiac damages (Judson, 1993).

The peripheral and central nervous system may be affected by a number of drugs (Jansen et al., 1993). Walking difficulties may be caused by a combination of sensory ataxia and weakness due to motor involvement (Dodd, 1984). Weaknesses may progress from slight difficulty in rising from a chair or boarding a bus, to total paraplegia. Tinnitus may occur in association with hearing loss, or in isolation (Burning, 1985). Patients may be unable to hear normal or usual noise tones. Encephalopathy has also been reported, presenting as ataxia, somnolence, drowsiness, change in mood, or even coma (Jansen et al., 1993; Judson, 1993). Apart from the effects upon a person's physical health, chemotherapy affects one's well-being, including mental tiredness, depression, anxiety, sudden mood changes, insomnia, and nervousness (Bruning, 1985; Dodd, 1987; Judson, 1993).

1.2.2 Radiotherapy

Radiotherapy refers to the use of high energy rays or radiation to stop or destroy cancerous cells (Dodd, 1987). It is used most commonly with localised tumour tissue (Burish, Carey & Morrow, 1987). It is estimated that one half of all cancer patients receive radiotherapy (Burish et al., 1987). The various radiotherapeutic modalities may be classified in several ways including the method of production of the radiation (such as electrical machine or disintegration of a radionuclide), the type of radiation (such as photons, electrons, neutrons, protons and heavy nuclei), and the location of the radiation source (external or internal to the patient's body) (Griffiths & Short, 1994).

An external radiation treatment is the most common method. It involves the use of high energy rays to the spot where the tumour is in the patients' body (Dodd, 1987). An internal radiation treatment is placed inside the patients' body, usually in a body cavity like the vagina or into a tumour of the prostate or breast. Most external radiation is conducted on an outpatient basis. In contrast, the internal therapy requires that patients are hospitalised during treatment, because the implant is left in the cavity for a few days and patients are radioactive (Dodd, 1987).

Radiotherapy may produce many side-effects including nausea and vomiting (Judson, 1993). Fatigue, skin irritations, anorexia and difficulty in swallowing are common side-effects of radiation (Dodd, 1984; Hann, Jacobsen, Martin, Azzarello & Greenberg, 1998; Irvine, Vincent, Graydon & Bubela, 1998). Alopecia, taste alterations and diarrhea have been reported (Yasko, 1982). The degree of these side-effects depends on the site irradiated, the extent of the irradiated field, and the amount of radiation given with each treatment. Furthermore, radiation patients may be fearful of the specific nature of their treatments and the equipment used. Some patients have reported fears that the machine will fall on them or the treatment will cause another type of cancer (Burish et al., 1987).

1.3 Attribution Theory

This study utilised attribution theory, especially, Weiner's model as the theoretical framework. Weiner's model has been one of the systematically tested social psychological theory in achievement (Försterling, 1988; Weiner, 1990), behavioural medicine, psychosomatic dysfunction (Försterling, 1988), particularly in the domains of coping with serious illness such as diabetic (Försterling, 1988) and heart disease (King, 1983). Additionally, attributional approaches have been documented as having a wide range of applicability in areas of anger, anxiety, reactive depression related to cancer (Försterling, 1988; Taylor, 1983).

1.3.1 General Orientation of Attribution Theory

Attribution theory, as first proposed by Heider (1944) and elaborated upon by Kelley (1967), replaced dissonance theory as the dominant paradigm within social psychology in the 1970s (Weiner, 1992). Generally speaking, attribution theory is concerned with epistemology, or how people know (López & Wolkenstein, 1990; Weiner, 1990). As claimed by Försterling (1988), there are some basic assumptions that are common to almost all attribution models. Firstly, attribution models assume that causal cognitions play a central role in an individual's behaviour, affect and experiences. These cognitions are also used to explain events that happen to themselves and others. In cognitive processes, individuals respond not to the actual world but to their perceptions of the world (Miller, Yahne & Rhodes, 1990). That is, no matter what actual conditions and rules are operating in the environment, the individuals respond to what they believe the rules to be. Values or morals, for example, represent rules for behaviour an individual has developed through experience.

Secondly, attribution models assume that individuals are motivated to seek a causal explanation for events in their physical and social environment (Försterling, 1988). The attribution models assume that individuals use methods such as critical thinking that is similar to those used by scientists in order to determine causality. Moreover, individuals generally attempt to develop a realistic concept of causality with regard to the events in their personal domains. Finally, causal judgements that result from rational, scientific analyses of the events might help the individual to predict the future effectively and to behave appropriately in a given situation (Försterling, 1988). Also, causal understanding serves the function of attaining personal goals and ensuring survival. However, individuals might come to unrealistic causal judgements because they fear that the true attributions might affect their self-esteem negatively and subsequently cause them to experience negative affects (Kelly & Michela, 1980).

There have been a number of unrealistic causal judgements that have influenced attribution (Kelly & Michela, 1980). First, individuals faced with two or more plausible causes, attempt to explain the same effect as individuals faced with only one plausible causal hypothesis. Individuals may discount or disregard the extent to which a second cause has contributed to an effect. Second, individuals have both a plausible obstructing cause and a plausible promoting cause. In this case, the role of the promoting cause will be judged more favourably than if it was presented as a plausible cause alone (Bootzin, Bower, Zajone & Hall, 1986). Third, there are systematic differences in attributions to dispositional versus situational factors as a function of the perspective of the attributor. Individuals initially tend to overestimate dispositional factors like personality traits and underestimate situational factors, like particular circumstances, to account for behaviour (Bootzin et al., 1986; Kelly & Michela, 1980).

These errors may derive from a motivational bias which can be divided into egotism and defensive attributions (Roedigo III, Rushton, Capaldi & Paris, 1987). Attributional egotism refers to a tendency to take credit for successes (or other good outcomes) but to avoid blame for failures. Defensive attribution refers to attributions that serve to protect the perceiver's self-concept or just world beliefs. Beliefs in a just world refer to attributions biased by a wish to believe that there is a contingency between persons' actions and their fate (Roedigo et al., 1987). As a consequence, people may believe that they have control over their lives and that they can effect desired outcomes. People may blame themselves unjustifiably for negative events.

The error or bias may derive from hedonic bias which refers to people's tendency to take more credit for success than they do responsibility for failure (Weiner, 1992). Three mechanisms have been proposed to account for the observed hedonic biasing of causal attributions. First, attributions are conscious devices used by individuals in order to appear favourably in the eyes of others. Second, people tend to take more credit for success rather than to ascribe success externally. Also, people tend to place fault externally rather than on the self. Such a motivational interpretation of self-serving ascriptions assumes that attributions influence emotions. Third, it has been suggested that most individuals have had general success in life and expect further success (Kelly & Michela, 1980; Weiner, 1992). If success is anticipated, then actual success will tend to result in an internal ascription, inasmuch as the behaviour is consistent with the past. Conversely, failure is inconsistent with prior outcomes and thus promotes an entity (external) attribution. Two distinct elaborated causal explanations in attribution theory are in the Kelley model and the Weiner model of attribution. This study mainly applied those of Weiner, whose model categorises different types of explanations.

1.3.1.1 Kelley's Model of Attribution

Kelley (1972) identified three types of information including consensus, consistency and distinctiveness. Consensus information refers to the degree to which other people respond similarly in the same situation. Consistency information refers to the degree to which people act similarly when placed in similar situations experienced in the past. Distinctiveness information refers to the degree to which people behave similarly in differing situations. The three types of information combine to determine whether an attribution is made to the person, the stimulus and the time (or any combination of these three). The three dimensions of person, stimuli and time can then be defined as part of an Analysis of Variance (ANOVA) cube. The ANOVA cube implies that certain patterns of information lead to certain attributions For example, the high consensus, high consistency and high distinctiveness pattern is attributed to the stimulus rather than person or time (Kelley & Michela, 1980). With other combinations, for example, a low consensus, low consistency and high distinctiveness pattern may be attributed to the person.

1.3.1.2 Weiner's Model of Attribution

The current study tested the sequence of Weiner's model of attribution which identified four factors of causal attribution for the explanations of success and failure. These are ability, effort, task difficulty and luck (Weiner, 1985). These factors vary along the dimensions of locus, stability and controllability. Weiner explained that locus refers to the perception of the cause as either internal or external to the actor. Stability refers to the cause as either fixed or changeable over time. Controllability refers to the degree to which the cause is subject to control.

Within the dimensional classification, a number of studies were guided by the contrast between a perception of internal versus external control. Most related to Rotter's classification of generalised expectancies for internal versus external control of reinforcement. Rotter defined internal control as the perception that rewards are determined by skill or ability, while an external control indicates that reinforcements are perceived as decided by luck or fate (Weiner, 1986). Weiner pointed out that Rotter's classification is inadequate. For instance, an individual may believe that an illness , such as a virus may be controlled by personal behaviour despite the cause being external. In addition, Weiner (1990) explained that ability is stable, internal but uncontrollable, whereas effort is unstable, internal and controllable. Further, task difficulty is external, stable and uncontrollable, while luck is external, unstable and uncontrollable. Consequently, individual differences in emotional reaction and achievement behaviour result from the differential causal attributions of outcomes.

While the two models of attribution are considered separate entities, they have some similarities. The same information that determines Kelley's (1972) model of attributions also influences Weiner's (1985) categories of explanation (King, 1983). For instance, attributions related to the person under Kelley's model are functionally similar to Weiner's ability characteristic since they are internal, stable and uncontrollable. Furthermore, person-situation attributions are functionally similar to effort since they are an internal, unstable and controllable factor, whereas, circumstance attributions are functionally similar to luck since they are external, unstable and uncontrollable. Finally, stimulus attributions are functionally similar to task difficulty since they are external, stable and uncontrollable. These attributions have a direct and predictive influence on emotion, thus indirectly contributing to behaviour (Weiner, 1992). For example, patients' attributions often significantly relate to the way they cope with an illness and their decision to comply with medical advice or regimen (King, 1983).

1.3.2 Attribution Processing

Apart from the need for a more stringent test of attribution model, there are a number of aspects of the model in need of clarification. Four of these were selected for examination in this study including outcome, social support, emotion and behaviour. First, Weiner (1992) pointed out that negative, unexpected, or important events elicit searches for the reasons behind them. It is likely that people would seek a causal explanation. In the attribution model, Weiner did not explicitly discuss the possibility of direct relation between an outcome and social support. However, a substantial literature has developed on the attributional mediation of interpersonal conflict. Fincham (1983), while reviewing the literature, found that among room mates, lower satisfaction was associated with blame directed towards the other person and stable causal attributions for the conflict.

Attribution errors constitute another possible basis for the development of relationship dissatisfaction and conflict. For example, making dispositional attributions for interpersonal events could lead to high levels of dissatisfaction (Newman & Langer, 1988). Further, social support related to emotions following success are maximised when internal attributions are made (Försterling, 1988). Individuals might react to the unsatisfying interpersonal support with various negative feelings, such as boredom and anxiety (Newman & Langer, 1988). Additionally, involvement in support groups can provide a person with a way to find opportunities to learn coping skills from others (Folkman, 1992).

In the another aspect, Weiner (1986) posited that success is followed by the positive affect of happiness, regardless of the perceived cause of that outcome. Failure is accompanied by outcome-related negative affects, such as sadness, frustration and unhappiness. Amirkhan (1990) indicated that perceived control is an important moderator in explaining the outcome. For instance, in a cause of failure, internal causes produce negative emotions. Peterson and Seligman (1984) showed that individuals who have an explanatory style that invokes internal, stable and global causes for negative events tend to become depressed when negative events occur.

Each causal dimension is uniquely related to a set of feelings such as the experience of shame, guilt, pity and anger (Weiner, 1972, 1990). For example, shame affects such as disgrace, embarrassment and humiliation, result from an attribution to failure that is self-related and uncontrollable. Shame gives rise to withdrawal and motivational inhibition. Guilt occurs when a person perceives themselves as personally responsible for a negative outcome. Guilt related affects, such as regret and remorse, are associated with failure due to lack of effort (Weiner, 1990, 1992). Pity follows when a negative state or act is not controllable by the other, just as shame seems to require an act not controllable by the self. Anger presumes that others are responsible for a self-related negative action (Weiner, 1992). Negative self-esteem is experienced when a negative outcome is ascribed to the self. Hopelessness and resignation are experienced when negative events are caused by stable causes (Weiner, 1985).

In the third aspect, Weiner (1986) explicitly pointed out that psychological consequences lead to behaviour. These psychological reactions provide messages or information to the actor to go toward or away from, to help or to neglect, to make amends or withdraw, and so forth. In addition, these affects often promote approach and avoidance behaviour, retribution and motivational activation. These behaviours can also be described according to their degree of intensity and latency of occurrence (Weiner, 1985). The research in the helping domain provides a good test of the attributional theory. Two investigations have been conducted to examine directly the role of affect in helping behaviour. In one study, Menec and Perry (1998) tested Weiner's attribution-affect-help judgement model across a range of stigma, such as AIDS, blindness, drug addiction, heart disease, leg amputation, lung cancer, obesity, paraplegia and unemployment. The affective ratings could be described by two distinct dimensions, called anger and pity. A path analysis was constructed to account for helping judgements. The results indicated that greater pity was associated with greater willingness to assist the targets.

Reisenzein (1986) performed a path analysis to test Weiner's attribution-affect model of helping behaviour. In this model there is a direct path between affective reactions (anger and sympathy) and helping behaviour. To test the model Reisenzein made use of a role-playing methodology. Two situations were a person falling down in a subway and someone requesting class notes. The results showed that the model fitted the data. Sympathy was positively associated with help while anger was negatively associated with help willingness.

In the fourth aspect, because human behaviour is varied and complex, many behaviours are rational, consciously selected strategies to help control stress. However, many aspects of conduct are irrational, therefore, behaviours may not be mediated by cognitions and emotions. Reisenzein (1986) tested the direct path between eliciting situations and helping behaviour. It was found that help willingness was not mediated by the cognition of controllability and the subsequent affective reactions.

1.3.3 Attribution and Related Studies

The attribution model has been applied in a variety of field settings. Taylor, Lichtman, and Wood (1984) found that self-blame for a negative outcome like cancer was associated with guilt, shame and feelings of inferiority. The results indicated that 95% of cancer patients (n=78) made attributions for their cancer. Twenty-eight stated that the question of what caused their cancer was important to them at initial diagnosis. Beliefs in either external or internal control were associated with adaptive or coping behaviour.

It was also found that blaming another person was associated with poorer adjustment (Taylor et al., 1984). This result was congruent with Berckman and Austin (1993) who stated that patients who attributed external cause to their cancer experienced more psychological distress. Taylor et al. suggested that self-blame was related to successful coping because it signified control, even though people who blamed themselves for their condition experienced more distress. Results however were not consistent. In the early time period of diagnoses, self-blame was negatively associated with adjustment. However, in the middle time period after surgery, self-blame was positively associated with adjustment. Taylor et al. (1984) concluded that self-blame may have multiple meanings, signifying control and good adjustment for some people, and guilt and poor adjustment for others. Belief in owning control over the cancer was associated with better adjustment. In contrast, Jenkins and Burish (1995) found that strong beliefs in powerful others' locus of control were associated with less depression while strong beliefs in internal control were associated with greater anxiety.

Amirkhan (1990) also disagreed with Taylor et al. (1984) and argued that the results showed better adjustment occurred in patients who believed they had some control over their cancer because perceived control over previous outcomes in the situation is essential to the prediction of a stressor's impact. The fact that the relationship between perceived control and illness may not be linear, as indicated by some studies, has provided disconfirmatory evidence (Amirkhan, 1990). Moreover, patients who have either more internal or more external control may produce more psychological distress.

In Taylor et al.'s (1984) study, the researchers did not control for the effect of religious or ethnic beliefs in relation to adjustment to illness, despite the fact that their participants were from various religious dominations including Protestant 46%, Catholic 15% and Jewish 31%. Leung (1996) found that Hong Kong Chinese have a greater belief in external control than American-born Chinese, who in turn were more external than Anglo-American people. As the ways in which a member of one culture may differ from a member of another are large, this may present problems because religious and ethnic factors may have been used as an important factor in belief about control for some who experienced stress or illness. Bond (1983) pointed out that ethnic and religious factors are important in research on the cultural responses to illness.

In relation to self-blame, Bulman and Wortman (1977) have investigated the coping behaviour of individuals who became paralysed after receiving spinal cord injuries during accidents. Interviewing was the method used in their study. The findings indicated that individuals were most likely to blame themselves if they believed they could have avoided the accident. The researchers concluded that the more victims blamed themselves the better they coped, and the more victims were able to blame another cause, the worse they coped. The researchers suggested that self-blame was associated with successful coping because it signified control. Also, victim attributions reflected a need to find some meaning for their injury.

Bulman and Wortman's (1977) results were consistent with those of Taylor et al. (1984) in relation to the result of self-blame in emotional responses. However, the study was limited in that people may have had an exaggerated notion of their own causal powers. Furthermore, there were some obvious weaknesses because of instrument and definition problems, primarily in regard to the assessment of coping. For example, the researchers defined good coping if individuals had accepted their injuries. The fact is that this definition may not always be true because for some situations an avoidance coping might be more appropriate and be regarded as good coping. For instance, an avoidance coping might help in reducing the emotional reaction to stress.

Bulman and Wortman (1977) argued that as the consequences of an accident become increasingly severe, people become motivated to assign blame to someone possibly responsible for the accident. They, however, noted that training people to feel that they can influence and control their outcomes may have maladaptive consequences for individuals who are faced with outcomes that are truly uncontrollable.

Peterson and Seligman (1984) examined the causal explanations as a risk factor for depression by modifying the learned helplessness model within attribution theory. The central prediction of this model is that individuals who have an explanatory style that involves internal, stable and global causes for bad events tend to lose self-esteem and become depressed when bad events occur. The results were divided into three parts. In the first part, the results of cross-sectional studies indicated that a characteristic way of explaining bad events with internal, stable and global causes, co-occurred with depressive symptoms. The second part is of longitudinal studies which showed that this explanatory style preceded the development of depressive symptoms. The laboratory experiment studies showed that imposing uncontrollable bad events were associated positively with depression. These results were consistent with Fö rsterling (1988) who reported that persons who attributed their illness to internal and stable factors were subject to depressive feelings.

Follette and Jacobson (1987) also examined the extent to which causal attributions were predictive of depressed moods in college students who experienced a negative event. This study replicated and extended the study by Metaisky, Abramson, Seligman, Semmel, and Peterson (1982). The researchers reviewed the literature and found that students who made internal and global attributions for negative events were more likely to show a depressive mood change than were students with a propensity toward external and specific attributions. The results showed that the attribution of failure to internal, stable and global causes was associated with increased motivation to problem-solve. They found that individuals who attributed failure to their stupidity or laziness may be more susceptible to depressed moods than those who did not study or attend class, because students know that they can rectify their behavioural deficits. However, the researchers did not find a correlation between attributional style and depressive mood following a negative life event.

Baumgardner, Heppner, and Arkin (1986) tested a hypothesis concerning the role of attribution in personal problem solving and choice of coping strategies. They utilised a sample of college students who had previously scored in the upper or lower eighteen per cent on the Problem Solving Inventory (PSI). To find causal attribution for frequently encountered intrapersonal and interpersonal problems, attributions to internal, stable and controllable causes were assessed. The study was divided into two sections. The first section focused on causal attributions regarding etiology of personal problems. The second section focused on attributions regarding actual attempts to solve personal problems.

In their first study, Baumgardner et al. (1986) randomly selected college students from the top (those perceiving themselves as avoiding problems and lacking both confidence and personal control) and bottom (those perceiving themselves as approaching problems and having confidence and personal control) eighteen per cent of PSI scores. The results indicated that self-appraised effective problem solvers tended to attribute cause for common intrapersonal problems to internal, variant and controllable factors. This result contradicted those of Follette and Jacobson (1987) in terms of the effect of the internal and stability dimensions.

The second study comprised college students who had previously scored in the upper or lower eighteen per cent on the PSI scores. Half of the subjects had received bogus success feedback and half had received bogus failure feedback. Attributions for the performance outcome as well as expectations of performance for a second task were assessed. The results indicated that self-appraised effective problem solvers attributed success more to internal causes and failure more to external causes, relative to their counterparts. In failure, self-appraised effective problem solvers were more likely to ascribe outcome to transient factors. In conclusion, Baumgardner et al. (1986) pointed out that perceptions of effort are the major distinguishing feature of the effective versus ineffective problem solver. Both in studies 1 and 2, the self-appraised effective problem solver tended to attribute personal problems to lack of effort.

The relationship between cognitive appraisals of stressful events and coping skills was examined by Forsythe and Compas (1987). They found that when events were perceived as controllable, the use of relatively more problem-focused coping than emotion-focused coping was associated with lower symptom levels. In addition, a sense of personal control was also associated with either increased or decreased distress. Similarly, Taylor (1983) and Taylor et al. (1984) reported that breast cancer patients who believed that their cancer was caused by controllable factors such as dieting, coped better with their illness than those who attributed the illness to uncontrollable causes. In contrast, Lavery and Clarke (1996) found that, in Australia, breast cancer patients who made an uncontrollable attribution were more likely to use problem-focused coping skills.

In the aspect of stability, Vitaliano, DeWolfe, Maiuro, Russo, and Katon (1990a) found that when the stressor was appraised as changeable, depression was negatively associated with problem-focused coping and positively associated with emotion-focused coping. However, when the stressor was appraised as unchangeable depression it was not related to coping skills. The Vitaliano et al. results on the controllability aspect were consistent with those of Folkman and Lazarus (1985), Forsythe and Compas (1987), and Taylor et al. (1984) in which depression symptom scores were positively associated with emotion-focused coping in less controllable circumstances.

1.3.4 Culture and Attribution

Although the attribution model has been applied in a variety of field settings, its use has been limited in health behaviour especially, in cancer patients. While these models were derived mainly from the United States and Western studies, their framework may apply to different cultural contexts. For example, a number of studies conducted in Taiwan and People's Republic of China have correlated attributional patterns of students with achievement-related variables suggested by Weiner

(Crittenden, 1996). However, cultural and personal values may play an important role in understanding attribution patterns. For instance, research on cultural differences in causal attributions has shown that Chinese students were more likely to attribute success to luck and attribute failure to lack of effort while the Euro-Canadian students attributed success to high ability and attribute failure to high task-difficulty (Wong, 1991). Additionally, Chinese people have a stronger belief in external control than Western people (Leung, 1996).

This study was conducted in Thailand and was not cross-cultural study. Because the largest ethnic minority in Thailand is Thai Chinese, the attributional meanings of causes for Chinese people are different from those of Americans. The Chinese perceive that fate is an external, stable factor and luck is an external and unstable factor whereas Americans and Westerners perceive that fate is equivalent to luck and that both are external and unstable factors (Crittenden, 1996). In this case, Weiner (1985) argued that although the interpretation of causal explanations of causes might vary between people, the underlying dimensions on which causes are given meaning remain constant. That is, dimensions are conceived as stable. Therefore, the conception of attribution model has a wide range of applicability.

The background information discussed in the preceding pages indicates that Buddhism profoundly influences everyday life in Thailand. Buddhism offers significant insights into understanding the nature of consciousness and psychology of Thai behaviour. Specifically, Buddhism is primarily designed to answer the question "*what are the causes of suffering and what is the way out of it*" (De Silva, 1991, p. 41). It also offers people techniques to deal with mental and behavioural disorders through self-analysis and searching for the roots of discord within themselves (De Silva, 1991; Humphreys, 1990). The techniques range from meditational exercise, moderation in eating to noble friendship and engagement in suitable conversation.

For Thai Buddhists, a serious illness is perceived as punishment for prior deeds or misdeeds (Humphreys, 1990). This viewpoint is consistent with some Western beliefs (Janoff-Bulman & Lang-Gunn, 1988; King, 1983). Furthermore, according to Buddhist ideas, individuals are responsible for their suffering and illnesses. Most Buddhists believe that acts committed in previous lives affect one's situation in this life and acts committed in this life will affect one's situation in this life as well as in a future life (Humphreys, 1990). Furthermore, Buddhists perceive that individuals have free will and personal endeavour, and are capable of changing both themselves and their environment. Muslims, however, perceive themselves and others as the ones to blame for their illnesses (Baider & Sarell, 1983). In addition, Muslims expressed that nothing could be done for their illnesses and only God could help. The illness was seen as uncontrollable and irreversible (Baider & Sarell, 1983).

Thais have a strong belief in the power of other control including physicians, health professionals and the supernatural (Golomb, 1985). Most Thais utilise a variety of resources to control their illnesses. As Weisberg (1982) found, choice is one component that Thai people use for coping with the reality of illness. Even if the individuals are in a situation where their power is extremely limited, the situation will encourage them to look after their own fate and fortune. They commonly deal with illness through a judicious choice of healer, bargaining over the amount or terms of payment, the selection of healing context and environment, and negotiation about which component parts of therapy will be employed (Weisberg, 1982).

As can be seen in this section, ethnic and religious values have important effects on attribution explanations. The Chinese have a strong belief in external and controllable factors, while Thai Buddhists tend to attribute the cause of their illness to internal factors. The Buddhists also perceive they are responsible for their illnesses whereas the Muslims, express their trust in God. Both Buddhists and Muslims view their illness as a punishment. While Buddhists believe in other control, Muslims believe in God control. The next section reviews a literature regarding health status, psychological symptoms, social support and coping skills relevant to cancer patients.

1.4 Health Status

This section investigates health status aspects of chemotherapy and radiotherapy. Although health is difficult to define, some theoretical concepts define health as 'absence of disease', 'role performance', 'adaptation' and 'maximising human potential' (Simmons, 1989). Within health as a disease-free state, a person is considered healthy if the disease condition has been eliminated or controlled (Smith, 1983). The role performance model considers health as the state which enables persons to perform their roles in life (Simmons, 1989). A third orientation, adaptation, involves health as a condition which enables persons to adapt to their environment (Weiss & Lonnquist, 1997). Health is the condition of actualisation or realisation of human potential proposed by maximising human potential or edudaimonistic model (Simmons, 1989).

The absence of disease and role performance models focuses on the maintenance of stability. Conversely, the adaptive and edudaimonistic models are oriented toward change and growth. In Thailand, Wasee (2000) proposed the broad concept of health as complete physical, mental, social and spiritual well-being, which was similar to the World Health Organisation's definition. In contrast, Thai men viewed health as related to role performance such as career capacity, while Thai women were considered healthy if the disease state was eliminated or controlled (Rujkorakarn & Sukmak, 2000).

From the review of theoretical orientations, health is theoretically defined as a multidimensional human state. However, the most frequently used scales of health are the indices of physical health (McArdle et al., 1981; Vinokur, Threatt, Caplan & Zimmerman, 1989), social functioning and some psychological indices (Bloom et al., 1991a). These scales of health are conceptualised the same as the dimensions of the quality of life index which measures a positive mood state, supportive relationships, and the absense of physical or psychological distress (McDowell & Newell, 1987).

Few studies of the side-effects of chemotherapy and radiotherapy have examined the self-perceived health problems of patients undergoing these treatments. Instead, most studies investigating health as it relates to chemotherapy have been conducted using only medical records, such as Buckingham et al. (1997) and Hibbard (1985), and experimental models such as Andrykowski, Jacobsen, Marks, Gorfinkle, Hakes, Kaufman, Currie, Holland and Redd (1988). A few studies have also measured several aspects of health in relation to chemotherapy or radiotherapy and their definition of health status differs. For example, health status has been assessed on the basis of symptoms of illness by McArdle, Calman, Cooper, Hughson, Russell, and Smith (1981) and Seeman, Seeman, and Sayles (1985). Physical criteria has been assessed by Hughson, Cooper, McArdle, and Smith (1986) and Nowack (1989), and the ability to perform within the expectations of normal roles by Bloom et al. (1991a), Coates, Dillenbeck, McNeil, Kaye, Sim, and Fox (1983), and Lamb, Robert, and Brodie (1990).

Lindley, Vasa, Sawyer, and Weiner (1998) have examined the quality of life and preferences for chemotherapy in breast cancer patients. They measured physical symptoms and sexual function, and the results showed that the most commonly reported moderate to severe symptoms were fatigue, worsening appearance and altered bowel function. Patients showed little change in feelings of affection toward their partner but perceived a decrease in sexual acceptance by their partner. The majority of patients indicated a willingness to accept chemotherapy for what appears to be modest benefit whereas a small group of patients would not accept treatment even for substantial potential gain. Although, the study was limited in generalisability, their findings are plausible.

Coates et al. (1983) found that ovarian cancer patients (n=39) had the highest correlation between general well-being and physical activity. General well-being scores also decreased markedly during radiotherapy and chemotherapy. The researchers however did not compare the levels of quality of life between the two treatments. Priestman and Baum (1976) conversely assessed the quality of life in patients in two different chemotherapy regimes. The results indicated that there was no significant difference between the quality of life in the two groups. The latter was consistent with those of Bloom et al. (1991a) who claimed that the type of treatment did not have significant effects on patients' social functioning. These two studies gave only a superficial view of patients' experiences. The combination of the assessment of side-effects and the measurement of quality of life may be more useful in studying the impact of therapy on quality of life.

McArdle et al. (1981) intensively investigated social, emotional and financial implications of adjuvant chemotherapy in breast cancer. They used a longitudinal design which tested participants at one, three and six months after surgery, using three groups of patients. The first group was undergoing conventional postoperative radiotherapy. The second group received chemotherapy alone. The last group underwent radiotherapy followed by chemotherapy. The results indicated that nausea and vomiting were common with the chemotherapy regimen. These side-effects resulted in some patients refusing further treatment. However, most patients completed the full course of chemotherapy and a majority was able to return to normal activities involving work. These findings were supported by Bloom et al. (1991a), Coates et al. (1983) and Hughson et al. (1986).

Hughson et al. (1986) extended and supported the study of McArdle et al. (1981), utilising the same design and methodology. The researchers added items for measuring health status such as somatic and physical symptom scores, at one-, three-, six-, thirteen-, eighteen- and twenty-four months. The findings indicated that by six months patients receiving chemotherapy, or a combination of chemotherapy and radiotherapy, had suffered more physical and conditioned reflex nausea without vomiting, than those who received only radiotherapy. Specifically, most patients considered the adverse effects of chemotherapy to be worse than those of radiotherapy. Physical symptom scores at six and thirteen months were significantly higher in the two groups treated with chemotherapy. This study utilised a small sample size using twenty-four patients for radiotherapy, twenty-seven patients for chemotherapy, and twenty-three patients for combination treatment groups. As a consequence, the results should not be generalised to the larger population of patients undergoing chemotherapy and radiotherapy. These results were consistent with those of Graydon (1994), Hann et al. (1998), and Peck and Boland (1977).

The quality of life in women with breast cancer who received radiation therapy was investigated by Graydon (1994). The findings indicated that patients were not experiencing many changes in their usual activities and were experiencing very few symptoms. There was evidence that the patients reported receiving radiation therapy were not having a negative impact on their lives. In a well controlled design, Hann et al. (1998) also reported that radiotherapy patients experienced a quality of life similar to those of healthy women. There was a non-significant difference between radiotherapy patients and healthy persons in physical functioning. These radiotherapy studies reported that fatigue was a common disruptive long-term side-effect of radiotherapy. These results were supported by Irvine et al. (1998) who found that fatigue significantly increased over the course of treatment and was highest in the last week of treatment, returning to pre-treatment levels three months after treatment. However, these findings were contradicted by those of Berglund, Bolund, Fornander, Rutqvist, and Sjödén (1991) and Hughson, Cooper, McArdle, and Smith (1987).

Hughson et al. (1987) found that nearly half of the patients given radiotherapy experienced social dysfunction such as feeling indecisive or uncommunicative, or failing to enjoy their usual activities. In addition, there were significant differences between radiotherapy patients and no-treatment patients on somatic symptoms. Radiotherapy patients reported more physical symptoms and social dysfunction because patients had to travel to hospital five days a week for treatment, and this often made them feel tired. Berglund et al. (1991) found that patients in the radiotherapy group had significantly greater physical problems with decreased stamina. The chemotherapy group had significantly more problems with smell aversion. Berglund et al. (1991) strongly believed that the quality of life in chemotherapy patients was higher than the radiotherapy patients.

Chemotherapy and radiotherapy are the conventional approaches to cancer treatment. The studies reviewed generally conclude that chemotherapy and radiotherapy side-effects are the sources of considerable health problems. It has been found that there are certain consistencies across the literature. There is evidence that chemotherapy and radiotherapy have a deleterious impact on patients' health, including not only physical, but also social functioning. But chemotherapy seems to more severely affect patients' health than radiotherapy.

1.5 Psychological Symptoms

Wide ranges of studies investigating the impact of chemotherapy and radiotherapy side-effects on psychological symptoms have been reported. Carey and Burish (1988) pointed out that the impact of chemotherapy side-effects on psychological distress should not be regarded as abnormal psychopathology. They argued that the development of side-effects or symptoms may be manifestations of underlying psychological re-adjustment problems, or due to patients displaying such symptoms so as to gain attention and sympathy. The researchers asserted that psychological symptoms induced by the side-effects may be the product of past experience, chemotherapy itself, or cognition.

In relation to cognitive functioning, Cull (1990) intensively reviewed previous research on the psychological aspects of cancer and chemotherapy. Cull pointed out that the side-effects of chemotherapy affect not only the cognition but also the emotions of patients. Similar to Carey and Burish (1988) cited above, Cull indicated that patients may experience psychological distress due to the direct action of drugs on the brain, or as a consequence of the emotional demands of the experience. This may be true but this study does not explore the psychological consequences in relation to the cognitive functions.

Nerenz et al. (1982) conducted a questionnaire concerning the side-effects that patients had experienced due to chemotherapy. They discussed the expectations about the effectiveness of treatment and the side-effects during the progress of treatment, interpretations of these side-effects, imagery about the disease and treatment, and general worries and concerns. The results showed that pain, chills, nausea and weakness contributed strongly to ratings of difficulty, while tiredness, weight changes and depression contributed to ratings of emotional distress. Patients who had side-effects reported more difficulty and distress than those who had not experienced side-effects. The number of side-effects experienced were significantly positively related to emotional distress. The duration of particular side-effects was not associated with distress scores.

Depression scores were highest for patients who noticed a change in palpable lymphadenopathy in the first cycle or later than the sixth cycle (Nerenz et al., 1982). Moreover, depression scores were lowest for patients who noticed changes in the third, fourth, or fifth cycles. The two possible mechanisms creating high emotional distress were the disappearance of palpable signs of disease which leave the patient in a condition of uncertainty, and the subsequent rapid disease responses in which patients view themselves as cured once palpable symptoms of disease have disappeared. The researchers did not postulate that severity of side-effects may lead to distress because of the damage of cognitive functioning. This study was also weakened because the researchers used a measure of symptom scores rather than ratings associated with a particular symptom category.

Nerenz et al. (1984) assessed psychological aspects of cancer chemotherapy. They investigated the presence, duration and severity of common side-effects. Their sample was divided into three groups consisting of patients with lymphoma (n=61), breast cancer with adjuvant chemotherapy (n=29) and metastatic breast cancer (n=31). Patients reported high levels of distress when treatment made them feel as though they were deteriorating rather than getting better. This finding was consistent with Leventhal et al. (1984). The distress of lymphoma patients seemed to be directly tied to treatment side-effects. This finding was congruent with Nerenz et al. (1982). When patients were in a condition of uncertainty, the groups were equally distressed by the treatments. Due to the small sample size and the cross-sectional analysis, the results could not be generalised.

Meyerowitz et al. (1983), using retrospective interviews conducted six months or more after patients had finished receiving adjuvant chemotherapy, examined the psychosocial effects of adjuvant chemotherapy after surgery for Stage II breast cancer (n=50). Patients took an average of 6.4 months after chemotherapy ceased to feel the same as they had before treatment. Nineteen percent of the patients reported that they felt better immediately following termination of treatments and seven percent reported that they did not feel fully recovered. Additionally, 37% of the patients reported having fears of the recurrence of cancer because of the possibility of chemotherapy being required for treatment. The design of the study did not delineate the differential effects of having received adjuvant chemotherapy from other treatments.

The levels of emotional reactions to radiotherapy were examined by Peck and Boland (1977). Fifty patients were interviewed by a psychiatrist one week after the completion of radiotherapy. The researchers reported that there were no severe emotional reactions. The degree of the emotional reaction was estimated as moderate if it interfered with customary daily behaviour and mild if it did not. This study was weakened because the researchers used a retrospective rather than prospective approach as well as a small sample size. For this reason the finding could not be generalised. These results were consistent with Graydon (1994) and Oberst, Hughes, Chang, and McCubbin's (1991), who found that radiotherapy did not increase the level of emotional distress. Similarly, Hann et al. (1998) and Hughson et al. (1987) reported that there were no significant differences between the radiotherapy recipients and healthy persons in state anxiety, trait anxiety, or self-reported depressive symptomatology. This may be the fact that patients who received radiotherapy could work the same level as healthy patients did. In contrast, Irvine et al. (1998) found that psychological distress decreased during radiation treatment and returned to pre-treatment levels at three and six months post-treatment.

In comparing chemotherapy and radiotherapy, various studies have measured psychiatric morbidity as a consequence of chemotherapy side-effects. McArdle et al. (1981) investigated psychological status in the chemotherapy treatment of breast cancer compared with those of radiotherapy, and in a combination of the two treatments. The findings showed no significant difference in the incidence of psychiatric morbidity in the three treatment groups. In addition, Hughson et al. (1986) assessed psychological symptoms of adjuvant chemotherapy following mastectomy. The researchers utilised a randomised trial of chemotherapy in Stage II breast cancer. Unlike the results of McArdle et al. (1981), Hughson et al. (1986) showed that at six months chemotherapy was more unpleasant than radiotherapy, and was reported as "*the worst thing that had ever been thought up*" (p. 1270). The cognitive thinking of an aversive effect may have an impact on the increase or decrease of distress. The study was limited by the small sample size (N=79). These two studies found that both the side-effects and treatments of cancer as well as cancer itself were linked to psychological symptoms. None have investigated the cognitive processes underpinning these symptoms

One may conclude from this review that the side-effects of chemotherapy and radiotherapy may have an impact on the psychological symptoms of patients. Patients experience distress not only in the short term but also in the long term. However, patients who received chemotherapy seem to experience more distress than those who received radiotherapy. The criticisms which were most commonly directed towards the earlier studies included poor research design, the absense or inadequacy of the control group and a small sample size.

1.6 Social Support

The purpose of this section is to examine social support variable. It focuses on the issues central to the definition and types of support. The mechanisms by which support may affect health and psychological symptoms are also presented.

1.6.1 Definition of Social Support

Social support can be defined in several ways. For example Shumaker and Brownell (1984, p.13) referred to social support as "*an exchange of resources between two individuals, as perceived by the providers or the recipient, and intended to enhance the well-being of the recipient*". They defined the concept of exchange as the perceptions of at least two participants using a broad outcome measure. The authors did not limit the support to network members. In contrast, Cohen (1985) defined social support as "*the resources that are provided by other persons*" (p. 73). The theoretical work underlying this assumption is that one's interpersonal relationships function as "*stress buffers, only when the types of support resources that are provided by one's relationship match the coping requirements elicited by the stressor*" (Cohen, p. 74). Sarason, Levine, Basham, and Sarason (1983) defined social support as "*the existence or availability of people on whom we can rely, people who let us know that* *they care about, value, and love us"* (p. 127). This definition utilised both networks and received support, and the present study uses this definition as a framework.

1.6.2 Types of Support

Social support is considered as a multi-dimensional construct. The main elements consist of informational, appraisal, emotional and instrumental or tangible support. Informational support includes offering information and advice. Appraisal support involves support with feedback and affirmation. Emotional support involves intimacy, attachment and reassurance which express positive affects. Instrumental support includes direct aid or services, as well as material aid. Most research on health, including cancer care, has focused on emotional and instrumental support (Bottomley & Jones, 1997). Wortman (1984) strongly believed that not all types of support are equally effective in reducing distress or inducing coping behaviour. There was some empirical evidence indicating that different types of support may have different effects on particular health outcomes. For example, Langlie (1977) reported that the perceived social support scores were significantly negatively correlated with the depression scores. In the separate measures for social support, tangible and emotional supports were both negative and significant predictors of depression. In contrast, informational support was positively associated with depression and negatively associated with morale, although not significantly.

Similarly, Bloom et al. (1991a) indicated that instrumental support was negatively related to social role functioning and emotional support had a significant and negative effect on psychological symptoms. In this study, the sample was composed of patients with Hodgkin's disease. The sample consisted of patients treated with a combination of radiotherapy and chemotherapy (51%), radiation alone (38%) and chemotherapy alone (7%). Social support was measured as an independent variable and included informational support, emotional support, instrumental support, family support, size of the network, and social ties. The findings indicated that informational support did not have a significant effect on social functioning. This may be due to the fact that the sample contained patients with chronic illness who had knowledge about their illnesses and treatments.

In a study of informational support, Dakof and Taylor (1990) interviewed fifty-five cancer patients in order to specify which particular acts were helpful and unhelpful from each of seven designated individuals in their support network. The researchers took into account both providers and recipients. Informational support was seen as most helpful when coming from cancer patients and physicians, while emotional support was seen as the most helpful type of support when coming from spouse, family and friends. Patients also reported that they were most upset when a friend avoided social contact with them. These results were congruous with those of Wortman (1984) who found that, through the course of diagnosis and treatment, most cancer patients have an intense need for support and for the opportunity to clarify their situation through discussion and supportive interactions with others. Some limitations of the study have been noted, such as the sample size (n=55) was somewhat small. The sample was not of newly diagnosed patients, and possible distortions in recall could have occurred due to the time that had lapsed since diagnosis. The sample was also drawn from middle and high-income patients with a good prognosis.

1.6.3 Mechanisms of Support

In the study of social support and health, it was evident that there are two distinct mechanisms of support which could be linked to health related outcomes. These are the main or direct effect and the buffering or interaction effect.

1.6.3.1 The Main or Direct Effect

Broadhead, Kaplan, James, Wagner, Schoenbach, Grimson, Heyden, Tibblin, and Gehlbach (1983) in a comprehensive literature review, noted that research on the direct effect relation between social support and health has been equivocal. Social support may influence health outcomes directly by providing access to information, or by enhancing motivation to engage in adaptive behaviour (Bloom et al., 1991a). It is probable that social support could also be related to physical health, through emotionally-induced effects on the functioning of neuroendocrine or immune systems, or through influence on health-related behavioural patterns. Several studies have examined the direct relationship between social support, health and distress.

The relationship between social support, distress and morale in relation to stressful life events was convincingly examined by Schaefer, Coyne, and Lazarus (1981). The social support measurement contained social network size and three types of perceived social support including tangible, emotional and informational support. The sample consisted of one hundred men and women, aged 45-64 years, living in Alameda County, California. The researchers utilised cross-sectional and longitudinal research techniques. The time interval between the first interview and the second interview was ten months after the first interview. This process was used to

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examine the stability of the relationship between social support, and physical and psychological symptoms, over time. The results showed that none of the social support variables was significantly correlated with physical health status. Because of sampling problems, primarily in regard to the assessment of physical health status in stressful life events, the researchers were unable to conclusively state that social support was associated with physical health.

Similarly, social network showing little relationship to health was found in Langlie'study (1977). Conversely, Schaefer et al. (1981) found that social network indices were strongly and negatively associated with depression. Informational support was positively associated with depression. Tangible support and emotional support were inversely associated with depression. The results of cross-sectional study were consistent from the first interview to the second interview. The limitations of the finding may have been due to a small homogeneous sample of middle-aged and middle-class people in whom the prevalence of severe psychological symptomatology was very low. Therefore, these findings should not be generalised to low-income people and differing age groups.

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Bloom et al. (1991a) argued that social contacts rather than social networks were related to psychological symptoms. These results contradicted those of Schaefer et al. (1981) who found that social networks were negatively associated with depression while informational support was positively related to depression. In terms of emotional and tangible support, the results obtained from Bloom et al. (1991a) were consistent with Schaefer et al. (1981). However, this study did not include a control for type of treatment and stage of cancer in correlating social support with illness.

The relationship between social support and psychological symptomatology among cancer patients was examined by Dunkel-Schetter (1984). Using interview procedures, the findings indicated that support from medical care providers was most important. Health care providers were seen as most effective when they provided a combination of direct assistance, advice or guidance and emotional support. Support was negatively related to physical conditions among poor prognosis patients. That is the stronger a patient's support, the more problems they faced in functioning. Inversely, support was positively related to psychological well-being among those with a good prognosis. It was concluded that support might have detrimental consequences for cancer patients with a poor prognosis, whereas it is beneficial for good prognosis patients. The researcher pointed out that one's well-being is threatened in multiple ways by a poor prognosis and support cannot possibly ward off all the threats.

Bloom et al. (1991a), Dakof and Taylor (1990), and Kessler, Price, and Wortman (1985), argued that cancer patients who had a poor prognosis receive less social support which led to poor health. This may be due to the mediating role of poor and good prognosis playing an important role in stress levels in cancer patients. For example, poor prognosis may lead to high levels of social contact avoidance from others (Wortman & Dunkel-Schetter, 1987). This result was consistent with Willey and Silliman (1990) who noted that breast cancer patients who were undergoing chemotherapy were more likely to report inadequate levels of support than those who had received curative treatment. An alternative explanation was that those with a poor prognosis may make more demands for support than those with better health.

Most studies have found that social support was negatively related to distress. Lin, Simeone, Ensel, and Kuo (1979) examined the effect of social support and stressors on illness. The sample comprised one hundred and twenty-one males and forty-nine females. The findings showed that social support contributed significantly and negatively to illness symptoms. Altogether, this study did little to explain the direct relationship between social support and illness. The social support items seemed to measure the respondents' feeling of the frequency of interactions and involvement with friends, neighbours, people nearby and the subcultural community. The study did not also attempt to further analyse the effects of the function or type of social support on illness.

In a more advanced approach, the effect of initial social support on later depression was studied by Holahan, Holahan, Moos, and Brennan (1995) in cardiac patients. The patients were divided into three groups. The first group comprised chronic cardiac patients (N=325). The second group was composed of acute cardiac illness patients (N=71). The final group was composed of healthy control persons (N=219). The researchers further divided patients according to gender. The results revealed a direct and negative relationship between social support and subsequent depressive symptoms. In addition, there was an indirect relationship between support and depression mediated by approach-coping skills. Social support had a significant direct effect on depression symptoms at both the first administered questionnaire and one year later. Moreover, women showed more depressive symptoms than men. Women also utilised a lower percentage of approach-coping strategies than men. This study was limited to late-middle-age patients with heart disease, therefore, the results should not be generalised to other groups of patients.

Other confirmatory studies were reported by Blankfeld and Holahan (1996) and by Norris and Kaniasty (1996). Blankfeld and Holahan investigated the relationship between family support, coping strategies and depression symptoms in mothers of children with diabetes (n=52). Support measures contained cohesion, expressiveness and conflict subscales. Cohesion referred to the extent to which family members helped and supported one another. Expressiveness referred to the degree to which family members expressed their feelings and acted openly. Conflict referred to the degree to which the family was characterised by expressions of anger and conflict. The model included support as an exogenous variable, and coping strategies and depression symptoms as endogenous variables. The results indicated that support was not significantly related to depression. However, support was positively related to coping strategies and coping strategies were mediators between support and depressive symptoms. The limitation of this study was the small sample size which decreased the probability of reflecting a postulated structural model.

While not directly related to ill health as a stressor, Norris and Kaniasty (1996) investigated the relationship between social support and distress in two groups of people who had experienced hurricane-damage. The researchers tested the goodness-of-fit model and found that received support was not associated with distress, while perceived support was negatively related to distress. The researchers argued that received support may have a long-term beneficial effect on mental health through perceptions of social support availability.

When social support was the dependent variable, a number of studies showed a consistent direct and negative effect of health on social support (e.g., Bolger, Foster, Vinokur & Ng, 1996; Choi & Wodarski, 1996; Cramer, Henderson & Scott, 1996; Hall, Milburn & Epstein, 1993; Hyduk, 1996; Willey & Silliman, 1990). Choi and Wodarski, using a time series analysis, found that the effect of physical health was initially negatively related to unpaid help from relatives in males and females. This finding was not supported for Time 2 of the data for the female sample. The longitudinal findings indicated that people who had strong social support at one point were likely to have strong social support later on.

Hall et al. (1993) performed a path analysis and tested the direction of the health-satisfaction relationship. Two-wave, two-variable panel data was utilised to test whether one's health affects one's later satisfaction with medical care, or whether one's satisfaction determines later health status. The researchers recruited 526 patients who were aged over 70 years old. The patients were interviewed initially to form a baseline, and then again 12 months later. They were divided into three groups. The first group received a consultation from an interdisciplinary geriatric assessment team. The second group received a special consultation from a second opinion internist. The final group received only standard health maintenance organisation services. The results showed that self-perceived health was a causal determinant of satisfaction with medical support (Hall et al., 1993). In contrast, there was no evidence that satisfaction with support leads to changes in health status. This study had two methodological flaws. First, the assumption of cross-lagged analysis of stationarity was not met. Second, the magnitude of cross-lagged correlations was less than the magnitude of the synchronous correlations which did not meet the assumptions of cross-lagged analysis.

Another cross-lagged study tested the relationship between mental health and adequacy of social support (Cramer et al., 1996). The four-wave panel model was tested using a 231 adult sample. The interval separating each wave was about four months. The findings showed that mental health problems were negatively associated with the adequacy of social integration. Only one out of three paths between mental health and social integration was significant.

Hyduk (1996) investigated the relationship change over time between health and social support. The data (n=803) was collected at three points in time (1975, 1976 and 1984). The results indicated that a significant delayed effect was found across the eight-year period between perception of health at Time 2 and subsequent social relationship contact at Time 3. The activities of daily living at Time 2 were significantly associated with social support at Time 3. This significant relationship confirmed the effect of initial health on subsequent social support.

Willey and Silliman (1990) tested the direct effect of illness on social support in cancer patients. The findings showed that disease factors have an impact on social support. Furthermore, patients with functional impairment, pain and a poor prognosis, or who had recently spent a day in bed, had lower levels of social activity and reported a less resilient social network. The size of the network was not associated with the characteristics of the disease. This may be due to several reasons including the sample of many clinically disease free newly diagnosed cancer patients and the use of cross sectional observation. As well, the researchers utilised the family structure as a measure of a social network. This measure was broad and lacked specificity.

1.6.3.2 The Buffering or Interaction Effect

The model of stress buffering in which stress and social support variables both contribute to health outcomes has been defined as interactive (Gore, 1985). The main idea of the buffering effect is that social support is only important for people under high stress conditions. Social support acts as a stress buffer only when the type of support resources that are offered matches the coping ability (Cohen & McKay, 1984). Moreover, the buffering effects may occur more strongly for only some sociodemographic groups, such as more for the married than for the unmarried (Husaini, Newbrough, Neff & Moore, 1982). Social support is irrelevant to those who have relatively low levels of stress (Gore, 1985: Thoits, 1985).

Bloom et al. (1991b), Cobb (1976), and Cohen and Wills (1985) pointed out that support may play a role at two different points in the causal chain linking stress to illness. Support may intervene between the stressful event and stress reactions by attenuating or preventing a stress appraisal response (Cohen & Wills, 1985). Adequate support may intervene between the experience of stress and the onset of pathological outcomes, by reducing or eliminating the stress reactions, or by directly influencing psychological processes. Various studies have shown that social support appears to have a buffering effect (Bloom et al., 1991a; Hibbard, 1985; Langlie, 1977; Lefcourt et al., 1984; Seeman et al., 1985).

With regard to depressive symptoms, many studies (Aneshensel & Stone, 1982; Brown & Gary, 1987; Cohen & Hoberman, 1983; Husaini et al., 1982) tested the stress-buffering of social support. These studies found little evidence to confirm the role of social support in the buffering effect. Aneshensel and Stone (1982) and Brown and Gary (1987) used the social support network to test the effect of support on distress. The results indicated that there was a lack of an interaction effect in social support as predicted by the buffering model. However, stress was found to have a positive association with depressive symptomatology among those reporting high as well as low levels of social support. The lack of buffering effect may be because social support was measured in terms of social network.

Cohen and Hoberman (1983) found that social support and positive events protect one from the pathogenic effects of high levels of life stress. The data only partially supported the buffering hypothesis in the case of physical symptoms. Self-esteem and appraisal support, however, were primarily responsible for the reported interactions between negative life stress and social support. In contrast, the frequency of past social support was not an effective life stress buffer in either the case of depressive or physical symptomatology.[1] Additionally, the main effect of perceived availability of social support was related to depressive but not physical symptoms. The data was only suggestive and did not provide definitive evidence for the specific hypothesis.

Husaini et al. (1982) tested the stress-buffering effect of personal competence and social support with regard to depressive symptoms. They utilised eight items of potential support dimensions. The items included marital satisfaction, spouse satisfaction, spouse as confidant, relatives' help, friends' help, relatives near, friends near, and church attendance. The results showed that personal competence appeared to have a greater buffering effect than the presence of social support alone. The main effects on depressive symptoms were found in life events, personal competence, and three of the eight social support structures including marital and spouse satisfaction and spouse as confidant. The interactions between life events and social support for females as measured by marital satisfaction and spouse as confidant were significantly related to distress. Among females, significant interaction was found between personal competence, and both marital satisfaction and spouse as confidant. For males, the interaction effects between personal competence and social support in relation to distress were not supported. The main effect of the help of friends among males related to depression and seeking help from friends, was positively related to distress. The generalisability of these findings beyond married adults requires substantiation.

In an examination of the role of social support as part of the stress-buffering process, Lefcourt et al. (1984) hypothesised that locus of control would produce the moderator effects of social support. In the first study, the sample was drawn from twenty-two males and twenty-four female students of a first year introductory psychology course. The results showed that with increasing negative experiences among people who perceived internal control, those with a high level of social support exhibited a decrease in mood disturbance, whereas those with low levels of support persons showed increases in mood disturbances. The moderator effect of social support was also more salient among those who were generally less gregarious and more self-attributing.

In their second study, Lefcourt et al. (1984) used honours psychology course students and found that persons with an internal locus of control derived greater benefits from social support than those who had a more external orientation. The moderating effect of social support largely occurred among those who were less sociable and highly autonomous. Unsupported persons with an internal locus of control showed elevated mood disturbances and an increase in negative life events. The researchers concluded that the relations between negative life events and mood disturbance were substantially reduced by social support for those who had an internal locus of control and were highly autonomous. Negative life events had strong effects on mood disturbance among persons who did not have access to social support. The major problems in these studies were that the findings were derived from a limited sample size (N=46).

Similarly, Hibbard (1985) examined the relationship between social ties and indicators of health status utilising the Locus of Control Scales as a modifier. The researcher found that when trusting others was introduced as a modifying variable, it did not change the relationship between social ties and health status. Trusting others was independently associated with health status. Among persons who perceived internal and external control, social ties were significantly related to health status. As Hibbard suggested, under conditions of externally perceived control, more social ties were related to better health. The results indicated that perceived control modified social ties and health status relationships. But, this study may give a flawed picture, as the social ties variable was drawn from an index of social ties which indicated number and frequency of contact, because social ties may not contain sufficient conditions for positive influences on health.

The relationship between social ties and health outcomes was also studied by Seeman et al. (1985). They pointed out that the sense of control, either directly or in interaction with social supports, was a significant determinant of health outcomes. Using a longitudinal analysis, they found that when these ties provided instrumental support, such support was typically associated with favourable health. When social ties resulted in using one's network for consultation regarding health, high engagement was not clearly connected with favourable health and was negatively associated with preventive health behaviour. In addition, the combination of high instrumental support with a high sense of control was associated with better health outcomes. Seeman et al. concluded that network engagement and sense of control were related in a patterned way to physical health status. The results of Seeman et al. were consistent with the findings of Cummins (1988) who found that among persons with internal control the interaction between received social support and stress have an influence upon symptoms.

As studies showed inconsistent buffering effects of social support on psychological symptoms or health, Cohen and Wills (1985) suggested that certain conditions must be met to test buffering effects. The study must meet the minimal methodological and statistical criteria. The support instrument must measure perceived availability of a support function or functions. The support functions assessed must be ones that enhance broadly useful coping abilities.

Most of the studies discussed in the previous pages demonstrate a relatively modest relationship between social support and health status or distress. Although there is a considerable variation in the models of the social support study, the results consistently reinforce the fact that social support was related, both main and buffer, to health outcomes. The directions of these relationships are ambiguous. That is, health may bring about social support or vice versa. The findings of previous studies have been contradictory depending on the definitions of, and the theoretical underpinning of social support, as well as the statistical analysis used. The studies which provided the results showing that support leads to health outcomes usually utilised correlation and/or regression analyses, whereas, the studies which confirmed the results that health influences support, used confirmatory and/or time series analyses. There was evidence that the role of social support as the main and stress buffer effects was damaged by conceptual deficiencies, and few studies could provide firm conclusions. Many of the early studies employed social network measures to indicate support levels where the results were consistent with the main effect. Studies using measures of perceived support provided data that were generally consistent with the buffering hypothesis.

1.7 Coping Skills

1.7.1 Theoretical Approaches to Coping

There is considerable controversy concerning the conceptualisation of coping. A number of related perspectives have underlined the current concepts used for understanding coping. These perspectives include the psychoanalytic approach, personality characteristics, situational factors and cognitive approaches. They offer differing views of the conceptualisation of coping and its measurement and will now be discussed.

1.7.1.1 Psychoanalytic Approach

The psychoanalytic approach is based on the concept of defenses or unconscious adaptive mechanisms (Folkman, 1992). A hierarchy of defense mechanisms based on their maturity, was proposed by Vaillant (1977). Immature defenses include fantasy, projection, hypochondriasis, passive-aggressive behaviour and acting out. The neurotic defenses include repression, reaction formation, displacement and dissociation. The mature defenses include adaptive processes such as sublimation, altruism, suppression and humour.

The extreme limitation of this concept of coping, as described by Lazarus, Averill, and Opton (1974), was that the concept does not explain the nature of the stressful circumstances with which the person is dealing. Additionally, coping as attributed to the drive to reduce tension by satisfying sexual and aggressive instincts gives minor attention to the problem-solving functions of coping (Folkman, 1992). There was extensive evidence that this concept of coping posed several difficulties in the understanding of the relationship between the coping processes and psychological consequences. For example, the theory cannot predict behaviour on how certain experiences influence future behaviour (Petri, 1996).

1.7.1.2 Personality Characteristic Approach

The theoretical approach which focuses on coping as a personality or disposition trait or style proposes that coping, as a personality variable, influences behaviour in a wide range of situations (Folkman, 1992). Moreover, the concept of coping implies that coping styles remain constant over a long period of time. Therefore, an individual's coping behaviour can be predicted from the score on a measure of a coping trait or disposition (Folkman, 1992). A number of studies pointed out that there have been weaknesses in the assumption of a consistency in an individual's coping behaviour, because substantial consistency studies have not supported this assumption. For example, Cooper, Cooper, and Faragher (1986) examined the relationship between coping skills and Type A behaviour personality in breast cancer and found that this relationship was not significant.

1.7.1.3 Situational Approach

Unlike the personality perspective, the situational approach assumes that the types of strategies that individuals use to cope with problems depend highly on environmental demand. The general approach was to ask individuals to relate multiple problems and compare coping responses across problems. But, Aldwin (1994) persuasively argued that this assumption was problematic in that it did not try to develop a general model of human behaviour that was applicable across a range of contexts.

1.7.1.4 Cognitive Approach

The cognitive approach has concentrated on explanations of behaviours in terms of rational, thinking organisms. The cognitive approach, stress-symptomatology, is based on four assumptions. This perspective assumes that how individuals cope with a problem depends on their appraisal of the situation. There are three kinds of appraisals providing meaning and influencing the coping process. Primary appraisal refers to the individual's labelling of a situation as dangerous and provides an initial evaluation about the type of situation (Lazarus, 1966; Rice, 1992). Secondary appraisal refers to the use of cognitive processes in the attempt to cope with stress through the evaluation of coping resources and options (Folkman, Lazarus, Gruen & DeLongis, 1986). This type of appraisal also evaluates the match between coping skills and situation demands and can involve a defensive distortion of the situation, a more realistic cognitive appraisal, or plans for direct action (Rice, 1992). Reappraisal is based on feedback related to individual coping actions and from people who were involved in providing information about the way individuals deal with stressful events.

The cognitive approach, attribution theory, rests on three assumptions (Petri, 1996). First, it assumes that individuals attempt to determine the causes of both their own behaviour and that of others. Second, the assignment of causes to behaviour is not done randomly. Finally, the causes attributed to particular behaviours will influence subsequent emotion and nonemotional behaviours.

The cognitive approach assumes that individuals are flexible in their choice of coping styles and modify their styles according to the demands of the problem. Coping refers to an individual's cognitive and behavioural efforts to manage the internal and external demands of their person-environment transaction, and the conflicts between their cognitive and behavioural effects (Folkman, 1992; Rice, 1992).

Coping strategies are both problem- and emotion-focused (Folkman, 1992). Problem-focused coping is used to control the troubled person-environment relationship through problem solving, decision making and/or direct action. Emotion-focused coping is used to control distressing emotions by altering the meaning of outcomes. Furthermore, coping strategies do not constitute a hierarchy of adaptiveness

(Folkman, 1992). The general study in this perspective commonly identified coping strategies used in specific situations and the conditions under which the strategies did or did not promote positive adaptation (Aldwin, 1994).

1.7.2 Coping Skills and Related Studies

Although many theoretical frameworks offer the potential to broaden the understanding of the coping behaviour of cancer patients, to date this has been done in only a very rudimentary way. For example, patterns of coping with cancer were examined by Dunkel-Schetter, Feinstein, Taylor, and Falke (1992). Their sample was drawn from 603 cancer patients ranging in age from 21 to 88 years. They identified five patterns of coping consisting of seeking or using social support, focusing on the positive, distancing, cognitive escape-avoidance and behavioural escape-avoidance. The relationships of these coping patterns to socio-demographic characteristics, medical factors, stress and emotional distress were tested using correlational and regression techniques.

The results indicated that patients tended to use distancing techniques (26%) most frequently, while behavioural escape-avoidance coping was least used (11%) (Dunkel-Schetter et al., 1992). The median number of coping methods used was four in each situation. Similarly in Promjun, Fonggea, Peanpadun and Tapujaa (1999) it was found that that the most frequently coping strategies used by Thai patients were emotion-focused coping. The least frequently used strategy was problem-focused coping. Unlike Dunkel-Schetter et al. (1992), Heim, Valach, and Schaffner (1997) reported that the modes of attention and care, passive co-operation and acceptance-stoicism were the coping strategies of choice used by cancer patients, while negative-emotional coping was the least preferred strategy. Compared with cancer patients, the general population reported more frequency in using problem-focused (49%) than emotion-focused (38%) coping (Billing & Moos, 1981). The general population used an average of 6.5 forms of coping (Folkman et al., 1986), and students used an average of 8 forms of coping (Folkman & Lazarus, 1985) in each stressful situation.

In terms of demographic factors, Dunkel-Schetter et al. (1992) reported that younger cancer patients used more support seeking, focusing on the positive and behavioural escape-avoidance than did older patients. These results contradicted the findings of Hilton (1989) who found that the age of cancer patients was positively associated with the use of distancing and escape-avoidance. Hilton's results were consistent in that younger patients used more planful problem-solving and sought a greater amount of social support than older patients. In contrast, Billings and Moos (1981) reported that age was weakly related to coping. Less education was related to more distancing and more cognitive escape-avoidance (Dunkel-Schetter et al., 1992). Religiosity was associated more with distancing escape-avoidance and focusing on the positive. Gender of patients was unrelated to coping. The studies by Dunkel-Schetter et al. (1992), Hilton (1989), and Billings and Moos (1981) were limited to infer causality due to cross-sectional designs. These results differed from the findings of structural equation modelling from Holahan et al. (1995) where women used a lower percentage of behavioural approach coping strategies compared with men. In contrast, the studies of Billings and Moos (1981), Hilton (1989) and Sarell, Baider, and Edelstein (1983) showed that women were more likely to use avoidance coping.

The relationship between age and coping was also investigated by Feifel and Strack (1989). The researchers studied the coping responses in healthy persons in relation to five conflict situations. The situations covered decision-making, defeat in a competitive circumstance, frustration, authority conflict and peer disagreement. The sample consisted of 182 male medical patients. The patients were divided into middle-aged (40-64 years, n=76), and elderly (65-92 years, n=106) groups. In decision making, middle-aged patients used more avoidance than elderly patients, while the elderly patients used more problem-solving coping than middle-aged patients. Middle-aged and elderly patients used problem solving significantly more often in handling decision-making than in dealing with all other situations. Moreover, elderly patients used more problem-solving than avoidance and resignation in all five conflict situations. Middle-aged patients used more problem solving than avoidance in managing peer disagreement, handling defeat in competition, and frustration. The limitation of this study was its restriction to middle-aged and elderly males. Thus, this finding did not provide a comparison of coping in different groups of respondents. There were also some difficulties in comparing these findings with other investigations. This was because this study specifically defined stress situations which were not similar to those used in other studies.

One example is found in Feifel, Strack, and Nagy (1987) in their examination of coping strategies in a specific situation. They covered three major coping strategies including confrontation, avoidance and acceptance-resignation. Their sample was composed of 223 male patients suffering a variety of life-threatening illnesses such as cancer, myocardial infarction, rheumatoid arthritis, orthopaedic disability and dermatologic ailments. The results showed that situational factors impacted on the choice of specific coping strategies. For example, avoidance coping was most prominent among those of lower socio-economic status, the less self-directed and the more negative in self-perception.

Billings and Moos (1981) showed that level of income was positively related to problem-focused coping, and employment status was weakly related to coping strategies. Patients who were more extroverted and perceived their illness as serious, used more confrontation. Patients who had minimal expectations of recovery used more acceptance-resignation than other modes of coping. Additionally, cancer and heart patients used confrontation more frequently than the chronic illness group. Feifel et al. (1987) persuasively pointed out that life-threatened patients tended to use avoidance and acceptance-resignation coping which were linked to less effective coping, in contrast to the non-life-threatened patients. In contrast, Heim, Augustiny, Blaser, Bürkic, Kühne, Rothenbühler, Schaffner, and Valach (1987) found that there was no difference in coping strategies between breast cancer and benign breast disease patients. Dunkel-Schetter et al. (1992) pointed out that the specific problems in cancer patients were not associated with how the individual coped.

Further to this, Billings and Moos (1981) investigated the nature of individual coping responses to stressful life events using an adult sample. Six types of events were examined in relation to coping. These events included illness, death in the family, economics, children, other interpersonal events (such as work), and other non-interpersonal events. The coping items were classified into problem- and emotion-focused coping. The results indicated that respondents in illness events used more problem-focused coping than those in other events, while respondents in death-related events used the lowest amount of these coping strategies. The weakness of this study was the use of a measure of dichotomy for coping responses rather than using ratings associated with particular coping categories. This format for coping may have constrained the magnitude of the relationship between coping and events.

To study the change in mean levels of coping strategies over time, Folkman and Lazarus (1985) collected data from 108 students on three occasions. Time 1 was two days before the midterm. Time 2 was five days after the midterm and two days before grades were announced. Time 3 was five days after grades were announced. The coping strategies included problem-focused coping, wishful thinking, distancing, emphasising the positive, self-blame, self-isolation, and seeking social support. The researchers found that problem-focused coping, seeking social support, emphasising the positive, and self-isolation decreased significantly from Time 1 to Time 2, whereas distancing increased significantly. Wishful thinking and distancing decreased significantly from Time 2 to Time 3. Also, there was no significant increase in any type of coping from Time 2 to Time 3. In studying the change in mean levels of coping skills within cancer patients, Hilton (1989) found that the length of time since diagnosis was associated with more acceptance of responsibility, planful problem solving, and positive reappraisal and confrontation. In contrast, the main coping pattern of cancer patients remained unchanged throughout the pre-operation, post-operation periods, and 6 months later (Heim et al., 1987). These different results may be due to different types of events (such as time since diagnosis and pre and post operation periods) and cognitive appraisals of events (such as curable or incurable).

In relation to cognition, Hilton (1989) studied the relationship between commitments, uncertainty about the cancer situation, control of the cancer situation, and coping strategies in women with breast cancer diagnosis. The findings indicated that commitment was positively related to the use of planful problem solving and reappraisal strategies, and was negatively related to escape-avoidance strategies. Stress was positively related to five coping strategies including self-control, acceptance of responsibility, escape-avoidance, planful problem solving, and seeking social support.

Unlike Hilton (1989), Vitaliano et al. (1990a) found that stress was not related to coping. In fact, the appraisal of stress as changeable or not changeable was associated with coping strategies. The researchers used 746 persons in different life predicaments including psychiatric problems, physical health problems, and family stress. People who appraised their stress as changeable had higher problem-focused scores and lower emotion-focused scores than those who appraised their stress as not changeable. Within the family stress group, people who appraised their stress as changeable were more depressed than those who appraised their stress as not changeable. When the stress was appraised as changeable, depression was negatively significantly related to problem-focused coping but positively insignificantly related to emotion-focused coping. This study was weakened using the correlational method and only a single dichotomous item to assess the appraisal of change.

In a path analysis design, Forsythe and Compas (1987) studied the interaction of cognitive appraisals of stressful events and coping. The sample was drawn from 84 college students. The findings showed that the students used more problem-focused coping when events were appraised as controllable. This result was similar to Feifel et al. (1987) who found that people with an external locus of control used more avoidance coping styles. But, emotion-focused coping did not differ as a function of control appraisals (Forsythe & Compas, 1987). The use of more problem-focused coping efforts was associated with lower symptom levels when events were perceived as controllable. In contrast, the use of more problem-focused coping efforts was associated with higher symptom levels when events were perceived as uncontrollable.

A number of studies (e.g., Dunkel-Schetter et al., 1992; Folkman and Lazarus, 1988; Folkman et al., 1986; Heim et al., 1997; Manuel et al., 1987) showed that coping strategies were associated with psychological symptoms. Manuel et al. (1987) examined the relationship between coping strategies and depression in cancer patients. Their results indicated that patients who used approach and avoidance strategies to cope with cancer experienced less emotional distress than patients who used fewer of either approaches or avoidance strategies. The limitation of this results may have been due to a small sample size with 35 patients who had squamous cell carcinoma of the head and neck.

Folkman and Lazarus (1988) reported that planful problem-solving and positive reappraisal were associated with an improved emotional state. Confrontive coping was associated with worsened emotional states. In contrast, Dunkel-Schetter et al. (1992), Folkman et al. (1986), and Heim et al. (1997) found that levels of distress were positively correlated with the use of escape-avoidance behaviour. Furthermore, Lavery and Clarke (1996) found that breast cancer patients who rated their adjustment as excellent showed lower levels of distress and exhibited more information seeking behaviour than women who were less well adjusted. These findings differed from Nowack (1989) who found that coping styles were not significantly associated with psychological distress. In the results of Manuel et al. (1987), they explained that avoidance strategies might prevent anxiety related to a traumatic event. Avoidance might interfere with taking appropriate action, while approach strategies might facilitate appropriate action and the ventilation of affect.

The studies reviewed in the preceding pages have provided the evidence for a study of coping skills in both conceptualisation and operationalisation. Within the literature review the potential of the use of analysis to broaden the understanding of coping strategies has been provided. The analysis of coping behaviour has assisted in understanding the behavioural outcomes of people faced with daily, serious problems and illnesses. A number of studies have indicated that demographic variables such as age and gender have an impact on coping strategies. Personality and situational factors may also influence the choice of specific coping strategies. Most studies have confirmed the relationships between coping, health, social support and depression. However, these studies have used correlational analysis to examine the relationships, which is limited because it does not allow testing of the sequential nature of the theory.

From the literature review, the relationship between health status, psychological symptoms, social support and coping skills have been investigated extensively. However, none have been utilised attribution theory to explain these relationships. Also, the procedure being tested is limited to testing a model. The next chapter will propose the model for testing in this study.

Chapter 2

Research Model

2.1 A Proposed Model

In this chapter, the proposed model for testing is elaborated and integrates the variables of interest and the major theoretical constructs discussed in the preceding chapters. As demonstrated in the previous chapter, the interdependency of health, social support, psychological symptoms and coping skills has been debated. Most research assumes that coping skills influence psychological symptoms and health. Social support also impacts on health and coping skills. This research has been limited by the use of correlation and analysis of variance designs that do not assess the sequential nature of theory. It generally argues from the perspective of stress-symptomatology theory as developed by Folkman and Lazarus.

In this theory, stress can be seen as a combination of environmental demand and individual resources (Aldwin, 1994). Then, the appraisal process generates emotion. The appraisal and its attendant emotions influence coping processes (Folkman, 1992). Additionally, Folkman and Lazarus (1988) indicated that these variables may have bi-directional or reciprocal effects.

Attribution theory has been generated largely in academic achievement, marital conflict, close relationships, health psychology as well as behavioral medicine (Försterling, 1988). The current study, however, applied literature on attribution theory to health-coping behaviours in chemotherapy and radiotherapy patients. This general theoretical model is represented schematically in Figure 2.1. The theoretical formulation described in Chapter 1 provided a framework for explaining the proposed model involving latent variables, rather than focusing on individual measures. A model has been developed to identify variables of interest that either directly or indirectly influence patients' coping skills. The model is recursive given the order of variables indicated above and specified in Figure 2.1.

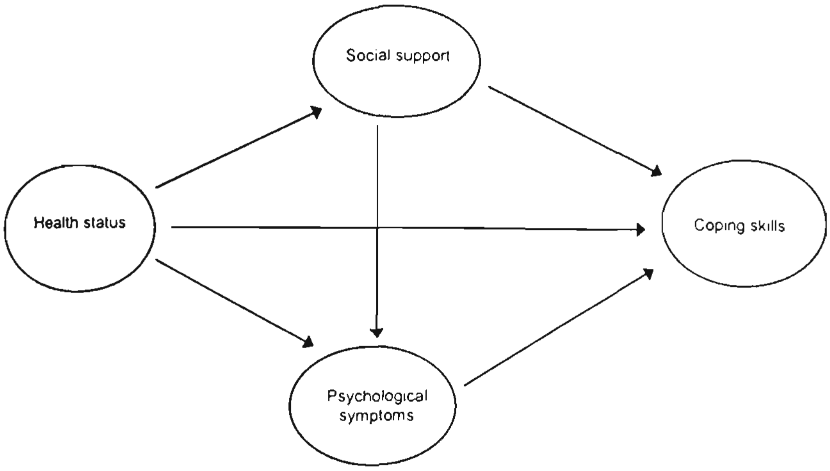


Figure 2.1 The Proposed Model

The exogenous variable, "health status", is associated with a person's perceived health. This includes the effect of somatic symptoms and social dysfunction. These health perceptions are viewed as an outcome of chemotherapy or radiotherapy side-effects since there is evidence that the side-effects of these therapies produce several adverse effects including nausea, vomiting and hair loss. These side-effects threaten an individual's physical, social and professional situations (Janoff-Bulman & Lang-Gunn, 1988). From attribution theory, patients will make efforts to find a causal explanation of their origin. Since attribution research has been traced the pathways linking perception of an event to consequent affective and behavioural reactions, the proposed model will utilised physical and social dysfunction as described the state of health to be exogenous variable. This notion was supported by

Leventhal et al. (1984) who found that cancer patients usually monitor their physical symptoms and their interpretations of the treatment's side-effects.

The first endogenous variable, "social support", refers to the number of persons and levels of satisfaction with support which may provide specific information (such as treatment and diseases), cognitive guidance (such as personal control and motivation) and emotional support (such as feeling of belonging). In the model, perceived health has a direct effect on social support. Weiner (1985) pointed out that negative, unexpected, or important outcomes elicit searches for the reasons for these outcomes. Since patients perceived an effect of chemotherapy or radiotherapy on their health, they would seek understanding and find meaning in their plight from various support resources.

The second endogenous variable, "psychological symptoms", refers to emotional responses. These included anxiety, depression, interpersonal sensitivity and obsession-compulsion. Emotions arise from how an outcome (health status) is interpreted or evaluated. In the model, perceived health has a direct link to psychological symptoms. It was predicted that patients who perceived their health as getting worse could produce affective reactions such as depression and anxiety. Psychological symptoms are directly influenced by social support. For example, social support may have an influence on patients by altering their psychological symptoms through calming and reassuring patients.

The final endogenous variable "coping skills" refers to both problem-and emotion-focused coping skills related to the side-effects of therapy. In the model, perceived health, social support and psychological symptoms directly influence coping skills. It was believed that patients who perceived better health, would show fewer psychological symptoms and consequently would use more problem-focused coping skills. Moreover, persons who were satisfied with support were more likely to cope better and used the most problem-focused coping skills. Perceived health also indirectly influences coping skills via social support and psychological symptoms. Furthermore, psychological symptoms are the mediator between social support and coping skills.

Because this model is drawn from Western countries, it is uncertain to what extent it applies to different cultural contexts. Additionally, there is an absence of research completed in Thailand in relation to health status, psychological status, social support and coping skills. Specific frameworks for completing studies in this area in Asia suffer from the lack of a theoretical or modelling framework. Because of these limitations it is difficult to speculate on the magnitude of the relationship between the variables in the model.

In Figure 2.1, the sign assigned to each connecting arrow or linkage was based on the research reviewed in the previous chapter, as well as on the proposition of a Thai cultural norm. The statistical significance of each hypothesis was tested using the latent variable structured modelling techniques of the Linear Structural Regression Analysis (through LISREL). These hypotheses are outlined below:

Hypothesis 1: A statistically significant negative causal relationship will be found between perceived health problems and social support.

Hypothesis 2: A statistically significant positive causal relationship will be found between perceived health problems and psychological symptoms.

Hypothesis 3: A statistically significant positive causal relationship will be found between perceived health problems and coping skills.

Hypothesis 4: A statistically significant negative causal relationship will be found between social support and psychological symptoms.

Hypothesis 5: A statistically significant positive causal relationship will be found between social support and coping skills.

Hypothesis 6: A statistically significant negative causal relationship will be found between psychological symptoms and coping skills.

Along with testing of the hypothesised model. the following research questions are addressed for describing the baseline of the data.

(1) How stable is each variable in patients receiving chemotherapy in the Thai context?

(2) To what extent do chemotherapeutic and radiotherapeutic patients display the levels of health problems, social support, psychological symptoms and coping skills?

(3) To what extent do socio-demographic groups (e.g., age, marital status, education and occupation) differ in the levels of health problems, social support, psychological symptoms and coping skills?

Issues related to the methods used in the present study will be discussed in Chapter 3.

Chapter 3

The Empirical Study

This study examines the relationship between health status, psychological symptoms, social support and coping skills in patients receiving chemotherapy and or radiotherapy treatments in Thai hospitals. This chapter outlines the methods used in the collection of data and the techniques utilised to analyse the data. The following pages are presented in four sections: (3.1) participants, (3.2) instruments, (3.3) data collection, and (3.4) design of the study.

3.1 Participants

The participants in this study were patients undertaking chemotherapy or radiotherapy at Songklanagarind and Hat-Yai hospitals, Thailand. Chemotherapy is normally used intermittently. Consequently, data from these chemotherapy patients was gathered over two time frames at each of the respective hospitals. Among participants receiving chemotherapy, 249 participants took part in the initial testing period (Time 1), while 158 took part in the second and final testing period (Time 2). The difference in participant numbers between Time 1 and Time 2 was due to two factors. Eighty-one (32.5%) of the original participants could not be contacted due to their being spread over 10 units. Therefore, the investigator was not able to contact them all in the same time frame. Six participants refused to participate at the second phase, while an additional four were admitted to the hospital at the time of the second round of administered questionnaires.

Two hundred and nine participants completed the questionnaire for the radiotherapy group only one time because their treatment was provided over an extended period of time. The participants were treated at Hat-Yai and

Songklanagarind hospitals, during March and September, 1997. The medical variables (diagnosis and cycle of treatment) were obtained from the patient's medical records, allowing a complete assessment of participant characteristics and symptoms encountered.

Participants needed to meet several criteria for inclusion in the study. First, it was required that participants were being treated in an out-patient unit. Second, it was required that participants were currently receiving chemotherapy or external radiotherapy. Third, the age range of the participants was 20 to 60 years. Fourth, participants were to be free of cerebral, renal or pulmonary complications. Fifth, suitability for participation in the study was determined through consultation with treating physicians and by checking their medical records, which were to show their Performance Status (the Eastern Cooperative Oncology Group: ECOG) at grade 0 and 1. The ECOG classification of 0 and 1 refers to fully active performance patients (Skeel, 1987) (see Appendix B for scaled detail).

3.1.1 Baseline Demographic and Medical Data

Table 3.1 Age Distribution of Participants

Age group	Chemotherapy Time 1	Chemotherapy Time 2	Radiotherapy
20-30 years	29 (11.6%)	15 (9.5%)	5 (2.4%)
31-40 years	60 (24.1%)	39 (24.7%)	53 (25.4%)
41-50 years	79 (31.7%)	50 (31.6%)	74 (35.4%)
51-60 years	81 (32.5%)	54 (34.2%)	77 (36.8%)
total	249 (100%)	158 (100%)	209 (100%)

Table 3.1 presents the number and percentage of the total sample in each age group. Participants' ages were collected by means of requesting their actual age in years. The mean age was 44.45 and 45.11 for the first and second chemotherapy tests. The mean age was 46.24 for the radiotherapy test.

Figure 3.1 Gender Distribution of Participants

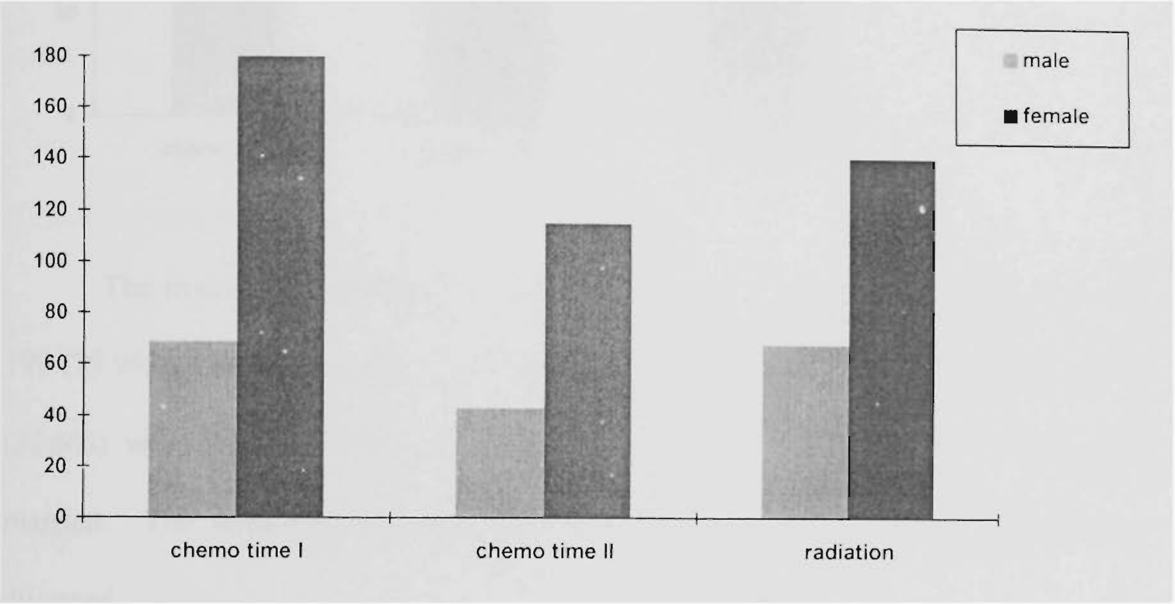
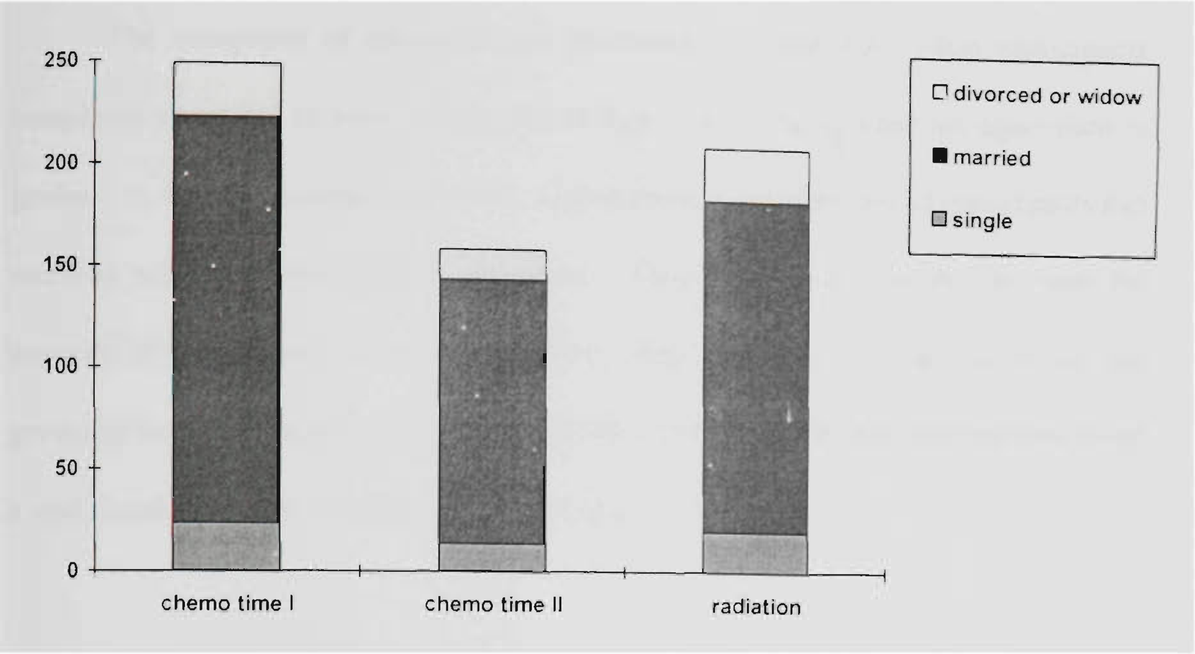


Figure 3.1 illustrates the number of participants according to gender. The majority of participants were female. Among the initial chemotherapy participants, 180 (72.3%) were female and 69 (27.7%) were male, while among the second chemotherapy participants, 115 (72.8%) were female and 43 (27.2%) were male. Among the radiotherapy participants, 141 (67.5%) were female and 68 (32.5%) were male.

Figure 3.2 Marital Status Distribution for Participants



The majority of participants were married. In the initial chemotherapy test, 199 (79.9%) of participants were married, while in the second chemotherapy test, 129 (81.6%) were married. Similarly, with the radiotherapy group, 163 (78%) were married. The remaining minority of participants were either single, widowed or divorced.

Table 3.2 Education Distribution of Participants

Educational level	Chemotherapy Time 1	Chemotherapy Time 2	Radiotherapy
no formal schooling	15 (6.0%)	9 (5.7%)	13 (6.2%)
year 1-4	118 (47.4%)	79 (50.0%)	130 (62.2%)
year 5-8	24 (9.6%)	11 (7.0%)	14 (6.7%)
year 9-12	52 (20.9%)	30 (19.0%)	31 (14.8%)
Above year 12	40 (16.1%)	29 (18.8%)	21 (10.0%)

The categories of education are presented in Table 3.2. Most participants completed years one to four. Years one to four in the Thai context are equivalent to grades 1 to 4 in the Australian context. Consequently, the majority of participants had received relatively little formal education. This may be due to the fact that the majority of participants in this study (70%) were aged above 40 and therefore had grown up in the pre-economic boom era (before 1978) when people normally received a traditional education in the temple or mosque.

Figure 3.3 Religious Distribution of Participants

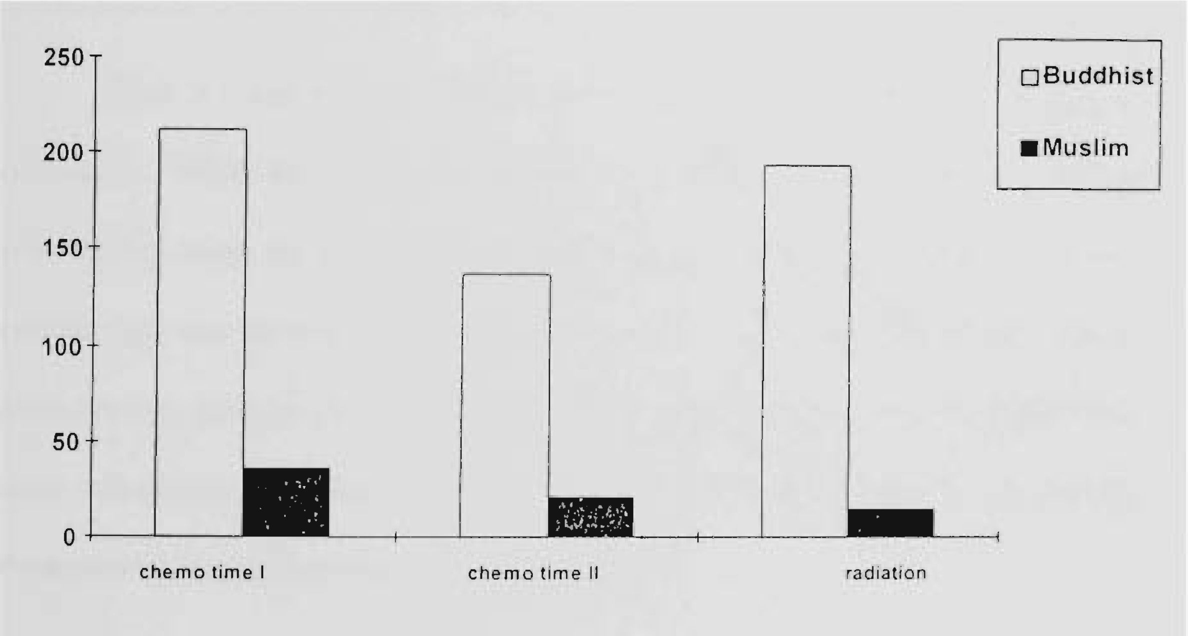


Figure 3.3 demonstrates the categories of religion showing that the majority of participants were Buddhist and the rest were Muslim.

Table 3.3 Occupational Distribution of Participants

Occupation group	Chemotherapy Time 1	Chemotherapy Time 2	Radiotherapy
farmer	53 (21.3%)	30 (19.0%)	87 (41.6%)
women working at home	83 (33.3%)	56 (35.4%)	30 (14.4%)
civil servant	36 (14.5%)	26 (16.5%)	26 (12.4%)
business	12 (4.8%)	6 (3.8%)	21 (10.0%)
worker	38 (15.3%)	25 (15.8%)	33 (15.8%)
unemployed or others	27 (10.8%)	15 (9.5%)	12 (5.7%)

Table 3.3 displays the number and percentage of participants according to occupation. While the majority of participants receiving chemotherapy were women who work at home, the predominant occupational group among participants receiving radiotherapy was farmers. This difference was due to the fact that around 70% of chemotherapy participants were women who had breast cancer. On the other hand, most radiotherapy participants were farmers who had cervical cancer. Accordingly, the treatment choice depended on the type of cancer.

Table 3.4 Site of Cancer Distribution in Participants

Diagnosis	Chemotherapy	Radiotherapy
breast cancer	95	26
lymphoma	62	8
cancer of nasopharynx	4	43
cervical or ovarian cancer	26	79
lung cancer	10	3
cancer of colon or rectum	24	7
cancer of tongue	---	6
cancer of esophagus	---	4
others	28	33
total	249	209

Table 3.4 displays the number of site of cancer in participants. The majority of participants receiving chemotherapy was breast cancer and lymphoma while the main site of cancer was cervical or ovarian cancer in radiotherapy.

Table 3.5 Side-effects Distribution in Participants

Side effect group	Chemotherapy Time 1	Chemotherapy Time 2	Side effect group	Radiotherapy
nausea	19 (7.6%)	12 (7.8%)	nausea	77 (36.8%)
nausea and vomiting	29 (11.6%)	18 (11.4%)	nausea and vomiting	52 (24.9%)
hair loss	12 (4.8%)	8 (5.1%)	itching	13 (62.2%)
nausea, vomiting and hair loss	168 (67.5%)	112 (70.9%)	nausea, vomiting and itching	19 (9.1%)
no side effect	21 (8.4%)	8 (5.1%)	no side effect	48 (23.0%)

As indicated in Table 3.5, the most frequent side-effects experienced were nausea, vomiting and hair loss for chemotherapy, whereas only nausea was common in radiotherapy.

Table 3.6 Number of Chemotherapeutic Agents Used

Number of agents	Chemotherapy Time 1	Chemotherapy Time 2
1	39 (15.7%)	24 (15.2%)
2	73 (29.3%)	43 (27.2%)
3	137 (55.0%)	91 (57.6%)

Table 3.6 shows the frequency and percentage according to the number of chemotherapeutic agents received. The majority of participants received three chemotherapeutic agents with a mean of 2.39 and 2.42 for chemotherapy across each time period.

Table 3.7 Course of Chemotherapy Agents Distribution in Participants

Course	Chemotherapy Time 1	Chemotherapy Time 2
1	69 (27.7%)	------------
2	49 (19.7%)	41 (25.9%)
3	29 (11.6%)	36 (22.8%)
4	29 (11.6%)	16 (10.1%)
5	22 (8.8%)	24 (15.2%)
6	13 (5.2%)	8 (5.1%)
7	13 (5.2%)	7 (4.4%)
8	8 (3.2%)	9 (5.7%)
9	2 (.8%)	7 (4.4%)
10 and over	15 (6%)	10 (6.3%)

Table 3.7 shows the course of chemotherapy received by participants. The majority of participants received the first course of chemotherapy when the questionnaires were administered at Time 1 with a mean of 3.66 courses per patient. At Time 2 when the majority of participants received their second course of chemotherapy, questionnaires were administered with a mean of 4.70 courses of treatment per patient.

3.2 Instruments

3.2.1 Issues Associated with Measurements

3.2.1.1 Issues Associated with the Measurement of Health Status

The use of health measurements was dependent upon the definition of health. Table 3.8 summarises health measurements used in the various studies. The majority of physical health and psychological indices have built their operational definitions of health on the concept of functioning.

McDowell and Newell (1987) pointed out that the General Health Questionnaire (GHQ) developed by Goldberg (1972) offers a leading example of how a health measurement method should be developed. It measures how a person is able to function and carry on his/her daily activity (Folkman et al., 1986). Moreover, they pointed out that the GHQ was founded on a clear conceptual approach. The initial item selected and the item analysed are fully documented. They claimed that questions have not been revised by subsequent users. The main version of the GHQ contains 60 items. Goldberg proposed the shorter version of the GHQ including 30, 28, 20 and 12 item abbreviations.

Table 3.8 Summary of Studies Associated with the Measurement of Health Status

Study	Samples	Control	Data Collecting Instrument	Dimensions Including	Reliability and Validity
Bond & Lader (1974)	500 respondents personnel in technical colleagues	none	L.A.S.A. 16 analogue scales	•mental reaction or intellectual impairment •physical sedation or bodily impairment •tranquillisation or calming effect •other type of feelings or attitude	no reliability and validity
Priestman & Baum (1976)	29 breast cancer patients	before treatment & after 3 months	L.A.S.A	• feeling of well-being mood level of activity pain nausea appetite •ability to perform housework social activities level of anxiety	compared with doctor assessment (r=0.87)

Table 3.8 (continued)

Study	Samples	Control	Data Collecting Instrument	Dimensions Including	Reliability and Validity
McArdle et al. (1981)	33 chemotherapy-patients 30 combination between chemotherapy and radiotherapy patients 44 radiotherapy patients	compared between groups	General health questionnaire 60 items	psychiatric illness general health	Alpha coefficient of 0.90
Hibbard (1985)	2603 respondents		health status	•global self-assessment of general health •the mean annual rate of doctor office visits for chronic condition	no reliability and validity
Seeman et al. (1985)	931 respondents of Los Angeles Country		health status	•overall health status •preventive health practices •the year-long illness	no reliability and validity
Folkman et al. (1986)	85 married couples	non	somatic health status	•chronic conditions, specific somatic symptoms, and disability in working, eating, dressing, and mobility	no reliability and validity

Table 3.8 (continued)

Study	Samples	Control	Data Collecting Instrument	Dimensions Including	Reliability and Validity
Coates et al. (1983)	30 cancer patients receiving chemotherapy 42 cancer patients receiving radiotherapy and chemotherapy 39 ovarian cancer patients		L.A.S.A. forms of general well-being ECOG performance status	mood nausea and vomiting appetite pain breathlessness physical activity	no reliability and validity
Hughson et al. (1986)	24 radiotherapy patients 27 chemotherapy patients 23 combination between chemotherapy and radiotherapy patients	group compared	the GHQ 60 items	• somatic items • psychiatric illness	Alpha coefficient of 0.90

Table 3.8 (continued)

Study	Samples	Control	Data Collecting Instrument	Dimensions Including	Reliability and Validity
Vinokur et al. (1989)	162 breast cancer patients	162 matched pairs	Physical functioning (Nagi. 1976: Rosow & Bresslau. 1966)	• Physical capabilities: upper-body and lower-body strength balance and fine dexterity	Alpha coefficient of 0.87
			medical variables	• staging of breast cancer number of medications activity limitations. other limitations	No reliability and validity
			Mental health and psychological well-being	• anxiety. depression and psychosomatic symptoms	Alpha coefficient of 0.81.0.86. and 0.67
			Hopkins Symptom Checklist	Sexual problems Social functioning	
			Perceived Quality of Life (Andrews & Withery. 1976	• Social contacts	Alpha coefficient of 0.89
			Bradbum's positive affect scale	• Perceived Health compared to others of same age	Alpha coefficient of 0.93
			Rosenberg's scale of self esteem		Alpha coefficient of 0.77
			social functioning		Alpha coefficient of 0.59

Table 3.8 (continued)

Study	Samples	Control	Data Collecting Instrument	Dimensions Including	Reliability and Validity
Nowack (1989)	262 professional employees	non	heath status Hopkins Symptom Checklist	• physical illness (Greenberg. 1981) • psychological distress	Alpha coefficient of 0.90
Lamb et al. (1990)	1385 sports participants	292 non-sports participants	self-perceived health	1 item	no reliability and validity
Bloom et al. (1991a)	403 cancer patients		Profile of Mood State (POMS)	psychological well-being	Alpha coefficient of 0.90
Aldwin & Revenson (1987)	291 respondents residing in the Los Angeles	non	the Langner 22 item	•psychological symptom •general health	Alpha coefficient of 0.77

As with the 60-item GHQ, the GHQ-28 contains items selected via factor analyses. The GHQ-28 provides four scores indicating the level of somatic symptoms, anxiety and insomnia, social dysfunction, and severe depression. The GHQ asks respondents whether they have recently experienced a particular symptom. It focuses on changes in conditions when compared to normal. The GHQ-28 is useful for studies in which an investigator requires more information than is provided by a single severity score. There were a number of studies providing confirmatory evidence that the GHQ assessed a number of dimensions of health status (Chan & Chan, 1983; Goldberg, Rickels, Downing & Hesbacher, 1976; Shek, 1993).

The GHQ was designed to be used in the general population or among medical outpatients (McDowell & Newell, 1987). Banks (1983) stated that the developed GHQ-28, in addition to having high validity when used with young people, revealed similar inter-scale correlations to those in the original published data. Other studies have validated the GHQ-28 version for general practice patients. Goldberg and Hillier (1979) reported that the test-retest coefficient after six months was 0.90. Furthermore, the short and balanced versions did not lose important information. This questionnaire has been used to measure somatic illnesses in cancer patients receiving chemotherapy and radiotherapy (Hughson et al., 1986; McArdle et al., 1981).

According to McDowell and Newell (1987), limitations of the GHQ may occur when studies investigate chronic conditions of patients. For example, Hughson et al. (1986) and McArdle et al. (1981) employed the GHQ in their analysis of the impact of chemotherapy compared with radiotherapy, and a combination of the two treatments in a longitudinal study. They claimed that the scale may not identify health status if the patient had suffered a symptom for a long time and had come to consider it as usual.

Validation studies of the GHQ have been thorough and extensive and undertaken in many different countries. For example, results from studies in England (Hobbs, Ballinger & Smith, 1983), Australia (Worsley & Gribbin, 1977), Yugoslavia (Radovanovic & Eric, 1983), and Thailand (Nilchaikovit, Sukying & Srilapakit, 1996; Piyavhatkul, Paholpak, Virasiri, Jareonsettasin, Kritsanapakornkit, Rangsrikajee, Mahaton & Tong-on, 1996) were very consistent and had a high degree of validity, with correlations between the GHQ scores and interview scores ranging from 0.76 to 0.81.

Another health status measurement scale developed by Langner (1962) is a twenty-two item closed-format questionnaire. It records symptoms of anxiety, depression and other neurotic disturbances, as well as subjective judgements of emotional status. An alpha reliability coefficient of 0.77 (n=613) was obtained. The limitations of the scale were the bias by sex which showed a higher symptom response rate among women than men (McDowell & Newell, 1987). They reported that the low-scoring group may contain healthy people.

To measure general health and subjective feelings, Bond and Lader (1974), Coates et al. (1983), and Priestman and Baum (1976) have utilised the Linear Analogue Self-Assessment (L.A.S.A.). The technique is referred to as the graphic rating scale. A 10 centimetres line is drawn for a given list of symptoms or problems, and the ends of the line are labelled with words descripting the extremes of those symptoms. The respondents were asked to mark the line at a point most appropriate to their feelings at that moment. The line is marked showing scores up to ten. Bond and Lader suggested that it is easy for the subject to understand, is quick to fill out and score, and does not require much subject motivation. Priestman and Baum argued that the L.A.S.A. system gives only a superficial view of an individual's feelings. Additionally, this scale may require the parallel forms of different scales to test its reliability. With respect to reliability, test-retest is not feasible because the scale is not measuring a stable phenomenon (Bond & Lader, 1974).

In an effort to measure health, Vinokur et al. (1989) utilised three forms of the self-measure of health. They measured the role of social functioning, emotional functioning, social contacts, satisfaction with relationships with significant others, perceived health compared to others, perceived threat of health, and the degree of stress evoked by breast cancer. They used the physical functioning scales developed by Rosow and Bresslaw (1966), and Nagi (1976) to assess and represent a variety of physical capabilities. They also assessed mental health on the Hopkins Symptom checklist (Derogatis, Lipman, Rickels, Unlenhuth & Covi, 1974). Finally, they used the quality of life scale developed by Andrews and Withen (1976), to assess satisfaction with life in general. They reported all scales had average reliability of about 0.70. Vinokur et al. claimed that all scales were extensively used in survey research because the scales were simple to apply. However, these results may significantly relate to the fact that they used many instruments in order to measure the same concepts.

It appears that health however it is defined, can be adequately measured. If one decides to measure it according to symptomatology, as many do, adequate measures exist. The same can be said for measurements of physical or functional status. Measuring perceived health status also appears to be a valid means of assessment.

3.2.1.2 Issues Associated with the Measurement of Psychological Symptoms

There have been many attempts to develop scales for measuring psychological symptoms. Although it was not easy to set criteria for what should be included, many specific and well-tested instruments have been used to establish overall psychological status. Psychological symptoms were widely acknowledged as being multi-dimensional. It was common to define psychological symptoms in terms of anxiety and depression, because both were common psychological problems and reasons for psychiatric hospitalisation (Cohen, Swerdlik & Smith, 1992). In addition to the use of anxiety and depression as measures of psychological symptoms, other means of measuring the state of emotion are used. These involve assessing the mental state of patients and include somatisation, interpersonal sensitivity and paranoid ideation.

Numerous specialised types of mental status examinations have appeared in the literature including interviews, observations, self-reported questionnaires and psychological tests. Several studies have demonstrated that the standardised self-reported scales can be used successfully to predict psychological symptoms. This review will briefly show some of the many instruments available to identify the measurements.

Hopkins Symptom Checklist (HSCL)

The Hopkins Symptom Checklist (HSCL) is a self-report symptom inventory. It was originally developed by Parloff, Kelman, and Frank (1954) and entitled the 'discomfort scale'. The HSCL is composed of fifty-eight items and is scored on five symptom dimensions including somatisation, obsessive-compulsive, interpersonal sensitivity, anxiety and depression (Derogatis et al., 1974). The somatisation dimension contains the items reflecting distress arising from perceptions of bodily dysfunction. The obsessive-compulsive dimension comprises the items that focus on thoughts, impulses and actions that are experienced as incessant and irresistible by the individual, but are of an ego-alien or unwanted nature. The interpersonal sensitivity dimension focuses on feelings of personal inadequacy and inferiority, particularly in comparison to other persons. The depression dimension reflects symptoms of dysphoric mood and affect, represented as signs of withdrawal of life interest, lack of motivation, and loss of vital energy. The anxiety dimension is composed of a set of symptoms and behaviours associated clinically with high manifest anxiety such as restlessness, nervousness and tension. Scoring for each item is on a scale of 1 (not at all) to 5 (extreme).

The alpha coefficients (N=1435) were presented for each of the dimensions and were uniformly high, ranging from .84 to .87 (Derogatis et al., 1974). They reported item-total correlation contributing substantially to each dimension, with all being above .50 and most at about .70. Test-retest reliability over the one-week period was very high, ranging from .75 to .84. In addition, Derogatis et al. showed that the HSCL was sensitive to the measure of clinical and treatment responses.

Folkman et al. (1986) pointed out that the HSCL scale has demonstrated a sensitivity to low levels of symptoms in normal populations and a relatively high stability over an eight month period (test-retest coefficient approximately .70) in a comparable population. Numerous studies have demonstrated that the HSCL can be used successfully to assess distress in cancer patients (Bolger et al., 1996; Vinokur et al., 1989). Bolger et al. utilised the two scales of the HSCL for assessing anxiety and depression. Five of six items were drawn from the anxiety scale and five of eleven were drawn from the depression scale. They reported the alpha coefficient for the anxiety scale was .81 at first interview and .82 at the second interview 6 months later. Furthermore, the alpha coefficient for the depression scale was .88 at the first interview and .86 at the second interview.

Profile of Mood States (POMS)

The POMS, developed by McNair, Lorr and Droppleman (1981), is a 65-item Likert-type measure which provides an assessment of patient mood state in six separate dimensions including tension, depression, anger, vigour, fatigue and confusion. A total mood disturbance score may be obtained by summing the scores across all six factors (weighting vigour negatively). The item is rated on a five-point scale ranging from 0 (not at all) to 4 (extreme).

The reliability reported for each individual scale was near .90 or above. Test-retest reliabilities ranged from .65 for vigour to .74 for depression, within a range of 3-110 days. Several studies reported that the POMS scales were sensitive to change associated with psychotherapy (McNair et al., 1981). Spiegel, Bloom, and Gottheil (1983) used the POMS to measure adjustment, whereas Lefcourt, Miller, Ware, and Sherk (1981) used the POMS to measure a general mood state. Moreover, Dunkel-Schetter et al. (1992) used this scale to measure mood levels in cancer patients. However, this measure was sensitive to age and sex (McNair et al., 1981). For example, older patients tended to obtain lower scores for anger and confusion. Males reported a lower score on all factors except vigour, than females.

Leeds Scale

The Leeds Scale is a self-rating scale for the self-assessment of anxiety and depression (Snaith, Bridge & Hamilton, 1976). Snaith et al. indicated that this Scale was taken directly from the Anxiety scale of the Symptom Rating Test developed by Kellner and Sheffield (1973). The Leeds Scale is composed of twelve items rated on a four-point scale ranging from 0 (not at all) to 3 (definitely).

The Scale comprises two separate sub-scales measuring depression (LSD) and anxiety (LSA). The LSD and LSA each consists of six highly specific target questions for the diagnosis of either depressive illness or anxiety states. McArdle et al. (1981) utilised the Leeds Scale to examine emotion and degree of pathological depression or anxiety, while Hughson et al. (1986), used this scale to measure psychological morbidity.

Hamilton Depression Rating Scale (HDRS)

Hamilton (1960) developed a Rating Scale for Primary Depressive Illness. Hamilton (1967) presented the successfulness of the scale in a series of studies and further analysed and reconstructed the scale and called it the Hamilton Depression Rating Scale (HDRS). The HDRS consists of twenty-one items measured on a five-point scale (0-4). Each item is rated by a clinician for severity of the symptom presentation.

In this scale, the first factor is a general factor of depressive illness, measuring the severity of symptoms. The second factor is symptoms of anxiety and agitation. The third factor consists of insomnia, loss of appetite and fatigue. The fourth factor consists of hypochondriasis, loss of weight and loss of insight. Hamilton (1967) indicated that a score of ten or more on this scale for depression was regarded as an indication of the presence of symptoms sufficient to impair patients' day-to-day functioning, to lead them to seek help, and to be sufficiently distressed to consult the patients' doctors with psychiatric symptoms. Of patients scoring less that ten, only 8% consulted their doctors. However, this scale focused mostly on the depressive aspect which may not suit studies where the researchers need more information on psychological symptoms.

Other Measures of Psychological Symptoms

Numerous other measures of psychological status are available. For example, the state-rait Anxiety Inventory developed by Spielberger, Gorsuch, and Lushene (1970) is a 40-item self-report measure. It assesses anxiety as a trait or relatively stable dispositional variable, and is a state which refers to the degree to which persons display anxiety in a specific situation Johnson & Sarason, 1978).

The Symptom Checklist-90R (SCL-90R) is a 90-item scale measure of symptoms of psychological distress along nine empirically validated dimensions including somatisation, obsessive-compulsives, interpersonal sensitivity, anxiety, depression, hostility, phobic anxiety, paranoid ideation and psychoticism. Three global indices of distress are scored on the general severity index, the positive symptom total and the positive symptom distress index.

The SCL-90R has been shown to be reliable and valid in a study by Manuel et al. (1987) where coping and cancer was examined. They claimed that the SCL-90R focused on current symptoms of psychological distress and was used because it was more sensitive than trait measures to changes in symptomatology occurring over time. They pointed out that the SCL-90R was sensitive to changes in emotional distress in cancer patients. As well, the SCL-90R can easily be adapted to clinical settings and administered before, during and after cancer patient treatment (Manuel et al., 1987).

The Psychosocial Adjustment to Illness Scale (PAIS) developed by Derogatis is used to evaluate health-care orientation, vocational, social and domestic environment, extended-family relationships, sexual relationships and psychological distress. A total score reflects overall psychosocial adjustment, and separate scores reflect adjustment within individual domains.

There has been evidence that many self-reported questionnaires are widely used to examine emotion reactions and levels of emotion reactions. Measuring psychological symptoms has been shown to be reliable and valid. Several measurements of psychological symptoms are provided.

3.2.1.3 Issues Associated with the Measurement of Social Support

Measures of social support generally fall into two categories. First, there have been measures of social integration or social network properties which include size, frequency and density. Second, there have been measures of social functional characteristics which include instrumental, emotional and informational support (Broadhead, Gehlbach, DeGruy & Kaplan, 1988; Wortman & Dunkel-Schetter, 1987).

Many instruments were used to measure the social network and quantify the number of supporters or the amount of social contact as a measure of social support in studying the relationship to health outcomes (Langlie, 1977; Schaefer et al., 1981; Willey & Silliman, 1990). However, a great number of investigators agreed that structural measures provided only a very indirect index of the availability of support functions (Cohen & Wills, 1985; Broadhead, Kaplan, James, Wagner, Schoenbach, Grimson, Heyden, Tibblin & Gehlbach, 1983; Broadhead et al., 1988). In addition, it provided little information about the nature, quality, or content of the relationship (Wortman, 1984). This measure also failed to illuminate the mechanism of social support influences on stress or psychological distress (Barrera, 1986). In contrast, small networks characterised by close relationships have generally been regarded as the most supportive in times of crisis (Wortman, 1984). There was inconsistent evidence that quantity of social support was significantly related to well-being (Broadhead et al., 1983; Wortman & Dunkel-Schetter, 1987).

The qualitative or functional aspects of supportive relationships commonly incorporated the dimensions of perceived availability and adequacy of supportive ties. These support scales measure adequate support being available if needed (Barrera, 1986). As Cohen and Wills (1985) claimed, adequate functional support may be derived from one very good relationship, but may not be available to those with multiple superficial relationships. Thus, several research findings have supported that quality of social support was a stronger predictor of health outcome than the quantity of social support (Bloom et al., 1991a; Cohen & Wills, 1985; Schaefer et al., 1981).

However, there have been many problems related to the measurement of social support. One problem with functional social support measurement was that the correlations between support, stress, and health were likely to be spurious, due, for example, to variance in well-being (Barrera, 1986; Wortman, 1984). This problem may be reflected when social support scale items were highly similar to those in a stress or distress measure. According to Broadhead et al. (1988), quality of social support and frequency of social interaction were minimally inter-related, and it may be inappropriate to combine them into summary measurements. The last problem with social support measures was associated with confounding variables that occur when the relationship between two variables can be explained by their linkages to a separate variable of quality, and frequency of social support that causes both (Barrera, 1986). Consequently, caution should be exercised in interpreting the findings in association with social support.

Regarding social support measurements, several self-rating measures have been developed (Barrera, 1986; Holahan & Moos, 1981; Sarason et al., 1983). For instance, the

Interpersonal Support Evaluation List (ISEL) was developed by Cohen (1985). It consists of a list of social resources. The items are counterbalanced for desirability: that is half of the items are positive statements, while half are negative statements. The ISEL is designed to assess the perceived availability of the four separate functions of social support including tangible support, appraisal support, self-esteem support and belonging support. Cohen reported that the internal reliability (Alpha coefficient) ranged from .77 to .88. In test-retest within a four-week interval, correlations of the two periods were .87 for the entire scale. This included .87 for appraisal, .82 for belonging, .71 for self-esteem and .80 for tangible support subscales separately. However, the limitations of this scale are due to the overlap among its subscales.

Another standardised measurement in social support is the Social Support Questionnaire (SSQ) developed by Sarason et al. (1983). The SSQ is a 27-item self-administered scale. Each scale requires a two-part answer. In the first part, persons are asked to list people on whom they could rely in a specified set of circumstances. In the second part, persons rate their satisfaction with the available support. The number (N) score for each item of the SSQ is the number of support persons listed. The satisfaction rating is the same for each item, and uses a six-point scale running from " very satisfied" to "very dissatisfied". A satisfaction score (SSQ-S) is based on the mean of the 27 satisfaction scores. The overall N and S scores are obtained by dividing the sum of N or S scores for all items by 27, the number of items.

Sarason et al. (1983) revealed evidence of the reliability and validity of the SSQ from three studies. In the first study, the results showed that the number scores for the 27 items ranged from 2.92 to 5.46, with a mean of 4.25. The inter-item correlations ranged from .35 to .71, with a mean inter-item correlation of .54. The correlations of items with the total score ranged from .51 to .79. The alpha coefficient of internal reliability for SSQ-N was .97. The S scores for the 27 items ranged from 5.12 to 5.57, with a mean of 5.38. The inter-item correlations ranged from .21 to .74, with a mean inter-item correlation of .37. The correlations of items with the total score ranged from .48 to .72. The alpha coefficient for S scores was .94. The correlation between the SSQ-N and S scores was .34. The test-retest correlations for N and S within 4-week intervals were .90 and .83, respectively.

In a second study, the results demonstrated that the correlations between the number of social supports (SSQ-N) and satisfaction with social supports (SSQ-S) were .31 for men and .21 for women. There were significant negative correlations for women between the SSQ-N and SSQ-S measures of social support and anxiety, and the depression and hostility subscales scores of the Multiple Adjective Affect Checklist (MAACL). Both SSQ-N and SSQ-S were significantly associated with scales of optimism as measured by the Ladder of Life scale. Additionally, the number of social supports was positively related to extroversion scores whereas satisfaction with social support was negatively related to Neurotivism measure. The Marlowe-Crowne scale of social desirability did not correlate significantly with either the SSQ-N or SSQ-S for either sex.

A third study showed that the SSQ-N scores were associated with the positive life event scores. However, analyses of SSQ-S quintiles failed to show significant differences for the number of positive events, but did show significant differences on the rated affects of positive events. People tended to feel a greater sense of control over their life events if they had high SSQ-N scores.

Social support measurements could be divided into two major aspects including social network and function of social support. Social network measurement included the type of relationship, the frequency, the total amount of contacts with the network, or the total number of supports. Function of social support measurement was categorised into four types including emotional, instrumental, informational and appraisal support. Many researchers suggested social network and function of social support should not be combined into one measure.

3.2.1.4 Issues Associated with the Measurement of Coping Skills

The current measurement of coping skills can be assessed in different ways depending upon the theoretical framework. They may be assessed in terms of standardised instruments, structural interview guidelines and suitable observational techniques.

The psychoanalytic approach could be evaluated by projective techniques and interviews. This approach may be evaluated using questionnaire forms. For example, Bond, Gardner, Christian & Sigel (1983) cited in Moos and Schaefer (1993) developed the defense style questionnaire to assess individuals' characteristic styles of dealing with conflict. Moos and Schaefer (1993) convincingly argued that the psychoanalytic framework made it difficult to draw any valid conclusion because this type of coping response was subject to transactions between the physicians and patients.

Another method of assessing coping responses is to quantify personality characteristics using the Minnesota Multiphasic Personality Inventory (MMPI) developed by Hathaway and Mckinley (1943). This questionnaire contains five hundred and fifty-five statements covering different areas of life experience. Respondents indicate an answer as true, false or cannot say. The MMPI has been reported as a reliable inventory. Its test-retest correlations ranged from .46 to .93 over periods of two or three days up to one year (Horrocks, 1964). This questionnaire has been criticised because the scale had a time consuming scoring system (Horrocks, 1964). In terms of construct validity, the MMPI has been criticised for having some of the same items used in the different scales (Cohen et al., 1992). Subsequently, the MMPI-2 was developed in 1992. It contains 567 items with no repeated items. The MMPI and MMPI-2 have been strongly criticised by Folkman (1984) who believed that coping skills may be more a measure of cognitive factors than an assessment of personality.

The Multidimensional Coping Inventory (MCI) is another personality measure questionnaire developed by Carver, Scheier, and Weintraub (1989). It was composed of seventy items, but later changed to forty-four items. It is constructed of three types of coping styles including task oriented, emotion oriented and avoidance oriented coping. It uses a five point frequency scale, ranging from not at all (1) to very much (5). They reported overall alpha coefficients ranging from .70 for men on the emotion subscale to .91 for women on the task subscale. The mean interitem correlation for the task subscale was .29 for men and .36 for women.

Subsequently, Carver et al. (1989) developed a measurement of coping called COPE, which has two formats, dispositional and situational. The COPE measure consists of thirteen scales on problem- and emotion-focused coping. It focuses on emotions, behavioural disengagement and mental disengagement (Endler & Parker, 1990). The internal consistency of each scale from Cronbach's alpha reliability coefficients ranged from .45 to .92. COPE has a number of limitations such as emphasising gender differences (Carver et al., 1989) Furthermore, disposition indexes provide only limited information about the coping processes in specific stressful situations (Moos & Schaefer, 1993).

In an effort to gather more specific information on coping, Billings and Moos (1981) created the Coping Responses Inventory (CRI). The authors divided the CRI in a similar way to

Pearlin and Schooler (1979), who presented coping as an approach-avoidance form. Billings and Moos (1984) expanded the items from nineteen to thirty-one and used a four-point Likert scale instead of a yes/no format. The internal consistency reliability ranged from .41 to .66. However, Billings and Moos did not report empirical evidence to support their classification system (Endler & Parker, 1990).

The most broadly used measurement of coping strategies was proposed by Lazarus and his colleagues (1980). The authors have developed two coping scale measures called the Ways of Coping (WCC) and the Ways of Coping Questionnaire (WCQ). These measures are divided into two general types of coping: problem- and emotion-focused coping. The WCC is composed of 68 items from a variety of behavioural and cognitive coping strategies. The checklist is a yes/no format. The internal consistency reliability was .80 for the problem-focused scale and .81 for the emotion-focused scale. Later, the authors developed the WCQ from the WCC. The WCQ is a four-point Likert scale for the 67 remaining items. Eight subscales were developed. These are planful problem solving, seeking social support and six emotion-focused scales. Internal consistency reliabilities for the eight subscales were reported, ranging from .56 to .85 (Endler & Parker, 1990; Folkman & Lazarus, 1985, 1986; Vitaliano, Russo, Carr, Maiuro & Becker, 1985). Folkman and Lazarus (1988) again revised this scale into the short form which comprised 50 items to assess coping in the younger sample and 30 items to appraise coping in the older sample. The researchers explained that the items for the short version were selected on the basis of their factor loadings from the full-length Ways of Coping Questionnaire that was used with the younger sample. The alphas for the eight subscales based on the shortened version ranged from .47 to .74.

Edwards and Baglioni (1993) reported that the WCQ still showed four of the eight factors as containing some items with non-significant loadings, indicating that these items did not adequately represent the intended underlying factor. Moreover, 35 of 50 items yielded significant modification indices for loadings on at least one other factor. and 14 of these items yielded significant indices on three or more factors. For the internal consistency. only three of the eight WCQ factors exhibited significant within-factor residuals. Edwards and Baglioni claimed that the residuals for the accommodation factor corresponded to several item pairs sharing specific content that was not explained by the common underlying factor.

As the intercorrelations between the scales were very high, making it difficult to assess coping multi-dimensionally and the checklist was long, Vitaliano et al. (1985), further. developed a revised version of the WCQ. Forty-two items remained in the revised version with five factors: problem-focused coping. blaming self. wishful thinking. seeking social support and avoidance. The reliabilities of the subscales ranged from .74 to .88. For example, in the medical student sample (n=425), the alpha for problem-focused, wishful thinking, seeking social support, blaming self and avoidance were .88, .85. .75, .78 and .74, respectively. Vitaliano et al. stated that the intercorrelation of the revised scales had substantially less overlap than the original scales. The results indicated that no significant associations occurred for gender in either the original scales or the revised scales. Besides, neither the original set of coping scales nor the revised set of scales was significantly related to education and marital status. The validity for use with cancer patients was confirmed by Dunkel-Schetter et al. (1992) and Hilton (1989).

Several studies have demonstrated that the WCC and WCQ can be used successfully to predict coping strategies and its consequences (Folkman & Lazarus, 1985, 1988; Folkman et al., 1986; Follette & Jacobson, 1987; Hilton, 1989). In addition, a great number of studies divided the items into only two subscales. They were problem- and emotion-focused coping (Billings & Moos, 1981; Forsythe & Compas, 1987; Manuel et al. 1987; Vitaliano, Maiuro, Russo, Katon, DeWolfe & Hall, 1990b). Although all aspects of the use of the WCQ were not desirable, Oakland and Ostell (1996) have argued that its advantages were that it was easy to use, required little training for administrators, and could be used with large samples. As well as this, the WCQ includes lists of items which assess both problem- and emotion-focused strategies.

Coping skills reflect in the strategies used by an individual in a stressful situation. The assessment of coping skills can be measured in several ways depending on their conceptual framework. These measurements include self-reported questionnaires, interviews and observational techniques. The coping skills can generally be grouped into two categories including problem- and emotion-focused coping.

3.2.2 Instrumental Development

Four instruments were used in this study along with the demographic data. They were (a) the General Health Questionnaire, (b) the Hopkins Symptom checklist (HSCL), (c) the Social Support Questionnaire (SSQ) and (d) the Ways of Coping Questionnaire (WCQ). These four instruments were used to measure health status, psychological symptoms, social support and coping skills. These instruments were standardised questionnaires and have established reliability and validity for use in the general population as well as people suffering from cancer. The scales and subscales demonstrated acceptable reliability. In response to this, the investigator opted to utilise these validated instruments in the present study.

The original instruments were designed for use in Western countries. It was intended, however, that this research be conducted in Thailand where there may be different perspectives. Since psychological illness and behavioural responses to illness are influenced by cultural factors, an instrument valid in one country may not be valid in another. As a consequence, the investigator contacted relevant persons and organisations in Thailand, including the heads of the Psychiatry Departments and Faculties of Medicine at Mahidol, Songklanagarind, Chiang Mai and Khon Kaen Universities in order to request copies of, and permission to use, the required questionnaires.

Because of the lack of previous study in this area, it was difficult to find questionnaires that had already been systematically tested for validity and reliability in the Thai language. The only Thai version of the health status questionnaire GHQ 28-items, translated by Piyavhatkul and her colleague (1996) from Khon Kaen University, was used in this study because it had already been systematically tested for validity and reliability on the large number of Thai population. Each dimension of this GHQ Thai version was validated by clinical psychiatric interviews for use with Thai respondents. The GHQ was used because it focuses on changes in condition when compared to normal. Therefore, the GHQ score can be interpreted as the improvement or deterioration of the health of participants who have received prior treatment. The present study utilises two dimensions (somatic and social dysfunction) for measuring health problems because there was evidence that side-effects of chemotherapy and radiotherapy affect overall physical and social conditions of participants (Bloom et al., 1991a; Judson, 1993). The two other dimensions, anxiety and depression, were not used because they measure psychological symptoms. A letter of permission to use this questionnaire was obtained from Dr. Piyavhatkul from the Khon Kaen University (see Appendix C). The HSCL, SSQ and Ways of coping were not systematically validated in the Thai language. The investigator, therefore, decided to translate and validate before using them for the study.

Items in the questionnaire were constructed in the form of a Likert scale. The investigator also decided to use the short version of all instruments because the original version was very long and may not have been suitable for cancer and Thai participants. The HSCL consisted of 20 items, with five items representing each subscale according to the factor loadings reported by Derogatis et al. (1974). Scoring for each item is on a scale of 1 (disagree) to 5 (agree). The Social Support Questionnaire (SSQ) contained six, from twenty-seven items that yielded a single dimension of support adequacy. Scoring for each item of the SSQ-S is on a scale of 1 (very dissatisfied) to 6 (very satisfied). The number of support persons (SSQ-N) listed on each item ranged from 0 to 8 persons. The Ways of Coping Questionnaire contained 23 items from the 42 items described in the revised version of Vataliano et al. (1985). Five items from each of the five subscales were selected excluding the 'blaming self' subscale which contained all original three items. Scoring for each item is on a scale of 1 (disagree) to 4 (agree). The HSCL and the Ways of coping items were selected by the investigator. These items were chosen on the basis of the factor loading results described in the literature because they were relevant for use within the Thai context. The psychological symptom, social support and coping skills questionnaires required translation and testing for reliability. The reliability of these three questionnaires was previously tested on a sample group from the Thai population in Melbourne, Australia (November, 1996). The pre-test of the questionnaire was administered to a general sample rather than a group of cancer patients because the general population could provide some recommendations for wordings that may not clear for them.

3.2.3 Translation

Translation of the English version questionnaires into the Thai language was completed by the investigator. The investigator is a native speaker of the target tongue, is knowledgeable about the content area and is aware of the intent of each item and of the scale. A literal translation of phrases may convey very different meanings in the two languages, as feelings, disorders and even symptoms may not be expressed in the same manner as it is in English. After being translated into the Thai language, questionnaires were back-translated into English by two Thai nationals who are fluent in English and completing post graduate studies in Melbourne. They were not associated with the translation phase. If the meaning seemed to have been lost or altered, then that item was taken through the process again. Brislin (1993) described this procedure as an important aspect of using questionnaire in different culture. Once the translation was completed, the questionnaire was tested for reliability. Some wordings were changed in response to further comments and discussion with the Thai persons who completed the pilot questionnaires.

3.2.4 Pre-testing of Instruments

It has been previously stated that the instruments used for this study consisted of four standardised questionnaires. These were the General Health, Social Support, Ways of Coping Questionnaires and the Hopkins Symptom Checklist. Because the General Health Questionnaire has already been validated for the Thai culture, the investigator decided not to pre-test this questionnaire.

Therefore, the short and modified forms of the HSCL, SSQ and WCQ were administered to a general population of Thai people in Melbourne between the ages of 20 and 60 (November, 1996). Participants (n=62) in this phase included 33 males and 29 females. The majority of participants were single (n=49) while twelve persons were married and one was divorced. Participants were first asked to imagine a recent stress situation, and then asked to think about the ways they coped, how emotional they were, and finally who supported them and how satisfied they were with this support. The results of the pre-testing of measures were as follows.

The HSCL contained 20 items. The item range from 1 (disagree) to 5 (agree). The results of the pre-test of measure are displayed in Table 3.9. The Alpha test for HSCL scale was .936. The correlations among items ranged from .26 to.63

Table 3.9 Reliability Estimates for the HSCL

HSCL	
scale mean	24.32
item mean	1.216
variance	.259
Inter-item correlation mean	.650
alpha coefficient	.936
Reliability of Subscales	
obsessive-compulsive	.816
interpersonal sensitivity	.709
depression	.777
anxiety	.812

The Social Support Questionnaire (SSQ) contained six items. The item ranged from 1 (great dissatisfaction) to 6 (great satisfaction). Fewer participants (n=49) completed this questionnaire than the coping and Hopkins checklist. This may be due to the fact that the Social Support Questionnaire was developed for use with populations in Western countries and therefore some participants suggested that the SSQ-N scale was too difficult to think about in any short period of time. The sample (n=48) comprised 23 males and 25 females. The majority of the sample (37) was single but ten were married and one was divorced. The results of the pre-test are shown in Table 3.10.

The Alpha test for the SSQ scale (SSQ-N and SSQ-S) was .879. There were intercorrelations of .49 to .74 between items . The correlation between the SSQ-N and S scores was .233. As a consequence of this pre-test, the investigator specified the relevant support persons in accordance with the literature review who were relevant to the chemotherapy and radiotherapy patients, and left extra space to allow participants to identify other support persons.

Table 3.10 Reliability Estimates for the SSQ

SSQ	SSQ-N	SSQ-S
item mean	1.816	4.810
variance	.076	.012
inter-item correlation mean	.570	.529
alpha coefficient	.888	.871

The Ways of Coping Questionnaire contained 23 items. The item scores ranged from 1 (disagree) to 4 (agree). Participants (n=62) completed this questionnaire. The reliability of its subscales was consistent with those of Folkman and Lazarus (1985, 1988) and Vitaliano et al. (1985). The results of the Alpha coefficient and inter-item correlation mean are presented in Table 3.11. The correlations among items ranged from .09 to.45.

Table 3.11 Reliability Estimates for the WCQ

WCQ	
scale mean	58.613
item mean	2.548
variance	.1322
Inter-item correlation mean	.239
alpha coefficient	.785
Reliability of Subscales	
problem-solving	.650
wishful thinking	.748
seeking social support	.631
blaming self	.730
avoidance	.611

Although this pre-test was used on different populations, the pre-test results lead the researcher to have confidence in the meaningfulness and reliability of the measures when applied to the Thai population. The pre-test results of the Social support, Hopkins Symptom, and Ways of Coping questionnaires indicated a high reliability comparable to that reported in the Western studies. These questionnaires also altered wording as necessary, according to the comments from participants in the pre-test. The questionnaires, in English and Thai, are in Appendix A.

3.3 Data Collection

Data were collected during a six month period between March and September, 1997. The questionnaires were administered before participants received chemotherapy, in two consecutive cycles. However, participants had received at least one course of chemotherapy. For radiotherapy, participants had received at least 10 radiation treatments before being administered the questionnaires because some side-effects such as skin reaction usually occur 7 days after treatment. The sequence of questionnaires was randomly administered by participants.

3.3.1 Administering Questionnaires

3.3.1.1 Participant Selection

The investigator was responsible for administering questionnaires to participants. The sample was selected by total population sampling using the convenience technique. Convenience samples use readily available persons for the study. Random sampling was not used as it would have yielded a small sample for the study and been inappropriate for this type of study. Instead, all persons who satisfied the criteria of the study were selected for participation. These participants were identified through admission records, and eligibility confirmed by discussion with the practising staff. Participants who met the chosen criteria and could understand the questions were selected. Participants were excluded from the study if their consent was not obtained or if they were unable to understand the Thai language. For participants who were regarded as being ignorant of their diagnosis, the investigator did not mention the term "cancer" or any aspect of the disease.

3.3.1.2 Initial Participant Assessment

The purpose of this study was explained to the selected participants. They were introduced to the project during their visit to the out-patient units. Oral instruction on how to complete the questionnaires was given by the investigator only. Participants were asked to complete the questionnaires while waiting for treatment at the out-patient unit. All participants were asked to complete the instruments by themselves. Written instructions for completing the questionnaire were included at the beginning of each form. The investigator coded the data, and performed data entry and analysis.

3.3.1.3 Protocol

The chemotherapeutic protocol depended upon the participants' diagnosis. Chemotherapeutic agents were administered on an out-patient basis on day 1 and 8 of consecutive 28 day cycles, except for gynaecological and other participants, who were receiving chemotherapy for 12 hours continuously as in-patients. The latter also waited at the out-patient unit for admission processing. Dosages depended on the participants' weight and were administered intravenously by infusion. Standard anti-emetic protocol consisted of plasil 2 mg taken orally, 3 times per day. In cases of participants reporting post-treatment nausea or vomiting in their previous cycle, an anti-emetic of plasil 10 mg intravenously was prescribed at the time the chemotherapy was administrated. For radiotherapy, the protocol depended on the participants' diagnosis and performance status scores tested by the physicians.

Administration was postponed if the platelet count was less than $100 \times 10\ ^{3}/\text{mm}^{3}$. Chemotherapeutic agents were delayed by one week if the administration date coincided with a public holiday and/or participants' personal commitments.

3.4 Design of The Study

3.4.1 General Design

This study was a cross sectional design in naturalistic settings of participants undergoing chemotherapeutic and radiotherapeutic treatment. The design also incorporated a longitudinal component of participants receiving chemotherapy. It was conducted in the two selected hospitals in Thailand, Hat-Yai and Songklanagarind. Standardised measures were used to assess health status, psychological symptoms, social support and coping skills. The proposed model was tested using a causal modelling procedure.

3.4.2. Statistical Analysis Design

3.4.2.1 Statistics Methods

The model hypothesised in figure 3.1 was tested using a causal modelling methodology. Because of the popularity of the LISREL computer program created by Karl G. Jöreskog and Dag Sörbom in the late 1960s and early 1970s, some researchers refer to causal modelling as the Linear Structural Relation (LISREL). As well, some researchers refer to it as structural equation modelling (SEM), structural modelling or covariance structural modelling (Pedhazur & Schmelkin, 1991). The LISREL approach provides a means of estimating and testing a variety of linear models. Since it was introduced, it has been used extensively within the field of social science and non-experimental design. LISREL is also the program for estimating structural equation models and path analysis, a method for studying patterns of causation among a set of variables. Path analysis was originated by Sewall Wright as a technique used to assess the direct and indirect effects of variables hypothesised on the basis of knowledge and theoretical grounds as well as permitting variables to be both a cause and an effect (Pedhazur, 1982).

The model is written as a set of structural equations that represent the causal processes assumed to operate among the variables under consideration using the path analytic technique. Path coefficients are calculated between each hypothesised connection, indicating the fraction of the standardised deviation of the dependent variables for which the independent variables were directly responsible. The path coefficient indicates the direct effect of the antecedent on the dependent variables. Like multiple regression analysis, structural equation modelling contains several assumptions (Saris & Stronkhorst, 1984). First, the relations among the variables in the model are linear, additive and causal. Second there is a one way causal flow in the system called recursive. Third, the variables are measured on an interval scale. Fourth, the variables are measured without error. Finally, each residual is not correlated with the variables that precede it in the model, and residuals are normally distributed with a mean of zero.

3.4.2.2 Number of Subjects

The number of subjects selected for inclusion in the final sample was dependent upon the assumptions of the LISREL statistical analysis utilised in this study. It is well known that the LISREL methodology requires a large sample size (Long, 1983). As Saris and Stronkhorst (1984) claimed, the distribution of the large sample needs to be symmetrical and to resemble normal distribution. They recommended that if the observed variables have a multivariate normal distribution and samples larger than 100 are used, the distribution of the test statistic approaches the chi-square (χ^2) distribution very well. Hayduk (1987), Hair, Anderson, Tatham, and Black (1995), and Long (1983), supported not using a sample size smaller than 100, and recommended a sample size of more than 200. Besides, Hair et al. suggested the sample size should not exceed 400 to 500 because the method would become too sensitive, making all goodness-of-fit measures indicate poor fit.

3.4.2.3 Treatment of Data

After collecting the data, the investigator continued to transfer all precoded data from the questionnaires into the computer. The first step in the analysis was to check the reliability ratings of all indices using the Cronbach's Alpha coefficient of internal consistency. Then a series of Confirmatory Factor Analyses (CFA) was conducted to check the convergent and divergent validity of the chosen measurement models.

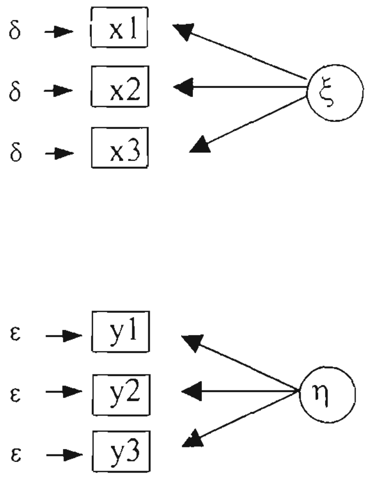
The statistical analysis for hypotheses testing and research questions are presented in two parts. Part 1 is a multivariate statistical analysis of the causal model (figure 2.1) set forth in the problem statement to test the proposed model. Part 2 is a bivariate statistical technique to answer the research questions posed in Chapter 2 (cf. pp. 78).

Part 1: Testing of Model

The first step in the analysis employed the LISREL statistical methodology presented in the statistical method section (p. 120). The investigator developed a structural model based on knowledge and the theoretical grounding of the attribution theory. The general LISREL model was broken into two submodels of measurement and structural models.

The measurement model specifies the relationships between the unobserved or latent variables and observed variables. Figure 3.4 shows the measurement model. For example, the three exogenous observed variables (x1, x2 and x3) form multiple indicators of an exogenous latent variable named xsi (ξ). The three endogenous observed variables (y1, y2 and y3) also form multiple indicators of an endogenous latent variable called eta (η). In addition, each observed variable contains an error or residual called delta (δ) for the exogenous variables and epsilon (ε) for the endogenous variables.

Figure 3.4 A Structural Model for a Latent Variable with Three Indicator Variables



When observed variables are regarded as nonperfect indicators of latent variables, the goodness of fit of the measurement model must be tested. In this study the goodness of fit of the indicators for health status, social support, psychological symptoms, and coping skills must be tested. The test takes the form of a Confirmatory Factor Analysis, and is designed to ascertain if observed indicators are related to latent variables predicted by the measurement model. Confirmation implies that the assumptions that were tested by empirical analysis provide corroborative support for the structural model.

The relationships among the observed variables and factors are specified in a set of equations 1.

$$x = \Lambda_x \xi + \delta \qquad [1]$$

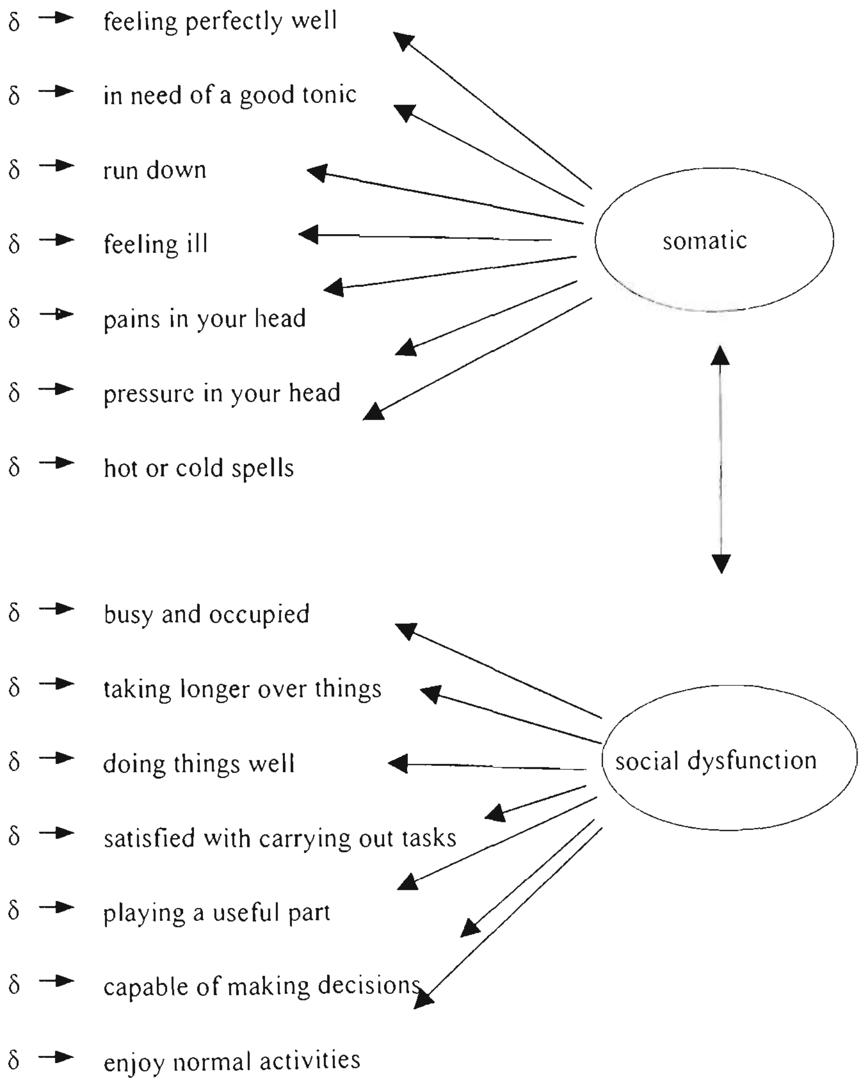
X is a vector of observed variables and Λ_x (lambda) is a regression matrix that relates exogenous factors to each of the observed variables designed to measure them. ξ is a vector of factors and δ (delta) is a vector of the residual. Both the observed and latent variables in equation 1 are assumed to be measured as deviations from their means. Mathematically the relationship between the endogenous observed variables and the factors is expressed as

$$y = \Lambda_y \eta + \varepsilon \qquad [2]$$

The observed y variables are linked by the loading matrix Λ_y to the latent η variable. Errors in the measurement of y are contained in ε (epsilon).

In this study, a measurement model for a health status variable with its indicators is shown in figure 3.5. The model postulates that health status is a two-factor structure consisting of somatic and social dysfunction factors. Each factor was composed of seven observed measures. The two factors are correlated while error or uniqueness terms (δ) are uncorrelated.

Figure 3.5 Hypothesised Two-factor Model of Health Status



To determine the overall fit for the measurement model, LISREL provides seven indices of fit.

(1) Chi-square (χ^2) with its associated degrees of freedom and probability can be used to test the fit between the restricted hypothesised model and the unrestricted sample data. The smaller the χ^2 and the larger the probability, the better the fit. However, χ^2 is dependent on sample size and very sensitive to departures from the multivariate normality of observed variables. Therefore, the use of χ^2 as a test statistic is not valid in most applications (Farrell, 1994; Marsh & Hocevar, 1985).

(2) A second measure of the model's fit is the chi-square to degrees of freedom ratio. In general, if χ^2 is small relative to the degree of freedom, the model is overfitted and parameters with very large errors should be eliminated. Byrne (1989), and Marsh and Hocevar (1985) suggested that chi-square to degrees of freedom ratios less than 5 represents an adequate fit.

(3) The goodness of fit index (GFI) and the adjusted goodness of fit index (AGFI) indicate the relative amount of variance and covariance explained by the model. Both indices range from zero to one, with a value close to 1.00, indicating a good fit.

(4) The root mean square residual (RMSR) indicates the average discrepancy between the elements in the sample and hypothesised covariance matrices. Values range from zero to 1.00 with a value less than 0.05 indicating a good fit.

(5) The parameter estimates are reasonable. The parameter estimates that are considered to be unreasonable are: negative variances, correlations >1.00, and covariance or correlation matrices that are not positively definite (Byrne, 1989; Cuttance, 1987).

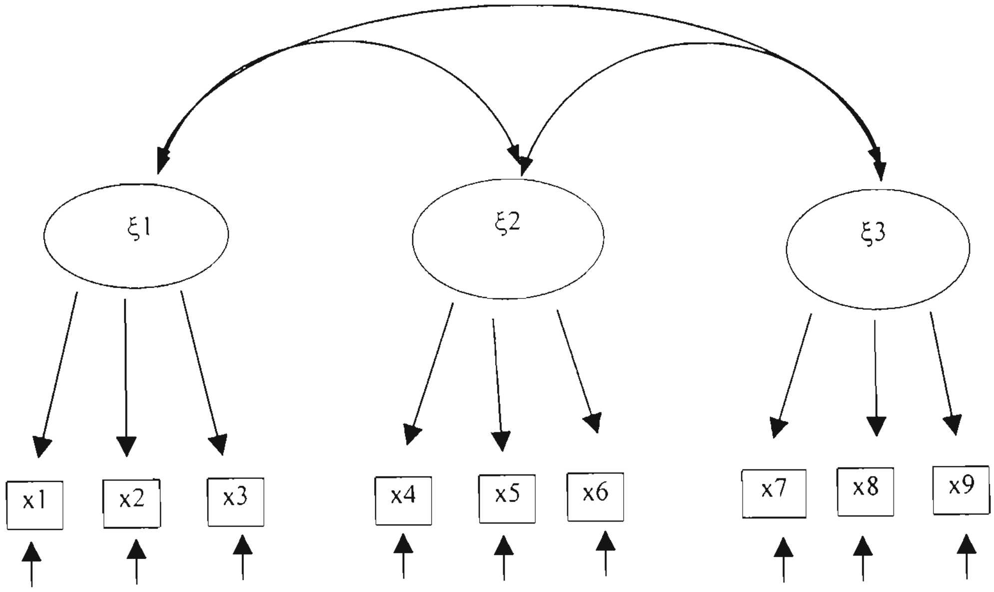
(6) The parameter estimaters should be significant. T-value provides evidence of whether or

not a parameter is significantly different from zero. Values more than 2.00 are generally considered to be statistically significant (Byrne, 1989). Nonsignificant parameters can be considered unimportant to the model. These parameters should therefore be deleted from the model.

(7) The squared multiple correlation (R^2) for each observed variable and the coefficient of determination for all the observed variables are close to 1.00, representing good models. The R^2 is an indication of the reliability of each observed measure with respect to its underlying latent construct (Byrne, 1989).

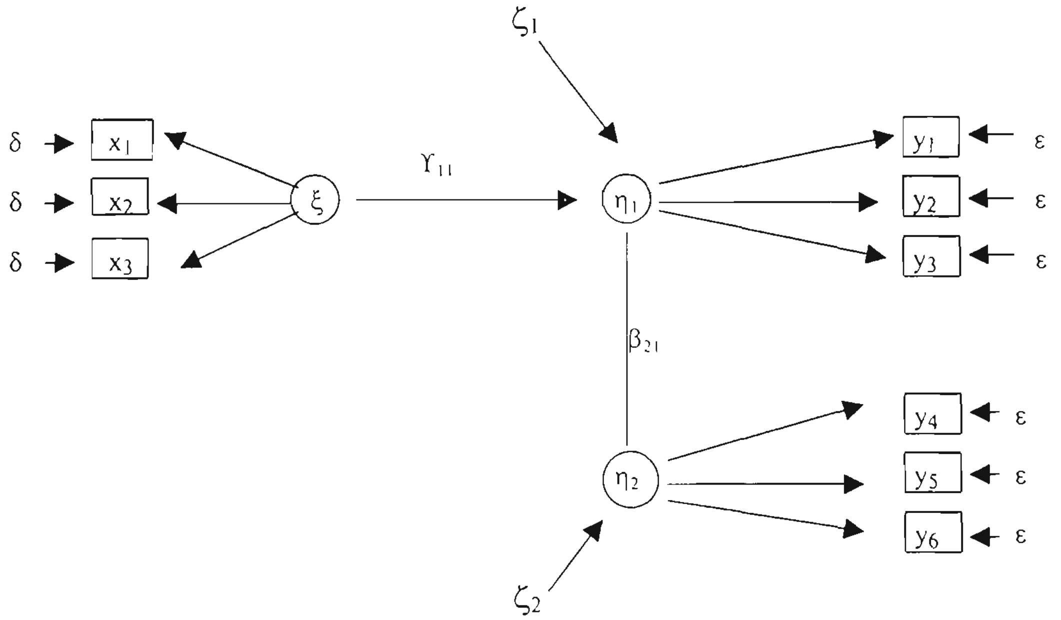
Once the measurement model for each construct had been completed, the CFA was also performed across all indicators of all constructs. This procedure was to estimate the measurement model for all the constructs without constraining the covariance matrix of the constructs (figure 3.6) as suggested by Bollen and Long (1993), and Herting (1985).

Figure 3.6 Confirmatory Factor Analysis Model for Three Constructs



After specifying the measurement model, the investigator constructed the structural equation model, or the hypothesised causal linkages, between the latent xsi and eta variables. This model was added to the previous measurement models to form the full structural equation model (figure 3.7).

Figure 3.7 A Structural Equation Model in which One Latent Exogenous Variable ξ causes a Latent Variable η_1, which in turn causes Latent Endogenous Variable η_2



Parameters within the structural equation model were specified by a system of linear structural equations as shown in equation 3.

$$\eta = B\eta + \Gamma\xi + \zeta \qquad [3]$$

η is a vector of endogenous variables, and ξ is a vector of exogenous variables. Where B (beta) is a matrix of coefficients relating the endogenous variables to one another, Γ (gamma) is a matrix of coefficients relating the exogenous variables to the endogenous variables. ζ (zeta) is a vector of errors in the equation, indicating that the endogenous variables are not perfectly predicted by the structural equations.

The evaluation of the model is composed of the following indicators:

(1) The Chi-square (χ^2) test statistic and the critical ratios for assessing individual parameters were provided by the LISREL program. Large χ^2 values correspond to bad fit and small values indicate good fit. However, there are problems with the statistical significance of chi-square (Marsh & Hocevar. 1985; Norris & Kaniasty, 1996). This test is highly sensitive to departures from multivariate normality. The chi-square is often statistically significant when there are many variables and degrees of freedom in the model. The chi-square test is sensitive to sample size. For example, in a large sample size a significant chi-square may be obtained even though the model fits the data (Saris & Stronkhorst, 1984). Consequently, some researchers (Marsh & Hocevar, 1985; Tanaka, 1987) have recommended using the chi-square/degree of freedom ratio ranging from 2 to 5 to indicate a reasonable fit.

(2) The goodness of fit index (GFI) and adjusted goodness of fit index (AGFI) were obtained to measure the overall degree of fit ranging in value from 0 (poor fit) to 1 (perfect fit). The value of the GFI above .90 was generally considered to indicate a good fit.

(3) The root mean square residual (RMSR) was analysed before deducing conclusions regarding the fit of the model. Marsh and Hocevar (1985) suggested that values of less than 0.05 represent a good fit.

Additionally, the Modification Index is a powerful tool that determines how the model can be modified to fit the data better. In testing the model or hypotheses, the analysis involves three separate analyses:

Analysis One

This analysis examines the proposed model for each group of participants separately. Once the model was identified, the investigator proceeded to evaluate the fit of the model to the data. The methods consisted of specifying the structural equations, estimating the parameters of the identified recursive model, testing the hypotheses within equations about the parameters and evaluating the overall fit by relating the equation hypotheses to the entire model. Several output measures were investigated before drawing conclusions about the fit of the model. The structural equations are:

$$\eta_1 = \gamma_{11}\xi_1+\zeta_1 \quad [4]$$

$$\eta_2 = \gamma_{21}\xi_1+\beta_{21}\eta_1+\zeta_2$$

$$\eta_3 = \gamma_{31}\xi_1+\beta_{31}\eta_1+\beta_{32}\eta_2+\zeta_3$$

Analysis Two

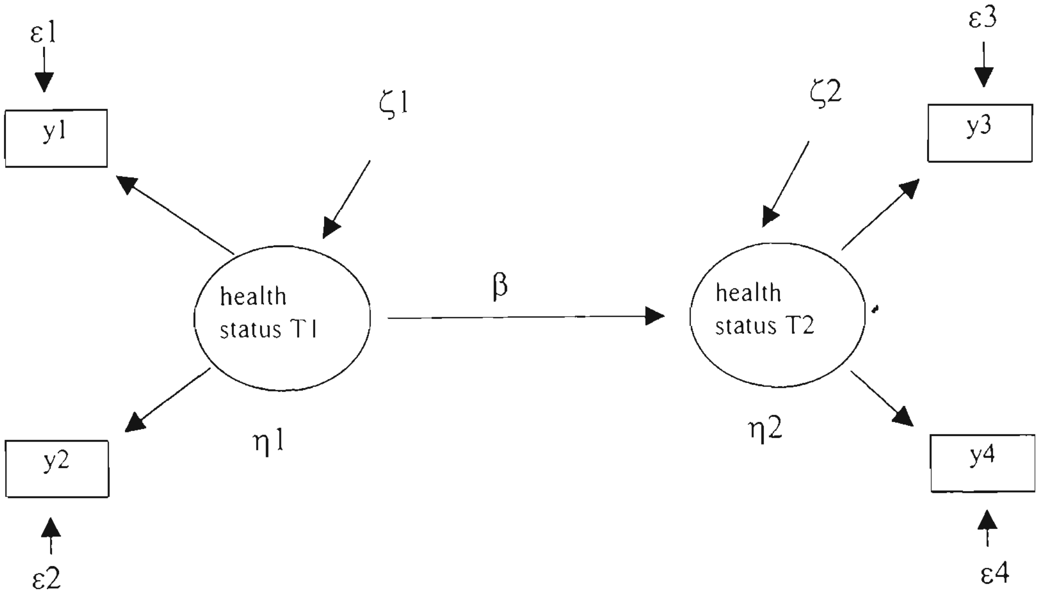
The purpose of this analysis is to investigate the extent to which a model is consistent across different times and different groups of participants. This analysis utilised the multi-group analysis method. The test imposed various restrictions on the similarity of parameters across groups. The parameters were neither estimates of averages across the groups nor based on separate calculations for each group. Rather, the estimated values were the estimates that minimised the fitting function (Herting, 1985). The procedure basically has the same structure as analysis one except the data determined the number of samples to be analysed. Also, the data included a variable group that flagged one of several groups in the data. The data specifications were then altered according to the hypothesised model across groups. These specifications defined which parameters were constrained specifically in the second samples and which were constrained across samples. The matrices which were defined as "invariant" in group 2 were defined exactly as in the first group.

The analysis sequence consisted of four steps: (1) path coefficients have the same pattern, (2) path coefficients are identical. (3) path coefficients and variances for the disturbance terms are the same across groups, and (4) path coefficients, variances and covariances among the disturbance terms and covariances among the endogenous variables are the same across groups. The chi-square difference test comparing the model with one that simply specifies the same pattern of path coefficients can be used to determine the extent to which the structural model is consistent across groups of samples (Bentler & Bonett, 1980; Bollen, 1989). A similar sequence of analyses can then be used to determine the extent to which the structural model is consistent across time.

Analysis Three

The main interest of this analysis is in the stability of variables over time as posed in question 1 of the research questions. The variables were measured at two points in time in the same participant. For example, figure 3.8 shows the path diagram for health status.

Figure 3.8 Path Diagram for Stability of Health Status Model



The structural equation for figure 3.8 is:

$$\eta 2 = \beta \eta 1 + \zeta \qquad [5]$$

where $\eta 2$ is a vector of health status Time 2. $\eta 1$ is a vector of health status Time 1. β is a matrix of coefficient, indicating the stability of variables. Stability refers to a lack of change over the time of the empirical values of a variable. ζ is a vector of errors in the equation.

Part 2: Technique to Answer Research Questions

In this phase of the statistical analysis, a bivariate analysis is used to assess the subject differences in the socio-demographic data. Generally, this analysis examined how well the socio-demographic variables predict health status, social support, psychological status and coping skills. The intent was exploratory. The variables were grouped into meaningful categories. The analysis employed the Analysis of Variance (ANOVA) statistical methodology. As this chapter provided the procedure utilised in pursuing testing of the hypotheses and research questions, the next chapter presents the results of the current study.

Chapter 4

Results

In this study, various tests based on models derived from the attribution theory were conducted to determine the relationships between health status, social support, psychological symptoms and coping skills in Thai participants receiving chemotherapy or radiotherapy. Data was collected by means of questionnaires and a demographic data form. The data obtained was analysed by applying structural equation modelling techniques using LISREL. The findings are presented in the following pages through narrative, tabular and graphic presentations. They are organised into seven sections: (4.1) reliability and validity of instruments, (4.2) analysis part one: model testing, (4.3) analysis part two: bivariate analysis, and (4.4) discussion.

4.1 Reliability and Validity of Instrument

The instruments utilised in this study comprised four standardised questionnaires, as well as selected questions regarding demographic and medical variables. The four standardised measures were the General Health Questionnaire, and Hopkins Symptom Checklist, and Social Support and Ways of Coping Questionnaires. In accordance with the empirical testing of structural equation models, measures require a sound foundation built upon reliable and valid indicators. All standardised questionnaires utilised in the present study have been tested for reliability and validity within the Western culture. The present study was conducted in Thailand which indicated different cultural contexts. The reliability and validity tests, therefore, were examined. The Cronbach's alpha test and the Confirmatory Factor Analysis (CFA) were used to construct and test the reliability as well as validity of each instrument. Cronbach's alpha is based on the average correlation of items within a test in which the items are standardised (Carmines & Zeller, 1979). The CFA seeks to resolve covariances or intercorrelations among variables into latent dimensions or factors, that account for the intercorrelations (Byrne, 1989). Data for the total sample (the initial testing for chemotherapy and radiotherapy, N=458) were combined in order to test for reliablities and measurement models. The correlation matrix of the total sample was chosen as the starting point for measurement model testing. The overall fit of a measurement model was determined by a Confirmatory Factor Analysis as described in the treatment of data section.

4.1.1 Health Status

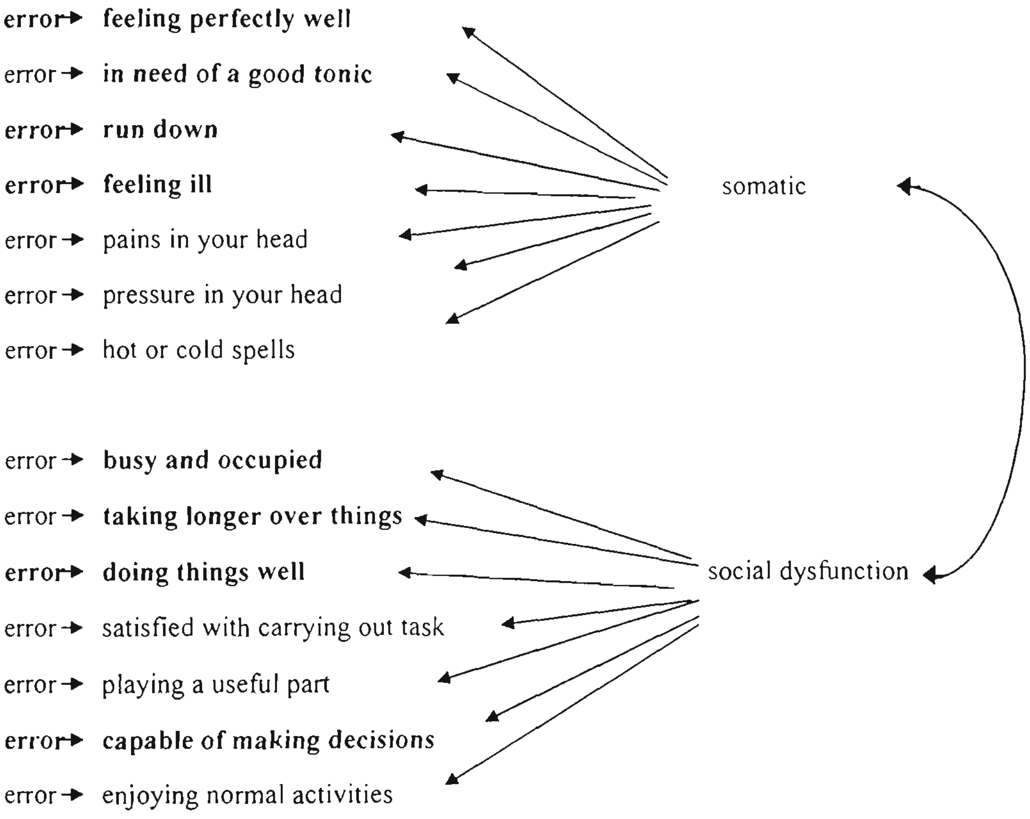
The health status scale used in this study contained two dimensions consisting of somatic symptoms and social dysfunction. It comprised 14 items. Each item scored on a scale of 0 (not at all) to 3 (more than usual). The item score ranged from .60 to 2.06, with a mean of 1.22. The construct "health status" was formed from the combination of 14 items as represented within the two aforementioned GHQ dimensions. All participants, including those receiving chemotherapy or radiotherapy, were put together to evaluate the measurement model. The alpha coefficient for health status scale was .84.

CFA was conducted (using LISREL) to test for construct validity. The 14 items formed two factors which served as indicators of health status. In the analysis, relationships were specified between latent factors and observed variables while constraining other relationships to zero (as shown in figure 4.1). The polychoric matrix was used as the basis for the confirmatory factor analysis which tested the fit of the model. The strength of the loadings between the respective indicators and their underlying latent variables served as an indication of construct validity. The Goodness of Fit Index (GFI) was used to assess the fit of the model. The GFI indicates the relative amount of variance and covariance jointly explained by the model.

The hypothesised model (14 items) indicated an inadequate fit (Table 4.1). The next step was to detect the source of misfit in the model. Many factors from the treatment of data were taken into account in assessing the adequacy of the hypothesised model. The statistical significance of parameters can be determined by examining the *t*-values provided by LISREL. The *t*-values represent the loadings of each indicator on its latent variable divided by its standard error. Loadings whose *t*-values are larger than two are generally considered to be statistically significant (Byrne, 1989). The squared multiple correlation for each indicator also represents the reliability of each indicator with respect to its underlying latent construct. Non-significant and low reliable (less than .50) parameters can be considered unimportant to the model and can be fixed at a value of 0.0 (Hair et al., 1995). They are therefore deleted from the model. However, a minimum of three indicators per latent variable is recommended (Farrell, 1994).

In the final model, 6 items (bold variables were deleted see figure 4.1) fit patterns in the data used for the health status variable (the loading values are shown in Appendix D). Factor scores were used as an approximation of the underlying factors. The use of factor scores formed by adding the scores of multiple item scales to form a single composite score is widely accepted in psychological research (Blankfeld & Holahan, 1996; Kim & Mueller, 1978; Shevlin, Miles & Bunting, 1997). The two summative factor scores, one for the somatic factor and one for the social dysfunction, served as the final indicators of the latent health status variable. The final model represented an adequate fit between the hypothesised model and the observed data as shown in Table 4.1. There was a correlation of .41 between these two subscales. The Cronbach's alpha coefficient for the revised scale was .73.

Figure 4.1 Summary of Health Status Variable Construct



Note: bold items were deleted

Table 4.1 Summary of Measurement Model for Health Status

Model type	χ2	df	GFI	RMSR
model 14 items	372.74	76	.896	.063
final model 6 items	46.24	8	.967	.054

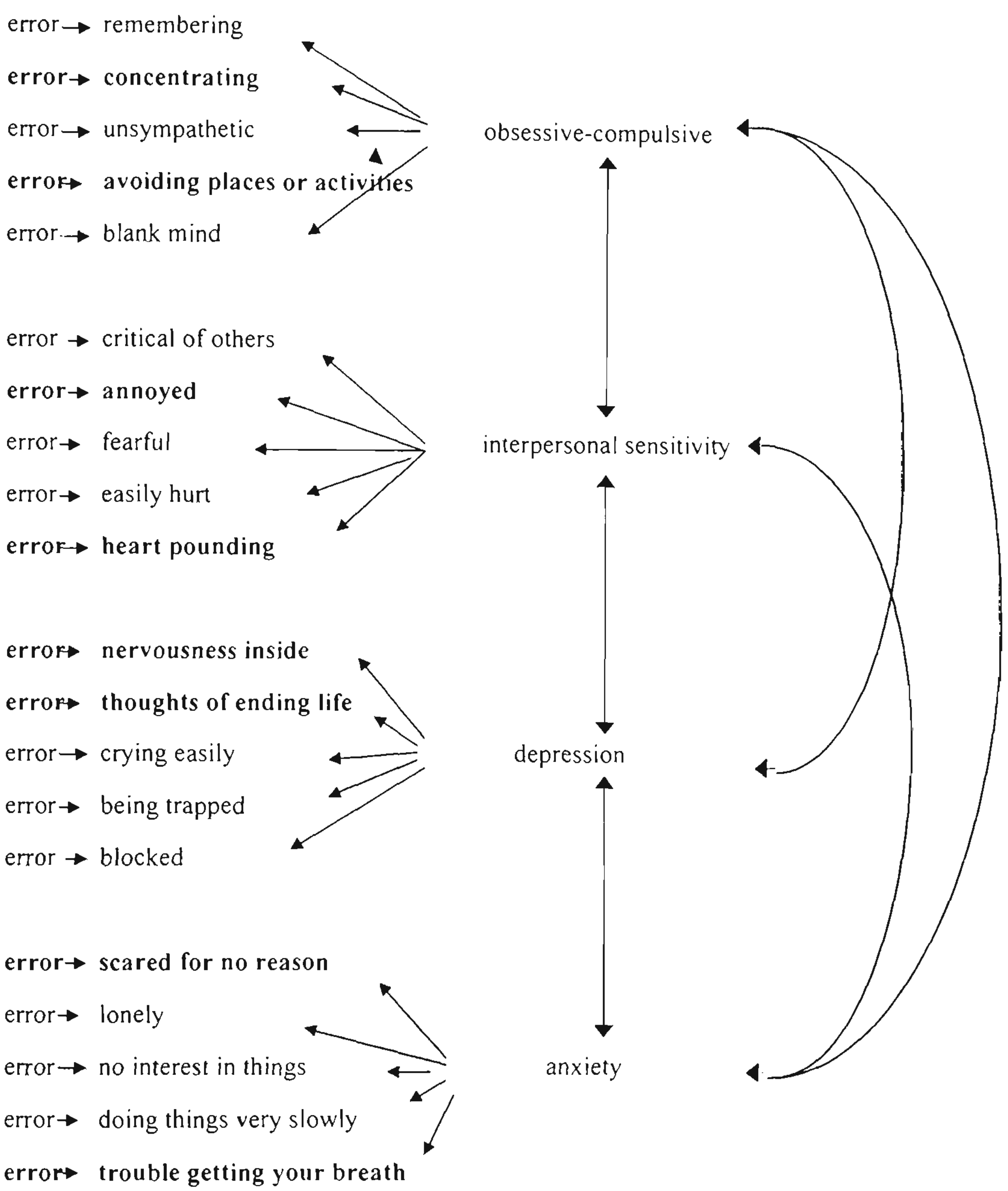
Note: N=458

4.1.2 Psychological Symptoms

The 20 items from the Hopkins Symptom Checklist were tested for reliability using the alpha index. The item score ranged from 1 (disagree) to 5 (agree). The item mean was 1.51 and the scale mean was 30.43. The alpha coefficient of internal reliabilities was .88 for the total sample while the subscales correlations consistently averaged .56.

CFA was conducted on the psychological symptom items to investigate its underlying factor structures. The hypothesised model (20 items) indicated an inadequate fit (Table 4.2). The next step was to detect the source of misfit in the model. The final model consisting of 12 items (see figure 4.2 where bold variables are deleted), fits patterns in the data constructing the psychological symptom variable. The indices (presented in table 4.2) support the fit of the measurement model chosen for psychological symptoms. To build a measurement model for psychological symptoms, factor scores were developed for the obsessive-compulsive, interpersonal sensitivity, anxiety and depression factors, respectively. Factor scores were used as an approximation of the underlying factors. Therefore, the four summative factor scores including obsessive-compulsive, interpersonal sensitivity, anxiety and depression factors, served as the final indicators of the latent psychological symptoms variable. The Cronbach's alpha coefficient for the revised scale was .79. The correlations among subscales ranged from .34 to .65.

Figure 4.2 Summary of Psychological Symptom Variable Construct



Note: bold items were deleted

Table 4.2 Summary of Measurement Model for Psychological Symptoms

Model type	χ2	df	GFI	RMSR
hypothesised model 20 items	739.53	164	.855	.069
final model 12 items	174.47	48	.939	.058

Note: N=458

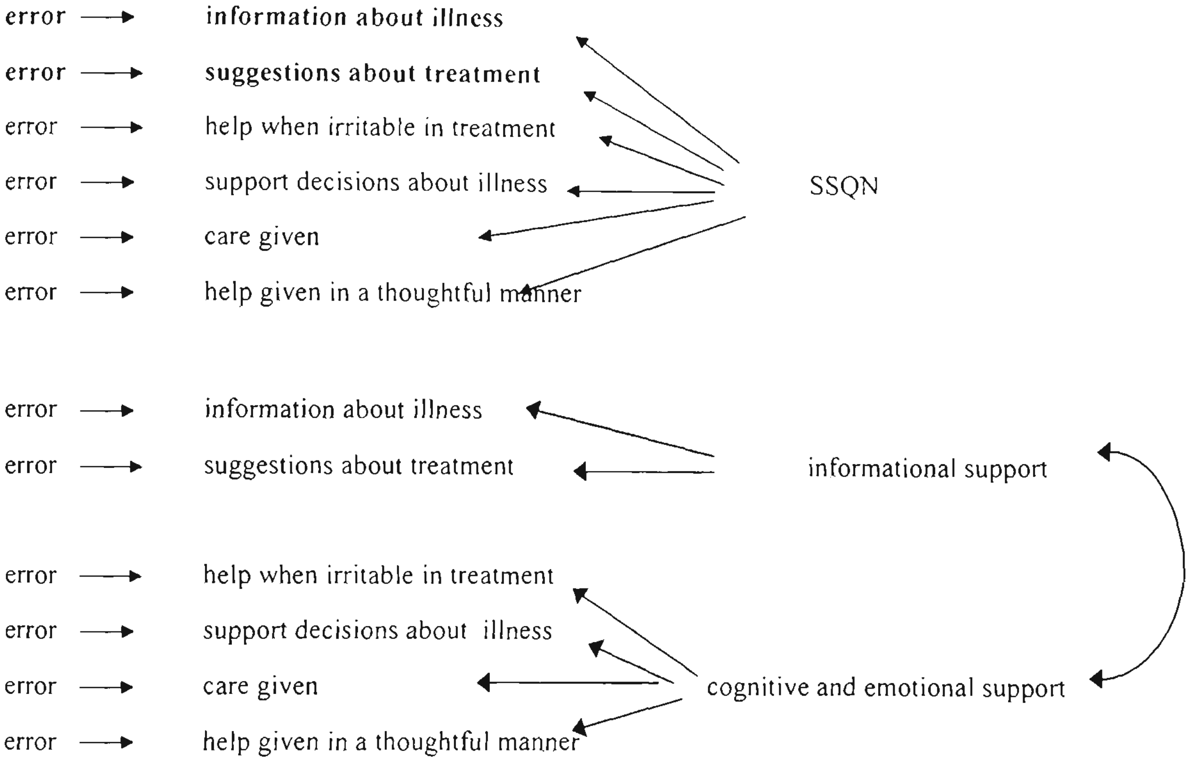
4.1.3 Social Support

The social support variable consisted of 6 items. The SSQN item ranged from 0 to 8 persons. The item of SSQS ranged from 1 (great dissatisfaction) to 6 (great satisfaction). The items mean was 2.62 for the SSQN variable and the item mean of SSQS was 4.99, with the scale mean of 29.95. The reliability of the twelve items was assessed utilising Cronbach's alpha test. A value of .80 was obtained for the total sample. The reliabilities of the SSQN and SSQS scales were .78 and .82, respectively.

According to the pattern of low correlations between these two subscales (r=.149), they may measure different aspects of social support. This pattern was also consistent with findings of Sarason et al. (1983) who reported a correlation of .34. Bagozzi (1980) pointed out that the low correlation between subscales indicated a problem with measurements and construct validity, and suggested a need to consider these as separate constructs. Broadhead et al. (1983) suggested that because the quality and quantity of social support are minimally intercorrelated, it may be inappropriate to combine them into summary measures. Subsequently, a CFA was then performed to test the validity for each scale separately (see figure 4.3).

The initial SSQN indicated an inadequate fit. The nonsignificant and low reliable parameters were deleted. The final SSQN variable consisted of 4 items while the final SSQS variable consisted of 6 items. The two summative factor scores including informational and emotional support indicated better fit than the one summative factor score of SSQS. Therefore, these two summative factor scores served as the final indicators of the latent social satisfaction variable. The alpha coefficients for the revised scale of the SSQN and SSQS were .80 and .82. The goodness of fit for the model is presented in table 4.3.

Figure 4.3 Summary of Social Support Variable Construct



Note: bold items were deleted

Table 4.3 Summary of Measurement Model for Social Support

Model type	χ2	df	GFI	RMSR
SSQN 6 items	213.79	9	.858	.136
SSQS 6 items	84.89	9	.941	.054
the final SSQN 4 items	23.16	2	.977	.048
the final SSQS 6 items (2 factors)	28.90	8	.981	.031

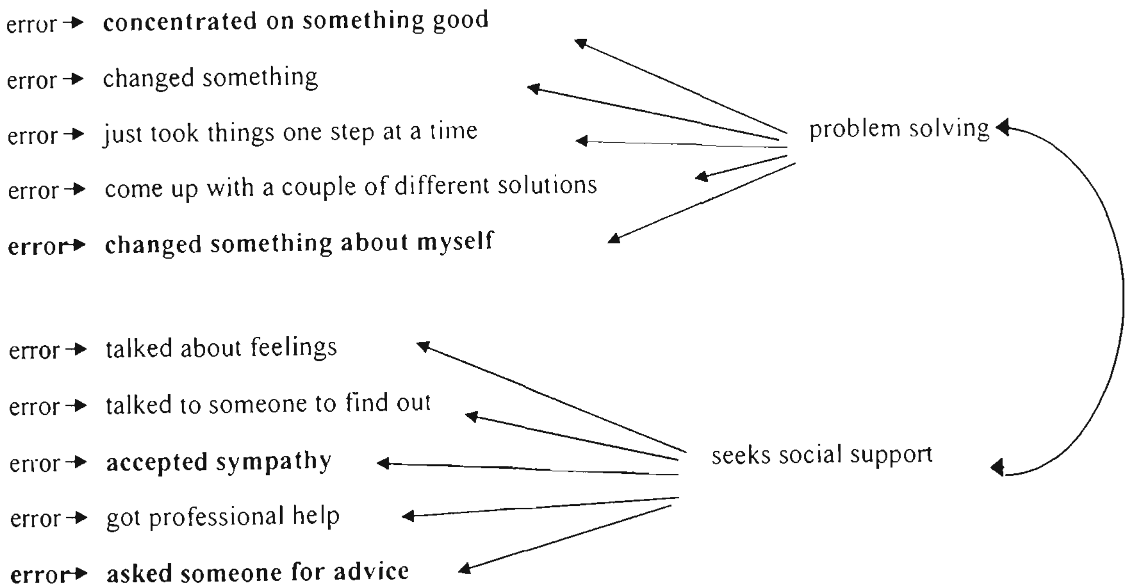
Note: N=458

4.1.4 Coping Skills

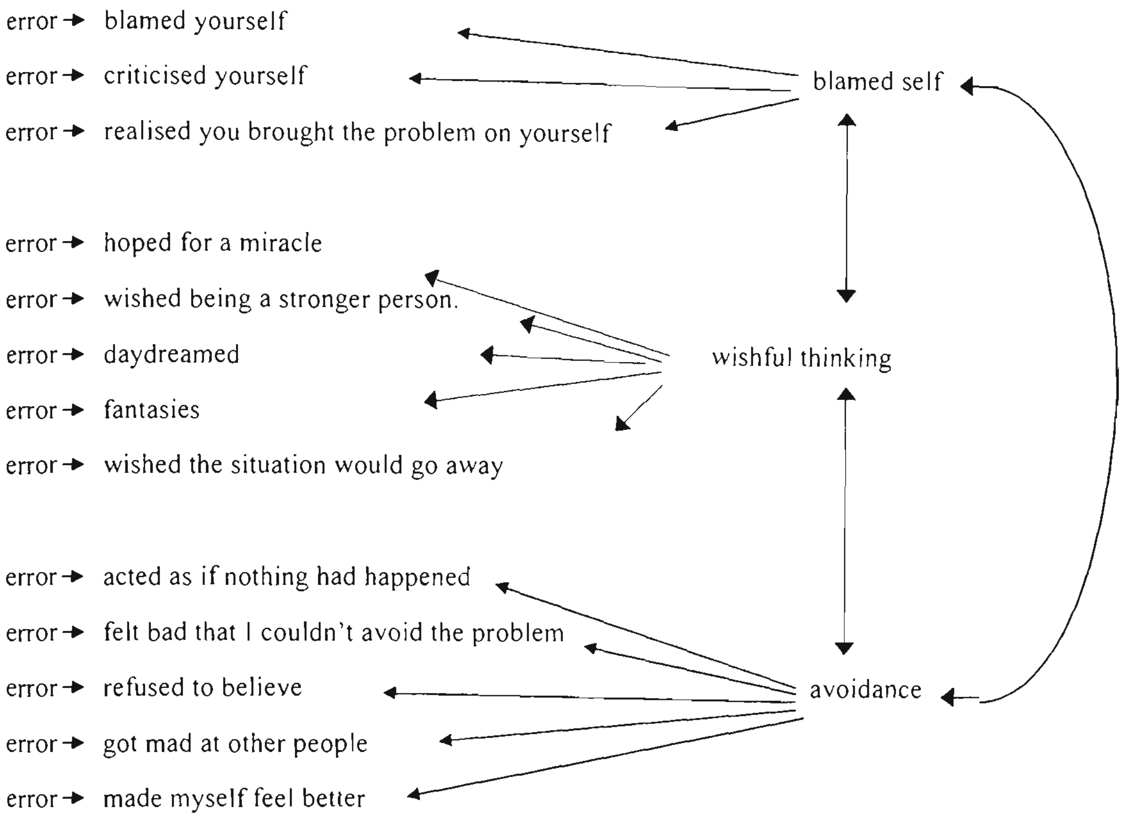
The 23 items from the Ways of Coping Questionnaire were tested for reliability. The item scores ranged from 1 (disagree) to 4 (agree). The item mean was 2.52 for the total sample. These items form 5 factors to serve as indicators of the latent coping skills variable. The alpha coefficient of internal reliability was .79. The initial model indicated an inadequate fit. The results indicated that the loading and reliability of many observed measures were unacceptable. A number of studies within the context of behavioural research (e.g., Billings & Moos, 1981; Endler & Parker, 1990; Forsythe & Compas, 1987; Vitaliano et al., 1985, 1990a) utilised two subscales consisting of problem-and emotion-focused coping. Accordingly, the coping skill scale was then divided into these two variables. The 10 items from the problem-solving and seeking-support subscales formed the latent problem-focused coping variable. The 13 items from the self-blame, avoidance and wishful-thinking subscales formed the latent emotion-focused coping variable.

The alpha coefficient for problem-focused coping variable was .87 while the emotion-focused coping was .61. These alpha coefficients just exceed Nunnally's (1978) .50 to .60, minimum criteria. Other authors suggested that the reliability coefficient should be close to .70 (e.g., Hair et al., 1995, p. 641). The reliability coefficient obtained for emotion-focused coping was comparable to those found in the literature (Billings & Moos, 1981; Blankfeld & Holahan, 1996; Edwards & Baglioni, 1993; Folkman & Lazarus, 1985; Holahan et al., 1995). However, when testing for construct validity, the coefficient of determination for the model was less than .10, indicating that observed variables do not explain enough of the variance of the latent variable. Hence, the emotion-focused coping items were not used in this study. The initial model of the problem-focused coping variable indicated an inadequate fit. The nonsignificant parameters were deleted. The final 6 items from the problem-solving and seeking support subscales served as indicators of problem-focused coping. The χ^2 overall fit of the final models is presented in Table 4.4. The Alpha coefficient for the revised scales of problem-focused coping was .80.

Figure 4.4 Summary of Coping Skill Variable Construct



Note: bold items were deleted



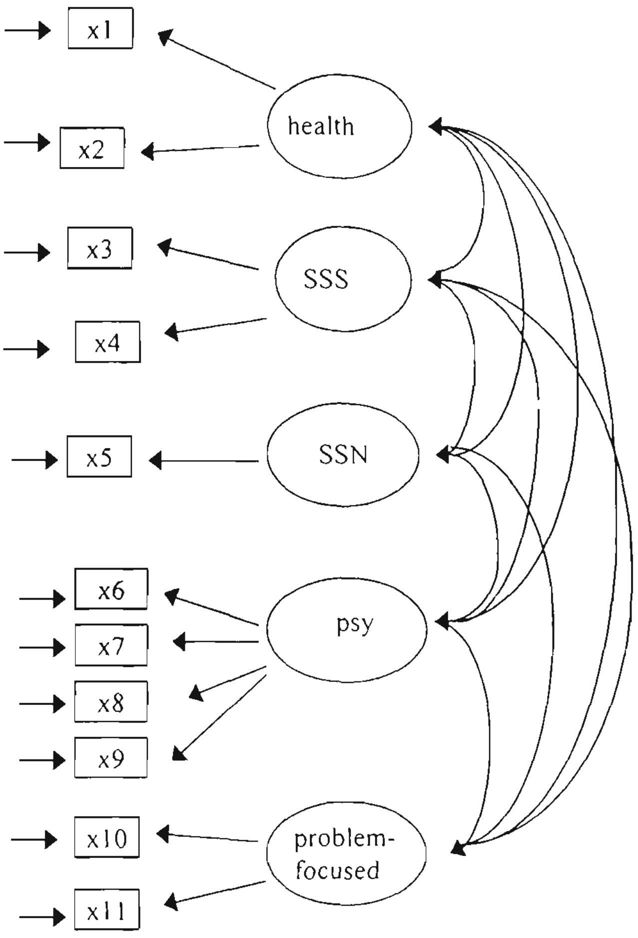
Note: emotion-focused coping was not utilised

Table 4.4 Summary of Measurement Model for Coping skills

Model type	χ2	df	GFI	RMSR
hypothesised model 23 items	795.96	220	.852	.072
final problem-focused 6 items	44.70	8	.969	.043

Once the measurement model was estimated for each construct separately, the model for all the constructs without constraining the covariance matrix of constructs was performed (figure 4.5). In this model, no correlations between error terms were included. This step was to assess the relation between measurement structures as described by Herting (1985) and Jöreskog (1993). This model as presented in Table 4.5 fits the data well.

Figure 4.5 Confirmatory Factor Analysis of All Constructs



Note: health=health symptoms; sss=support satisfaction; ssn=number of support persons; psy=psychological symptoms; problem-focused=problem-focused coping

Table 4.5 Result of Confirmatory Factor Analysis of All Constructs

Model type	$\chi 2$	df	GFI	AGFI	RMSR
initial model	97.76	35	.962	.929	.049

The summary shown in Table 4.6 represents the characteristics of scales used in this study. Table 4.7 summarises the latent variable and their reliability for the total sample. Table 4.8 displays a summary of the alpha coefficients for the separate groups used in the sample.

Table 4.6 Summary Characteristics of Scales in Total Sample and the Separated Three Groups

Scale	Number of Items	Scale Midpoint	Total Sample mean	Chemotherapy-Time 1 Mean	Chemotherapy-Time 2 Mean	Radiotherapy Mean	Total Sample SD	Chemotherapy-Time 1 SD	Chemotherapy-Time 2 SD	Radiotherapy SD
health status	6	9	6.63	7.17	5.96	5.99	3.06	3.26	2.95	2.68
number of person support	4	----	11.52	10.63	14.29	12.59	5.36	5.48	4.45	5.02
support satisfaction	6	18	29.95	29.56	30.59	30.76	3.60	3.85	2.95	3.22
psychological status	12	30	18.63	19.09	16.82	18.08	4.86	5.09	4.39	4.53
problem-focused coping	6	12	16.60	16.53	17.49	16.67	3.64	3.58	3.50	3.71

Table 4.7. Summary of Data Collection Instruments, Reliabilities and Validities for Total Sample and the Second Chemotherapy Test

Variable	Measurement	Crobach-Alpha Reliability of Composite	GFI for Total Sample	GFI for the Second Chemotherapy Test[1]
health status	six-four point Likert items	.73	.967	.930
psychological status	twelve-five point Likert items	.79	.939	.878
social support:				
number of support	open end four items	.80	.977	.902
support satisfaction	six-six point Likert items	.82	.981	.915
coping skills:		.80	.969	.948
problem-focused coping	six-four point Likert items			

Note: n=458

---

[1] The measurement model for the second chemotherapy test was performed after the measurement model for the total sample had been established.

Table 4.8 Summary of Instrumental Reliability Used in a Separate Group of the Samples

Variable	Chemotherapy Time 1	Chemotherapy Time 2	Radiotherapy
health status	.77	.78	.67
psychological status	.81	.80	.77
number of support	.79	.79	.81
support satisfaction	.83	.82	.79
problem-focused coping	.79	.81	.82

Note: n=249, 158 and 209, respectively

4.2 Analysis Part 1: Model Testing

This section presents the results of model testing. The results are composed of the three following analyses: (4.2.1) the assumptions of LISREL, (4.2.2) identification of the LISREL model, (4.2.3) analysis one: cross-section, (4.2.4) analysis two: multi-sample analysis, and (4.2.5) analysis three: two-wave model.

4.2.1 The Assumptions of LISREL

Once the reliability and validity of the indicators as well as the measurement models were specified, the final structural equation model was drawn using LISREL. Before proceeding with identifications and estimations, a check was made to determine if the observed variables met the statistical assumptions required to utilise the LISREL approach in data analysis. Billings and Wroten (1978) and Saris and Stronkhorst (1984) mentioned that conditions which associated linearity, additivity, identical parameters with all cases, independent observations, interval measurement and multivariate normality, as well as the appropriateness of a theoretical model must be satisfied. They also advised about special problems which may arise due to intercorrelations among the variables. They claimed that multicollinearity produced several interrelated problems such as computational errors in determining the least squares solution. The standard error of the regression weight may also become large, making it difficult to reject the hypotheses. The actual size of the regression may vary greatly from sample to sample.

The assumptions of the theoretical model were presented prior to estimations being met. The causal model in this study was developed through an extensive review of attribution theory studies. The sample was also drawn from the population of participants receiving chemotherapy or radiotherapy in Thailand. As the structural equation modelling shares the assumptions of the linearity and multivariate method, the latent variables were tested against these assumptions. The tests require two steps. Firstly, each variable was tested for univariate analyses which indicated that health status, coping skills and social support variables were normally distributed. The psychological symptoms indicators were positively skewed which indicates non-normal distribution. This was due to all participants recruited being fully active or mildly symptomatic. This deviation was viewed as a major violation of the structural equation model assumption. However, the commonly used estimation procedures such as maximum likelihood are robust to violations of normality in large samples but the chi-square test and standard errors may not be accurate (Farrell, 1994). Secondly, a bivariate scatterplot of observed variables demonstrated that linear relationships were held between all variables. All the observed variables were interval in nature, the covariances were, therefore, utilised in the input matrix.

The degree of multicollinearity was assessed by examining the correlation matrix and through the use of multiple regression. The results showed that the tolerance and variance inflation factor values (VIF) indicate inconsequential collinearity.

4.2.2 Identification of the LISREL Model

Before proceeding with the estimation of the structural equation model, it was necessary to demonstrate that the model was identified. The necessary condition for identification is that the number of parameters estimated must be smaller than or equal to:

$$\frac{1}{2}n(n+1) \qquad \text{where n is number of observed variables.}$$

Alternatively, a necessary condition for the identification of structural equation models is that the degree of freedom should be equal to or larger than zero, that is $df \geq 0$ (Saris & Stronkhorst, 1984).

Each of the GHQ, SSQS and problem-focused coping estimates consisted of 2 factors. The SSQ-N consisted of 1 factor, while the psychological symptom variable consisted of 4 factors. The hypothesised model had 11 variables or 66 distinct variances and covariances in the input correlation matrix. There are 30 parameters that had to be solved. Thus, df=36 implied that the first necessary condition for identification had been fulfilled. However, models which pass the necessary condition test may still be unidentified. Sufficient conditions for identification must be fulfilled meaning all of the model parameters can be uniquely determined by Σ by means of the equation $\Sigma = \Lambda\Phi\Lambda' + \Theta_\delta$ (Bollen & Jöreskos, 1985) Where Λ is the matrix of factor loadings of ξ, Λ' is the transpose of this matrix and Θ_δ is a q×q diagonal matrix containing the variance of δ in the main diagonal. If two or more sets of parameters are consistent with the same Σ, the model is not identified.

The identification procedure can be achieved by setting the matrices through either fixing the variance of the factors or fixing one loading on each factor to a non-zero value. The method used for this study was using a fixed value of 1.0 in each column of Λ. By fixing a loading to 1.0. the common factor is given the scale of the observed variable. For the latent variables which have only one indicator. the path from the construct to its measured variable equals one. The amount of random error variance (δ, ε) is the quantity one minus the reliability as recommended by James, Mulaik, and Brett (1982) and Kenny (1979), and applied by Cramer et al. (1996). Therefore, the model meets the necessary and sufficient requirement for the identification and parameter estimates to be accepted as unique.

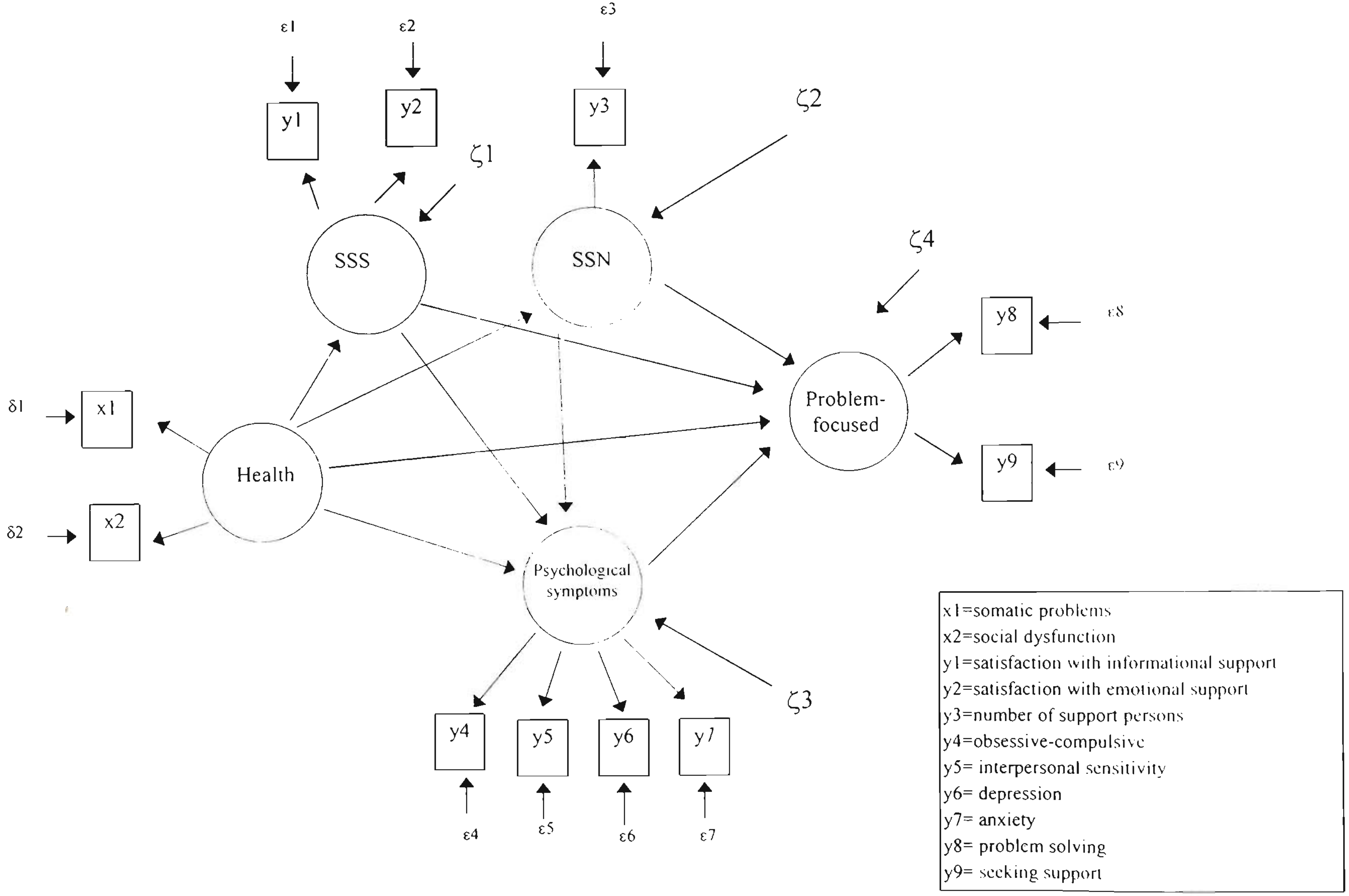
4.2.3 Analysis One: Cross-Sectional Analysis

This part of the study is a cross-sectional analysis used to examine the relationship between health status, social support, psychological symptoms and coping skills in Thai participants receiving chemotherapy and radiotherapy, separately. The causal modelling approach was used to investigate the hypothesised model. The sample consisted of participants from the initial chemotherapy test (n=249), the second chemotherapy test (n=158), and radiotherapy (n=209). These three groups were estimated separately.

4.2.3.1 Estimation of the Structural Equation Model

In estimating the model in figure 4.6. the structural equation model was estimated by inputting the covariance matrix with its 11 observed variables. The matrix specification for the model is shown in Appendix D.

Figure 4.6 A Complete Latent Variable Model



x1=somatic problems
x2=social dysfunction
y1=satisfaction with informational support
y2=satisfaction with emotional support
y3=number of support persons
y4=obsessive-compulsive
y5= interpersonal sensitivity
y6= depression
y7= anxiety
y8= problem solving
y9= seeking support

The next step was to test the specification of the fixed parameters of the model. These were not significant. The LISREL output also provided the *t*-value indices indicating that the coefficients were significantly different from zero. In order to simplify the obtained model, the parameter coefficient was fixed at zero when that parameter was smaller than .05 and their *t*-values were smaller than 1.96. The chi-square statistic used for this test was the difference chi-square which is equal to the difference between the goodness-of-fit chi-square statistics obtained for the initial model and the more restricted model. If the difference chi-square test comparing the model was not significant, then the more restricted model would be accepted.

4.2.3.2 Results

Table 4.9 presents the chi-square and the goodness of fit indices for the model in three sample groups compared with the more restricted models.

Table 4.9 Chi-square Statistical and Goodness of Fit Indices for Model Testing

Group/Model	χ^2	**Prob. level**	**df**	$\Delta\chi$	**GFI**	**AGFI**	**RMSR**
Chemotherapy Time 1							
model 1: initial model	63.92	<.01	36	---	.955	.917	.051
model 2: fix β_{32},	63.95	<.01	37	.03	.955	.919	.051
model 3: fix β_{32}, and β_{31}	64.67	<.01	38	.72	.954	.920	.053

Table 4.9 (continued)

Group/Model	χ^2	**Prob. level**	**df**	$\Delta\chi$	**GFI**	**AGFI**	**RMSR**
<u>Chemotherapy Time 2</u>							
model 1: initial model	34.11	>.55	36	---	.962	.931	.053
model 2: fix β_{31}	34.11	>.60	37	.00	.962	.933	.053
model 3: fix β_{31}. γ_{21}	34.24	>.64	38	.13	.962	.934	.054
model 4: fix β_{31}, β_{43}, and γ_{21}	34.38	>.68	39	.14	.962	.936	.054
<u>Radiotherapy</u>							
model 1: initial model	83.85	<.001	36	---	.936	.882	.071
model 2: fix β_{31}	83.85	<.001	37	0	.936	.885	.071
model 3: fix β_{31}, β_{42},	83.91	<.001	38	.04	.936	.888	.071
model 3: fix β_{31}, β_{42}, and β_{41}	87.54	<.001	39	3.63	.933	.887	.071

Note: Fix =constrainted at 0

The chi-square value for the first chemotherapy and radiotherapy models did not confirm or fit the pattern in the data. However, as indicated in the treatment of data section in the previous chapter. this study considered the goodness of fix index (GFI), adjusted goodness of fix index (AGFI), root mean square residual (RMSR), and chi-square ratio to the indicate criteria for model acceptance or rejection. Therefore, the initial chemotherapy and radiotherapy models indicated an adequate fit to the data, while the second chemotherapy model indicated a good fit. When the degrees of freedom were taken into account, the goodness of fit of the radiotherapy model decreased (AGFI=.887). Furthermore, in all groups, the chi-square difference of the restricted model was not significant in its difference of degree of freedom (df) (see Table 4.9). This is statistically significant at the 0.05 level. Therefore, the more restricted model would be accepted. The results of the standardised path coefficients, goodness of fit indices and standard errors for the three groups of the sample, are listed in Table 4.10.

Table 4.10 Estimated Standardised Coefficient, Goodness of Fit Indices and Standard Errors

	Chemotherapy Time 1	Chemotherapy Time 2	Radiotherapy
health status to support satisfaction (γ_{11})	-.205** (.134)	-.207* (.131)	-.247** (.214)
health status to number of support persons (γ_{21})	-.189* (.132)	----	-.689** (.317)
health status to psychological symptoms (γ_{31})	.789** (.189)	.424** (.110)	.663* (.427)
health status to problem focused coping (γ_{41})	.332 (.370)	.251* (.119)	.662** (.325)
support satisfaction to psychological symptoms (β_{31})	-----	-----	-----
number of support persons to psychological symptoms (β_{32})	------	-.169* (.070)	.286 (.164)
support satisfaction to problem-focused coping (β_{41})	.273* (.089)	.209 (.097)	-----
number of support persons to problem-focused coping (β_{42})	.284** (.075)	.366** (.091)	------

Table 4.10 (continued)

	Chemotherapy Time 1	Chemotherapy Time 2	Radiotherapy
psychological symptoms to problem-focused coping (β_{43})	-.492* (.274)	------	.263* (.192)
Ψ_1	1.10	1.15	1.73
Ψ_2	.771	.800	.425
Ψ_3	.200	.313	.319
Ψ_4	.435	.374	.474
χ^2	64.67	34.38	87.54
df	38	39	39
GFI	.954	.962	.933
AGFI	.920	.936	.887
RMSR	.053	.054	.071

Note: *significant at $p \leq .05$, **$p \leq .01$ level, two-tailed.

standard errors are beneath path coefficients

The results from Table 4.10 indicate that the pattern of parameter estimates of the chemotherapy and radiotherapy participants was in the same direction except for the path of the number of support persons to psychological symptoms (β_{32}) and the path of psychological symptoms to problem-focused coping (β_{43}). In the second chemotherapy test, the number of support persons was negatively related to psychological symptoms. However, this path was not significant in the initial chemotherapy and radiotherapy tests. The path from psychological symptoms to problem-focused coping was negative in the initial chemotherapy test. It was positive in the radiotherapy test but not significant in the second chemotherapy test. In addition, the path from support satisfaction to psychological symptoms was not significant in all groups. Moreover, psychological symptoms and problem-focused coping variables were mostly explained by the variable in the model, as the unexplained variance was small.

4.2.4 Analysis Two: Consistency of the Model: Multi-Sample Analysis

This analysis provided a test of whether the hypothesised model was identical for the same population at a different time point as well as in a different population. The sample consisted of the participants in each group and was analysed using the multi-sample analysis method.

4.2.4.1 Estimation of the Structural Equation Model

In this analysis, the structural equation model was estimated by inputting the covariance matrix with its 22 observed variables (2 groups at the same time). The structural model and matrices specification were also the same as analysis one (figure 4.6). The test began with determining whether the same model form was appropriate for the chemotherapy and radiotherapy tests as well as the first and second chemotherapy tests. Finally, the sequence of analyses explained in chapter 3 (cf. pp. 128-129) was performed.

4.2.4.2 Results

The results of the chi-square and goodness of fit indices for testing the consistency of the model across groups and time are shown in Table 4.11 and 4.12.

Table 4.11 Tests Invariance of Path Model for Chemotherapy Time 1 and Radiotherapy

Hypothesis	χ^2	df	$\Delta\chi$	GFI	
				Chemo Time 1	Radiotherapy
H_{form}	147.77	72	---	.955	.936
H_{Γ}	165.01	76	17.24**	.949	.929
$H_{\Gamma B}$	171.17	81	6.16	.948	.924
$H_{\Gamma B \Theta \varepsilon}$	186.25	89	15.08	.947	.915
$H_{\Gamma B \Theta \varepsilon \Psi}$	196.58	93	10.33*	.942	.913

Note: * p<.05, **p<.01

Table 4.12 Tests Invariance of Path Model for Chemotherapy Time 1 and Time 2

Hypothesis	$\chi 2$	df	$\Delta\chi$	GFI	
				Chemo Time 1	Time 2
H_{form}	98.03	72	---	.955	.962
H_{Γ}	101.69	76	3.66	.954	.960
$H_{\Gamma B}$	114.97	81	13.28*	.949	.953
$H_{\Gamma B \Theta \varepsilon}$	122.44	89	7.47	.947	.946
$H_{\Gamma B \Theta \varepsilon \Psi}$	125.81	93	3.37	.946	.945

Note: * p<.05

The model for the study specified the same pattern of fixed and free parameters, but estimated these parameters separately within each group. The chi-square of 72 df for the model was 147.77 and 97.03 for different groups and different times, respectively. The goodness of fit indices were .955 and .936 for the initial chemotherapy and radiotherapy tests, and .955 and .962 for the first and the second chemotherapy tests, respectively. The H_{form} hypothesis showed a good match even though the overall chi-square value was significant. All the goodness of fit measures provided strong evidence that the same model form held for both groups and times.

The next hypothesis H_{Γ} has an acceptable fit. The chi-square difference of H_{Γ} and H_{form} was 17.24 and 3.66 with 4 df and was statistically significant (α=0.01) between the first chemotherapy and radiotherapy tests. The other measures shows little deterioration in fit by imposing H_{Γ}. This means that the health status influence on other variables appears equal for chemotherapy participants in both the first and second chemotherapy tests, but not for the radiotherapy test.

$$\Gamma_{(1)} \begin{vmatrix} -.29 \\ -.29 \\ .71 \\ .40 \end{vmatrix} \quad \Gamma_{(2)} \begin{vmatrix} -.75 \\ -1.15 \\ .65 \\ -1.05 \end{vmatrix} \qquad [10.1]$$

The $\Gamma(1)$ and $\Gamma(2)$ in the matrix 10.1 above represent the path coefficient from health status to other variables for the initial chemotherapy and radiotherapy tests, respectively. The Matrices show that the large differences in $\Gamma(1)$ and $\Gamma(2)$ were for the coefficients of health status to satisfaction of support and number of support persons, while the coefficient of health status to problem-focused coping was in a different direction.

Adding a restriction on B leads to $H_{\Gamma B}$ shown in the matrix 10.2. The chi-square difference was 6.16 and 13.28 for different groups and time. The overall fit measured in the GFI in chemotherapy groups was slightly higher for H_{Γ} than for $H_{\Gamma B}$. The chi-square difference between H_{Γ} and $H_{\Gamma B}$ was a significant 13.28 with 5 df. This indicated that the coefficients in B between the initial and second chemotherapy tests were not equal. The largest difference in B for the initial and second chemotherapy tests was obtained from the coefficient of psychological symptoms to problem-focused coping.

$$B(1)\begin{vmatrix} 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \\ -.04 & -.02 & 0 & 0 \\ .20^{*} & .23^{*} & -.57^{*} & 0 \end{vmatrix}$$

$$B(2)\begin{vmatrix} 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ .01 & -.13 & 0 & 0 \\ .14^{*} & .29^{*} & .02 & 0 \end{vmatrix} \qquad [10.2]$$

Note: *=significant at $p<.05$

The next hypothesis $H_{\Gamma B \Theta \varepsilon}$ added the constraint that the measurement error variances were equal for different groups and different times. The chi-square for the model was 186.25 and 122.44 with 89 df. The chi-square difference of $H_{\Gamma B}$ and $H_{\Gamma B \Theta \varepsilon}$ was a non-significant 15.08 and 7.47 with 8 df. There was also a small change in model fit when equality constraint for Θ_{ε} was added to $H_{\Gamma B}$. The assumption that the error variances are equal for the different groups and times was tenable.

The $H_{\Gamma B \Theta_{\varepsilon} \Psi}$ led to a chi-square estimate of 196.58 and 125.81 (93 df) and a chi-square difference of 9.33 and 3.37 (4 df) compared to $H_{\Gamma B \Theta_{\varepsilon}}$. The change in the GFI did not reveal a great difference. These results indicated that the equation error variances were identical for the first and second chemotherapy tests but not for the radiotherapy test. The largest difference was obtained from the unexplained variance of satisfaction in the support variables shown in the matrix 10.3.

$$\Psi(1) \quad \begin{vmatrix} .78 & 0 & 0 & 0 \\ 0 & .75 & 0 & 0 \\ 0 & 0 & .10 & 0 \\ 0 & 0 & 0 & .54 \end{vmatrix}$$

$$\Psi(2) \quad \begin{vmatrix} .33 & 0 & 0 & 0 \\ 0 & .72 & 0 & 0 \\ 0 & 0 & .35 & 0 \\ 0 & 0 & 0 & .53 \end{vmatrix} \qquad [10.3]$$

4.2.5 Analysis Three: Stability of Individual Differences

The purpose of this analysis was to examine the stability of each variable in participants receiving chemotherapy. The paired *t*-tests were performed in order to investigate mean level stability while the structural equation model was performed in order to examine the stability of individual differences in each variable. The sample consisted of 158 participants who completed the questionnaire both in the first and second tests.

4.2.5.1 Mean Level Stability

Table 4.13 Mean Level Changes in Variables from Time 1 to Time 2

Variable	Time	Mean	*t* value	df
health status	Time 1	7.02	3.10*	157
	Time 2	5.96		
support satisfaction	Time 1	29.54	2.82**	157
	Time 2	30.59		
number of support	Time 1	10.95	6.01**	157
	Time 2	14.29		
psychological status	Time 1	18.41	3.20**	157
	Time 2	16.82		
problem-focused coping	Time 1	16.75	1.85	157
	Time 2	17.49		

Note: N=158, * p<.01, ** p<.001

As seen in Table 4.13, the mean levels in health status and psychological symptoms decreased significantly from the first to the second test while the remaining levels increased. However, there was no significant increase in problem-focused coping from the initial to the second test.

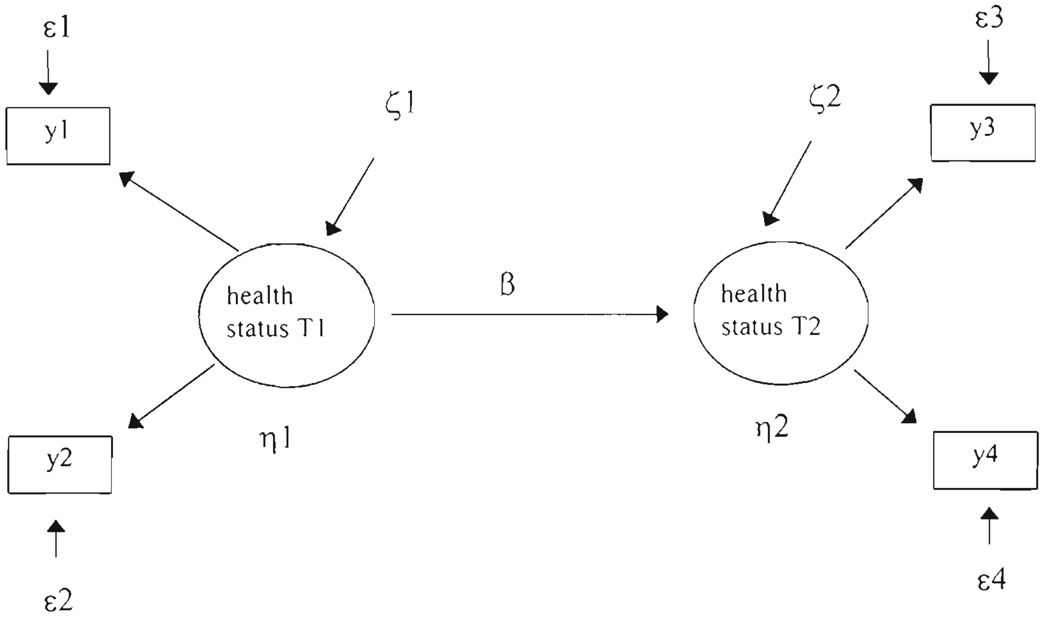
4.2.5.2 The Stability of Individual Differences

The objective of this analysis was to estimate the stability of individual differences in each variable over time, which is reflected in the parameter β.

4.2.5.3 Estimation of the Structural Equation Model

The structural equation model was performed by inputting the covariance matrix. The matrix specification for the health status, satisfaction with support and problem-focused coping models had 4 summative factors, while psychological symptoms had 8 summative factors, and a number of support persons had 2 summative factors. Figure 4.7 shows an example of the model. An example of matrix specification for health status presents in Appendix D.

Figure 4.7 The Stability Model of Health Status Variables



4.2.5.4 Results

The results of parameter estimates and correlation of variables are displayed in Table 4.14.

Table 4.14 Parameter Estimates and Output from the LISREL Analysis

Path	Direct effect	*t*-value	Correlation	Coefficient of Determination	χ^2/df
health status	.565 (.228)	2.48*	.576	.332	4.31/1
number of support persons	.295 (.101)	2.91**	.289	.084	-----
support satisfaction	.254 (.141)	1.80	.188	.035	.09/1
psychological symptoms	.370 (.131)	2.82**	.346	.120	23.16/19
problem-focused coping	.191 (.146)	1.31	.333	111	6.27/1

Note: * p<.05, **p<.01

standard errors are beneath path coefficients

As can be seen from Table 4.14, the model of each variable is acceptable. The β parameter represents the direct effect of the variables from the first test to the second test. The direct path which is significant indicates the stability of variables being tested. The health status, psychological symptom and number of support person variables were stable with a direct path of .565, .370, and .295, respectively. A zero-order correlation of .576, .346, and .289 was also obtained for these three variables. While health status, psychological symptoms, and number of support persons were highly stable over time, support satisfaction and problem-focused coping were not.

Although .254 and .191 of these were direct effects of the support satisfaction and problem-focused coping, neither were significant.

4.3 Analysis Part 2: Bivariate Analysis

This presents the results of Analysis Part Two which is related to the research questions posed in chapter 2. It is divided into two sections: (4.3.1) differences among variables and (4.3.2) differences in socio-economic variables.

4.3.1 Differences Among Variables

The purpose of this analysis was to test for mean differences among groups of participants. Independent group *t*-tests were used to identify group differences (between the first chemotherapy and radiotherapy tests, as well as between the second chemotherapy and radiotherapy tests) in each of the variables. These were completed to determine which groups differed in their health status, social support, psychological symptoms and problem-focused coping. The independent group *t*-tests were utilised because different participants were used in each group. However, when *t*-tests were performed across the groups, using the radiotherapy test twice, the *t*-tests used the .025 level for each comparison in order to control overall error rate at a $p \leq .05$.

The mean of the variables for all participants is shown in Table 4.15. Participants scored relatively highly on all five scales except on number of support persons. Participants displayed a mean perceived health problem score of 6.63 out of 18 possible points with lower scores indicating better health. Furthermore, the mean of psychological symptom scores was 18.63 out of 60, with a minimum of 12 and a maximum of 40. The higher scores indicated the experience of a greater number of symptoms. The support person mean was 11.52 per participant. The average number of support persons listed for each item was 2.88. Specifically, participants listed health care providers as support persons for informational support, whereas family and friends were listed for emotional and cognitive support. The support satisfaction score mean was 29.95 out of 36 with higher scores indicating higher satisfaction with social support. The problem-focused coping mean was 16.60 out of 24 with a higher score signifying the use of more coping strategies.

Table 4.15 Mean of the Variable Scores for All Participants

Variable	Score Ranged	Mean Score
health status	0-18	6.63
psychological symptoms	12-60	18.63
number of support	0-32	11.52
support satisfaction	15-36	29.95
problem-focused coping	6-24	16.60

Note: n=458

In table 4.16, the patterns of variables in each group show that the highest score for perceived health problems was obtained from participants in the first chemotherapy test. This group had the lowest number of support persons and the lowest satisfaction with support, followed by the highest psychological symptoms. They also used the least problem-focused coping strategies.

Table 4.16 Mean of the Variable Scores in Each Group

Variable	Chemotherapy Time 1	Chemotherapy Time 2	Radiotherapy
health status	7.17	5.96	5.99
psychological symptoms	19.09	16.82	18.88
number of support	10.63	14.29	12.59
support satisfaction	29.56	30.59	30.76
problem-focused coping	16.53	17.49	16.67

When comparing chemotherapy and radiotherapy, the results indicate that participants in the first chemotherapy test displayed significantly higher health problem scores (mean=7.17) than the participants in radiotherapy (mean=5.99) (*t* (1,456)=4.21, *p*<.01). There was no significant difference in health problems between the second test of participants receiving chemotherapy (mean=5.96) and those receiving radiotherapy (mean=5.99). These findings indicated that participants in the first chemotherapy test felt more negative about their health than participants in radiotherapy test, while there was no significant difference in perceived health between participants in the second chemotherapy test and those in the radiotherapy group. In contrast, the results indicated significantly higher psychological symptoms in the participants in the radiotherapy test (mean=18.08) than the participants in the second chemotherapy test (mean=16.82) (*t*(1,365)=2.66, *p*<.01). There was no significant difference in psychological symptoms between participants in the first chemotherapy test (mean 19.09) and participants in the radiotherapy test (mean=18.08).

There were highly significant differences in the number of support persons recorded in the treatment groups. Significant differences in the number of support persons were found between the radiotherapy and the initial chemotherapy tests, with *t* (1,456)=4.01, *p*<.001, and between the radiotherapy and the second chemotherapy tests with *t*(1,365)=3.37, *p*<.01. The lowest support person score was found in participants from the first chemotherapy test (mean=10.63), followed by radiotherapy participants (mean=12.59) and chemotherapy participants in the second test (mean=14.29).

There was a significant difference in support satisfaction between participants receiving radiotherapy and the first chemotherapy test group (*t*(1,456)=3.98, *p*<.025). The participants in the first chemotherapy test (mean=29.56) were less satisfied with social support than those in the radiotherapy test (mean=30.76). Conversely, there was no significant difference in social satisfaction between participants in the second chemotherapy test (mean=30.59) and the radiotherapy test (mean=30.76).

There was no significant difference among the groups in problem-focused coping among the groups. The highest problem-focused coping was used by participants in the second chemotherapy test (mean=17.49), followed by the first chemotherapy test (mean=16.53) and the radiotherapy test (mean=16.67).

4.3.2 Differences in Socio-Economic Variables

The study also determined if participants revealed significant differences in health status, social support, psychological symptoms and coping skills across socio-demographic categories. Split-plot ANOVAs were performed for the chemotherapy groups whereas one-way ANOVAs were performed for the radiotherapy group. The split-plot ANOVAs were used in the chemotherapy groups to enable repeated measures on variables to be collected. If a significant *F* ratio was obtained, a posteriori Scheffé test was used to assess each variable at a $p \leq .05$ level in the radiotherapy group. In this analysis, age, marital status, religion, gender, education, occupation and side-effects were independent variables, while health problems, social support, psychological symptoms and problem-focused coping were dependent variables. The full table of the results of this section is located in Appendix D.

The findings indicated that age, marital status and education did not have a statistically significantly differ with respect to health problems, psychological symptoms, social support and problem-focused coping among radiotherapy participants. There were significant differences across age in health problems, satisfaction with support and psychological symptoms for the same participants in the initial to the second chemotherapy test. In the same age across all categories, participants reported an increase in health problems ($F(1,156)=6.35$, $p<.05$) and psychological symptoms ($F(1,156)=12.49$, $p<.01$) from the initial to the second chemotherapy test as well as a decrease in support persons ($F(1,156)=26.09$, $p<.001$) and support satisfaction ($F(1,156)=8.43$, $p<.001$).

There was a significant difference in psychological symptoms according to religion ($F(1,156)=5.65$, $p<.05$). Participants of the Buddhist faith reported a higher level of psychological symptoms than Muslim participants in both the initial and the second chemotherapy tests. Within the same religious categories, psychological symptoms also differed significantly between the initial and the second chemotherapy test (*F*(1,156)=4.89, *p*<.05). Buddhist participants showed a decrease in psychological symptoms from the initial test (mean=17.04) to the second test (mean=17.00), whereas Muslim participants displayed an increase in psychological symptoms from the initial test (mean=15.45) to the second test (mean=15.73). However, the interaction of religion and chemotherapy did not have an influence on psychological symptoms. Buddhist participants reported a decline in the number of support persons and satisfaction with support from the first chemotherapy test to the second test. Conversely, Muslim participants reported a rise in both social support variables.

A significant difference in the number of support persons according to gender (*t*(1,208)=5.2, *p*<.05) was found among radiotherapy participants. Females (mean=13.14) reported a higher number of support persons than males (mean=11.46). Moreover, in chemotherapy, while females experienced a decrease in health problems and social support from the first to the second test, males reported an increase.

Significant differences in support satisfaction, psychological symptoms and problem-focused coping were observed across occupational categories. However, no significant difference was observed in health problems and number of support persons. Among chemotherapy participants, occupation had a significant effect on support satisfaction (*F*(5,152)=2.98, *p*<.01) and on psychological symptoms (*F* (5,152)=2.84, *p*<.05). The highest level of support satisfaction was reported by civil servant participants while the lowest level of support satisfaction was reported by worker participants, both in the initial test and the second test.

Civil servants reported the highest psychological symptoms, whereas, farmers reported the lowest level of psychological symptoms. Within the same occupation categories, there were significant differences in psychological symptoms (*F*(1,152)=10.78, *p*<.01) and in support satisfaction (*F*(1,152)=8.96, *p*<.01) between the first chemotherapy test and the second. Participants reported higher levels of support satisfaction and lower levels of psychological symptoms in the first test than the second test, except in the worker category. The interaction effect of chemotherapy and occupation was significant for support satisfaction (*F*(5,152)=2.49, *p*<.05) and for psychological symptoms (*F*(5,152)=2.53, *p*<.05).

Occupation had a significant effect on problem-focused coping in the chemotherapy (*F*(5,152)=2.97, *p*<.01) and radiotherapy groups (*F*(5,204)=2.84, *p* <.05). Civil servants used the highest level of problem-focused coping, whereas business participants used the lowest, both in the initial and second test. Among radiotherapy participants, civil servants utilised significantly more problem-focused coping (mean=18.30) than unemployed participants (mean=13.91). Within the same occupation categories, problem-focused coping differed significantly between chemotherapy groups in the first and second tests (*F*(1,152)=4.58, *p*<.05). Women who worked at home and the unemployed decreased their use of problem-focused coping from the first test to the second test, whereas, civil servants increased their use of problem-focused coping from the first test to the second test. The interaction effect of occupation and chemotherapy was not significant in problem-focused coping.

The analysis showed significant differences in health problems and social support variables for side-effects. In chemotherapy, a significant difference was found in health problems according to side-effects (*F*(4,153)=3.00, *p*<.05). The lowest health problems were reported by hair loss participants, whereas, the highest health problems were experienced by nauseated participants. However, health problems did not significantly differ between the first and the second chemotherapy tests for side-effects categories. The interaction effect of chemotherapy and side-effects was not significant in health problems.

In radiotherapy, it was shown that side-effects had a significant effect on health problems (*F*(4,205)=6.12, *p*<.001), the number of support persons (*F* (4,205)=10.65, *p*<.001) and satisfaction with support (*F*(4,205)=3.12, *p*<.05). Significant differences in health problems were found between nausea only and nausea and vomiting categories, between no side-effects and nausea and vomiting categories, as well as no side-effects, and nausea, vomiting and hair loss categories. Furthermore, the highest number of support persons was reported by nausea participants, while the lowest number of support persons was reported by participants who experienced nausea, vomiting and hair loss. Participants who experienced only nausea reported significantly higher support satisfaction than participants who experienced hair loss.

4.4 Discussion

4.4.1 Model Testing Discussion

The standardised path coefficients displayed in Table 4.10 for the gamma and beta matrices indicated the effects and the directional hypotheses formulated in chapter 2. Hypothesis one was strongly supported for all three groups of the sample.

That is, a substantial significant negative relationship was found between perceived health problems and satisfaction with support. This result was supported by several research studies (e.g., Choi & Wodarski, 1996; Hall et al., 1993; Hyduk, 1996). Possible explanations for the negative relationship are that patients with more health problems judged their support more negatively (Kessler et al., 1985) or due to unmet expectations of support (Fiore, Becker & Coppel, 1983).

In the literature review, Fincham (1983) found that among room mates, lower satisfaction was associated with blame directed towards another person and stable causal attributions for the conflict. Attribution errors constitute another possible basis for the development of relationship dissatisfaction and conflict. For example, making dispositional attributions for interpersonal events could lead to higher levels of dissatisfaction (Newman & Langer, 1988).

High health problems may affect patients' attitudes and cause them to blame others (Hall et al., 1993). Further, Fincham (1983) pointed out that blaming the other person effects the levels of satisfaction. For this reason, participants with high health problems were prone to be pessimistic and generally dissatisfied. This relationship may result from the prognosis. For example, cancer patients with a poor prognosis may receive less social support than those with better physical health (Bloom et al., 1991a; Wortman, 1984).

With regard to the research hypothesis, health problems were negatively related to the number of support persons. This result reinforced the idea that cancer patients reported high levels of social contact avoidance from friends and others

(Dakof & Taylor, 1990; Wortman & Dunkel-Schetter, 1987). The results may also be due to difficulty with communication and avoidance or fear by others (Willey & Silliman, 1990). Besides, patients may react with denial by having less contact with people, as patients guard themselves against emotions (Koster & Bergsma, 1990).

The negative relationship between health problems and support satisfaction and support persons may result from patients having lower levels of social activity, therefore leading to less person support. Moreover, Thai people normally do not discuss their private lives with others outside the family, and the stigma attached to cancer is great. As a consequence, intense fears of the stigma associated with cancer may make it difficult for patients to obtain support. In agreement with Cramer et al. (1996), patients with deteriorating health may withdraw from supportive others or select to be with less supportive others, depending on their own behaviour. This notion was congruent with the second chemotherapy test results where patients had low levels of health problems. Health problems did not decrease the number of support persons.

The positive link between health problems and psychological symptoms was strongly supported. There was substantial support in that the participants who felt their health was worsening tended to experience an increase in psychological distress compared to participants who felt their health was getting better. This finding reinforced the conclusion reached in an earlier study conducted in the health behaviour literature by Lefcourt et al. (1984). They found that negative life events have a significant effect on mood disturbance.

This finding was consistent with those of Leventhal et al. (1984) in that patients had high levels of distress when treatment made them feel as if they were deteriorating rather than getting better. This positive relationship may result from participants trying to control their situations which can increase the intensity of emotional reactions. As Amirkhan (1990) pointed out, patients who have more control may have more distress. Another important point is that Thai participants know little about their disease and treatment (Thanaprasertgorn & Nilchaikovit, 1997). This fact may lead to an ambiguity and uncertainty about their situations. Such situations can lead to high levels of psychological distress.

Hypothesis three proposed that perceived health problems would be positively related to problem-focused coping. This result may be reflected in participants' efforts to cope with and control their health problems. The study was congruent with Hilton (1989) who found that stress was positively related to self-control, planful problem solving and cancer patients seeking social support.

Support satisfaction had little impact on psychological symptoms. This finding contradicted Lefcourt et al. (1984) who found that social support was negatively related to mood disturbance. Furthermore, Lefcourt et al. showed that the effect of negative life events and mood disturbance were substantially reduced by social support for those who were internal for affiliation, internal for achievement, less generally affiliative and more highly autonomous.

These findings were opposed to those of Bloom et al. (1991a) who showed that emotional support and family support were predicted to decrease depression and mood distress of long-term cancer patients. The present study corroborated Lakey and

Cassady (1990) who found that support was not significantly associated with psychological distress. One explanation is that Thai participants may not receive informational and emotional guidance for their problems because they are not prone to talking about their psychological states. Besides, the lack of direct effect of social support on psychological symptoms may derive from social support acting as a stress buffer, whereas the present study tested for the main effects. Also, this study utilised the global effect of social support which may have influenced the results of this relationship since not all types of support were equally effective in reducing distress.

A statistically significant negative causal relationship was found between the number of support persons and psychological symptoms in participants receiving chemotherapy at the second testing, but not in the initial testing or in participants receiving radiotherapy. This result confirmed Bloom et al.'s results (1991a) where the size of a social network was not related to psychological well-being. Wortman (1984) argued that small networks characterised by close relationships may be the most supportive in times of crisis. Therefore, the relationship between network and distress might not be found. The unexpected result in the second chemotherapy test indicated a negative relationship may have occurred because participants in the second chemotherapy test had lower health problems than those of the other two groups. That is, when participants experienced a decrease in health problems, they usually wanted to contact more people, which may have reduced emotional tension.

The positive link between satisfaction with support, number of support persons and problem-focused coping was strongly evidenced by coefficients in the two chemotherapy groups. These results were confirmed by Leavy (1983) who noted that social support helped patients to comply with medical treatments and enhanced their motivation to engage in adaptive behaviour. Bottomley and Jones (1997) also believed that social support may result in improved coping by providing more information and increasing the accuracy of peoples' perceptions of the environment, or by supporting their alternative coping styles. It is possible that social support may help participants to evaluate potential problems and help them come up with new coping strategies to deal with those problems. Social support may also be the source of potential changes in demands and the utilisation of planned coping strategies (Broadhead et al., 1983).

The results indicated a negative relationship between psychological symptoms and problem-focused coping in the first chemotherapy test, while a positive relationship was found in radiotherapy. Folkman (1992) and Vitaliano et al. (1990a) pointed out that problem-focused coping and a depressed mood were negatively related when a stressor was appraised as changeable. Furthermore, Forsythe and Compas (1987) found that a negative relationship occurred when events were perceived as controllable. As a result, this link may have occurred because chemotherapy participants in the present study perceived their illness as changeable and controllable. This result also was consistent with Carpenter (1992) who noted that in situation that are controllable, a person is likely not to take action that is necessary to manage or resolve the problem.

Conversely, among radiotherapy participants, the link between psychological symptoms and problem-focused coping was positive. This may have been due to radiotherapy participants knowing they have cancer. Therefore, participants may have appraised their illness as uncontrollable or incurable. Although many participants may be uncertain about the success of treatment, they only hope that a cure may be found. As Aldwin (1994) pointed out, distress stimulated patients to increase coping efforts when the outcome was uncertain. This result was consistent with Kessler et al. (1985) who showed that distress increases effective coping efforts.

The overall goodness of fit of the model was tested. The original unmodified model was supported in every group of the sample. In addition, all standardised loadings for their construct ranged from .38 to .93 and differed significantly from zero. The significant parameters can be considered important to the model (Byrne, 1989). The important point might be that the variables do not explain enough of the variance of the endogenous variables, whereas normally social science studies try to explain as much variation in the dependent variable as possible. The percentage of variation unexplained in the latent variable is shown in the Psi matrix. The LISREL output provided these values. Psychological symptoms and problem-focused coping were still left unexplained by 20-30% while support satisfaction and number of person support had an unexplained variance of more than 70%. That is, some important variables had certainly not been accounted for in the model. However, the interest in this study was not centred on the explanation of variables, therefore, the causal variable lists were limited.

This study further tested the replicability of results which indicated that the model holds for different groups and times. The gamma coefficients (path from health status to other variables) in the model were identical for chemotherapy groups while the beta coefficients (path from endogenous to other endogenous variables) were consistent between the initial chemotherapy and radiotherapy tests. The results indicated that the different effect of endogenous variables in the first and the second chemotherapy tests came from other endogenous variables in the model. On the other hand, the different effect in endogenous variables between chemotherapy and radiotherapy was due to the health status variable.

In studying mean level stability, the increase in problem-focused coping coincided with the decrease of psychological symptoms, and participants felt their health getting better in the second chemotherapy test. This pattern may be due to the fact that participants appraised their health problems as controllable events and therefore tended to use more problem-focused strategies. This reason was supported by Folkman (1992). The increase in problem-focused coping in the second chemotherapy test may have occurred because of gender. As shown, the majority of participants in this study were female (more than 70%). Folkman (1992) pointed out that females tended to use more problem-focused coping to try to control the situation.

The present study indicated that three variables (health status, number of person support and psychological symptoms) were highly stable over time. There was a small discrepancy between their coefficients and zero-order correlation which indicated a spurious effect. The psychological distress and health problems were very well explained in the second chemotherapy test in their own right since there were 33.2 % and 12 % explained variance. However, the explained variance (8.4%) was low in the number of support persons. The high stability of these variables may be due to the time interval between the initial and second chemotherapy tests being small (28 days). As a result, the effects of these factors may still be unchanged.

Contrasting health status, psychological symptoms and the number of support persons, support satisfaction and problem-focused coping skills variables were unstable and very poorly explained (3.5% and 11 %) on their own in the second chemotherapy test. The low stability of coping skills occurred because an individual can increase or decrease their expenditure of skills. And, the low stability of satisfaction with support may result from the instability of attitude toward others, health problems and support needs. Consequently, support satisfaction and coping skills may change from moment to moment or from one time interval to the next. This result corroborated that of Stewart and Schwarzer (1996) who found that coping strategies cannot be well predicted by previous coping, stable resources and vulnerability factors such as optimism or anxiety. The researchers pointed out that the low level of stability in coping may be due to more situation-dependent than personality-dependent coping. Besides, the low level of stability may be due to being cognitive-dependent. This result was consistent with the results of analysis one (cross-section) in this study where psychological symptoms were negatively related to problem-focused coping in the first chemotherapy test. In contrast, psychological symptoms were positively related to problem-focused coping in the radiotherapy group, and no significant relationship was found in the second chemotherapy test. Additional work needs to be conducted to investigate this instability.

The findings of this study support the sequential attribution theory that links health, social support, psychological symptoms and coping skills both in chemotherapy and radiotherapy participants. The sign and magnitude of the relationships between variables in the model were not identical for different groups and time. The results of the stability of individual differences indicated that health problems, the number of support persons and psychological symptoms were stable over time. The support satisfaction and problem-focused coping, on the other hand, were unstable over time.

4.4.2 Bivariate Analysis Discussion

The results indicated that the more participants perceived health problems, the less they reported support, and the less they used problem-focused coping. These patterns were consistent with Forsythe and Compas (1987), Norris and Kaniasty (1996) and Vitaliano et al. (1990a). In comparison, participants in the second chemotherapy and radiotherapy tests felt their health was better than those in the initial chemotherapy test. Additionally, the participants in the initial chemotherapy test reported fewer support persons. They were also less satisfied with social support and experienced more psychological symptoms. Participants in the second chemotherapy test used more problem-focused coping efforts than those receiving radiotherapy. Radiotherapy participants used problem-focused coping efforts nearly to the same level as participants in the initial chemotherapy test, even though they felt their health was better and had fewer mental symptoms. These results may be due to the fact that participants perceived that radiotherapy was only used to treat cancer and few expected it to be curable. Consequently, participants may simply 'hope' it can be cured and may use fewer problem-focused coping efforts. These findings reinforce Peck and Boland's (1977) conclusions that there were no severe reactions from radiotherapy side-effects, but patients were reluctant to answer questions about themselves and others.

There was no significant age difference in self-perceived health, social support and problem-focused coping. The present results correlated with those of Billings and Moos (1981) who found age to be weakly associated with coping responses. No significant differences in health status, satisfaction with support and problem-focused coping were observed between participants with different marital status categories. The present findings were not consistent with Kessler's (1979) findings which indicated that there was a significant difference in distress scores between these married and those separated or divorced.

Buddhist participants reported significantly higher levels of psychological symptoms than Muslim participants. In terms of mean differences in self-reported coping skills, Buddhists used more problem-focused coping in chemotherapy groups, whereas, Muslims used more problem-focused coping skills in the radiotherapy group. These results may be due to Buddhist participants having a strong belief in responsibility for their own illness and more inclined to try to control it, whereas Muslim participants leave their illness in God`s hands.

There was no significant difference in all variables between gender categories except the number of support persons for radiotherapy participants. Females reported significantly higher support persons than the males. One explanation is that the females tended to find persons to talk with more often than the males. Therefore, females may have more support persons than the males.

There was an evident difference in psychological status, satisfaction with support and problem-focused coping between occupation categories for chemotherapy participants. A significant difference was also found in problem-focused coping for occupation in radiotherapy. Civil servant participants reported the highest level of support satisfaction and psychological symptoms. In addition, the civil servants used more problem-focused coping than other groups. This may be due to civil servants having free access to health care systems if they choose to use public services, while business persons have the resources to provide for themselves. However, civil servants reported more psychological symptoms than others. A possible explanation is that civil servants may have a higher level of knowledge about their illness than others, therefore, they tend to experience more psychological symptoms.

The relationship between side-effects and all variables showed that participants who reported no side-effects reported better health than others. The nausea, vomiting and hair loss categories reported the worst health problems. There were significant differences in health status, social support and problem-focused coping for side-effects categories in radiotherapy, whereas there were significant differences in health status in chemotherapy participants.

The participants who experienced hair loss, itching or no side-effects reported lower levels of health problems than the participants who experienced nausea or both nausea and vomiting. These results may be due to nausea and vomiting having a higher effect on both physical illness and social dysfunction than hair loss, itching or no side-effects. The participants who reported itching had the highest number of support persons and support satisfaction in the radiotherapy group. This may be because nausea and vomiting make other persons avoid contact with these participants rather than with those who experienced itching. In contrast, participants who reported no side-effect may experience a decrease in social support because other people perceived them as being in a good condition.

Chapter 5

Summary and Conclusions

The purpose of this study was to investigate the relationships between health status, social support, psychological symptoms and coping skills in Thai patients receiving chemotherapy or radiotherapy. These variables were set forth in a model within the framework derived from the attribution theory illustrated in figure 4.6. In this final chapter, the procedures used are reviewed, and important findings are summarised. The chapter concludes with a discussion of the theoretical and practical implications of the findings. Recommendations for further research are also provided.

5.1 Summary of Procedures

A series of directional hypotheses set forth in figure 4.6 was tested using a causal modelling study design. Two groups of participants who were undergoing chemotherapy and one group receiving radiotherapy were surveyed during March to September, 1997 in the Thai hospitals of Hat-Yai and Songklanagarind. All tests were administered concurrently on two consecutive occasions for the chemotherapy participants and on one occasion for the radiotherapy participants.

In analysing the data, the reliability and validity of the variables were assessed first. These variables were estimated utilising Cronbach's alpha for reliability and the Confirmatory Factor Analysis for construct validity. Using LISREL (7.20), the overall fit of the hypothesised model derived from the attribution theory was tested, obtaining path coefficients for each of the directional hypotheses. Multi-sample analyses were employed in order to test the consistency of the structural model across treatment and time. Furthermore, a two-wave model was performed to test the stability of the variables. Specific research questions were analysed using Analyses of Variance, attempting to examine the mean differences in health status, social support, psychological symptoms and coping skills across categories of the socio-demographic variables.

5.2 Summary of Findings

Results from the present study were drawn from three phases of the analysis: (a) construction of the measurement model, (b) estimating the structural equation model, and (c) the bivariate analysis of the socio-demographic variables. The measurements used in this study were multi-dimensional scales supported by the numerous studies discussed in the literature review. Health status was measured by means of health problems resulting from chemotherapy or radiotherapy side-effects. Social support was measured in terms of satisfaction with support and the number of support persons. Psychological symptoms consisted of four dimensions of symptoms: obsessive-compulsive, interpersonal sensitivity, anxiety and depression. Coping skills were measured in terms of problem-focused coping. These coping skills had the two dimensions consisting of problem-solving and seeking help.

Additionally, these measurements were all confirmed by the Confirmatory Factor Analysis in terms of construct validity (Chapter 4). The reliabilities of social support, psychological symptoms and problem-focused coping were high, ranging from .79 to .80 for three groups. Coefficient alphas of .73 for the health status scale were obtained, exceeding Nunnally's (1978) .50 to .60 minimum criterion.

The structural modelling phase consisted of three analyses. First, the model of each group was estimated separately. Second, the multiple-groups structural model was performed to test the consistency of the model. Finally, the two-wave model was completed in order to assess the stability of the variables. The goodness of fit of the model was investigated before estimating the structural coefficients. The standardised and unstandardised coefficients were examined to test each of the directional hypotheses formulated from the theoretical model.

The proposed model of the present study was derived from the attribution theory. Generally, the sequence nature of the theory was initiated by an outcome that participants interpreted as positive or negative. Subsequently, participants were motivated to seek a causal explanation of that outcome, generating differentiated affective reactions, which, in turn, were linked to behaviour. The present study proposed that health problems were an outcome of chemotherapy and radiotherapy side-effects. Therefore, participants tried to explain and search for reasons behind the side-effects which have impacted on their emotions and behaviour. In the study, the health problem variable was an independent variable, while social support, psychological symptoms and problem-focused coping were dependent variables.

The major goal of this study was to test the proposed model taken from attribution theory on participants receiving chemotherapy or radiotherapy in a Thai context. In study one, the model was supported in a different time frame and with different groups of participants. The most promising insight to arise from this study was the power of health status in explaining variation in variables of interest. The results indicated that perceived health problems were directly negatively linked with social support and positively linked with psychological symptoms. Health problems were also related directly to problem-focused coping and indirectly via social support and psychological symptoms. These findings were consistent with the conclusions of Bloom et al. (1991a) and Willey and Silliman (1990). The direct effect between social support and problem-focused coping was substantially supported. A strong relationship between these two concepts was found by Bottomley (1997).

The hypothesised link between psychological symptoms and problem-focused coping was strongly supported. This result was consistent with Kessler et al. (1985) and Vitaliano et al. (1990a). Psychological symptoms related negatively to problem-focused coping was supported in the initial chemotherapy test. On the other hand, psychological symptoms were associated positively with problem-focused coping in radiotherapy. These results may have occurred due to the differential causal explanation between chemotherapy and radiotherapy, as suggested by Folkman (1992), Forsythe and Compas (1987), and Aldwin (1994). These researchers explained that when a person perceives that events as controllable the relationship between psychological symptoms and problem-focused coping was negative.

The hypothesised effect of social support on psychological symptoms was not supported. Generally, this lack of a significant relationship contradicted previous research in health literature within the Western cultural context. This may be due to participants only staying in hospital for a short period of time (an outpatient centre). It may also be due to the tendency of Thai participants discuss their problems in terms of physical rather than psychological issues. Thus, the participants may not have been able to work through the emotional impact of their treatments. The Buddhist religion has also had a significant impact on Thai understanding.

Buddhism suggests a way to control the mind (De Silva, 1991). With Buddhism, diseases are of two kinds, consisting of diseases of the body and diseases of the mind. Although the body is sick, the mind is not to be sick. This perspective is essential in the Buddhist practice of mindfulness. Therefore, people tend to control their mind by themselves. In addition, the results may have occurred because the effectiveness of social support depends on a specific match between the participants and support persons.

Result from the multi-sample analysis indicated that the influences of health status on other variables in the model were identical for the initial and second chemotherapy tests, but not for radiotherapy test. Results of these analyses confirmed that participants in chemotherapy tests from both time periods may reach the same explanations for their health problems such as an event caused by internal and controllable factors.

The findings from the two-wave analysis indicated that health status, number of support persons and psychological symptoms were highly stable over time, while support satisfaction and problem-focused coping were not. One explanation is that the stability of health problems and psychological symptoms could be due to the consistency of the side-effects of chemotherapy, whereas the stability of support persons could be due to the limited number of contact persons in the community. The stability of health problems and psychological symptoms may also have occurred due to the short time interval between the initial and second tests. On the other hand, instability in problem-focused coping and social satisfaction can result from two factors, inconsistency in the appraisal process, or as a function of situational demand.

The result of problem-focused coping was consistent with Stewart and Schwarzer (1996) who found that coping strategies cannot be predicted by previous coping.

Results of the bivariate analysis supported the tendency for Buddhist participants to have higher levels of psychological symptoms than Muslim participants. This result could be because Buddhist participants took responsibility for their illness, whereas Muslim participants believed that their illness was due to the will of God. The significant differences in health problems, satisfaction with support, number of support persons and problem-focused coping styles were observed in occupational and side-effects categories. Civil servants reported the highest level of support satisfaction. These results could have occurred because civil servants had free access to health care systems. The fewer side-effects participants reported, the fewer health problems and the lower psychological distress they had. However, when participants had no side-effects, they had higher psychological symptoms and used more problem-focused coping. This may have been due to the fact that when participants did not experience any side-effects they thought the treatments were not working or their body was not responding to the treatment.

5.3 Limitations

The limitations in this study were

(1) The data was gathered from a cross sectional survey and a convenience sample. Also, all data in this study were based on self-reports. Despite the careful design of the study, structuring of the questionnaire and time of administration, the

shortcomings of administering questionnaires are well known (Alwin & Krosnick, 1991).

(2) Participants may be atypical because this study was conducted in hospitals located in the Southern region of Thailand. The majority of participants were female (over 70%) with low education (over 60% under year 4). Also, participants were fully active or mildly symptomatic. These findings may serve as indicators, but they cannot be generalised to the larger population.

(3) The variables selected in this study were consistent with the concepts of attribution theory. However, because all variables in the theory could not be included in one study, the test of the model was incomplete with respect to the larger field of study. It is acknowledged that other variables which were not included (such as attribution dimensions) might also fit within an acceptable model.

(4) Though the tested model is a causal model, structural equation modelling with cross sectional data does not provide evidence in relation to the directions of causality among variables. Longitudinal studies and theory-based studies are needed to provide evidence of the directions and causal nature of these paths.

(5) The existence of competitive model has not been tested. It should be noted that using different theoretical frameworks might lead to substantively different conclusions about the model.

5.4 Implications

The important results and relationships that emerged from this study have several implications in the behavioural field. The implications are evident in terms of (a) health promotion and educational programs, (b) social support intervention strategies, and (c) health behavioural management and interventions. This study has implications for health promotion and education because health problems are negatively associated with social support. This relationship may have occurred because of a lack of knowledge in chemotherapy and radiotherapy in either participants or support persons, or the severity of the participants' health problems. The decrease in person support may have affected the patients' access to information about their illnesses. For example, by contacting others, participants are able to draw comparisons and assess their strengths and weaknesses more accurately.

Based on attribution theory, participants are motivated to gather information available to them to assist their judgement and weigh it rationally. These attributions or causal explanations, play a key role in emotion and behaviour processes. They require the integration of specific information with existing knowledge to form a cognitive representation. Without knowledge, individuals tend to make errors due to the degree of uncertainty. As Schwalb and Crosson (1988), and Stephens (1992) pointed out, patients who understand the reasons for a particular treatment plan are more likely to comply with treatment regimens that may be difficult, unpleasant or simply inconvenient. Patients rated information about the success of treatments and treatment options as the most important, followed by information about specific cancer types and the side-effects of treatment.

An attribution perspective was able to focus on fostering the patients' realistic causal understanding, through gathering attributionally relevant information and through further disputation and scientific examination of attributional assumptions that are connected with the problems of patients (King, 1983). Therefore, health promotion and educational programs should be directed primarily at providing information relevant about the disease and its treatments to help patients, families and friends understand the patients better, and where patients, families and friends can evaluate and work through the patients' fears and concerns. These programs may help to increase the number of support persons and satisfaction with support.

These study results have implications for social support intervention strategies, since communication of divergent causal explanations is a common and important part of social interaction. The present study reveals that social support in terms of levels of satisfaction and support persons does not help decrease participants' psychological symptoms, indicating that social support is necessary for better effects. As discussed in Chapter 1 (cf. pp. 12), most Thai people tend to talk about their illness in terms of physical illnesses but not psychological symptoms. Therefore, social support intervention strategies should include providing choices, encouraging participation or cognitive control, providing information, as well as increasing environmental predictability and sufficient emotional support. Social support should focus on increasing self-esteem and altering mood states, and reciprocally interacting with other resources that promote adaptation.

The power of health and psychological symptoms variables to explain variation in coping skills has implications for health management and interventions. Noticing how patients feel and think may be a key to explaining variations in cognition towards management. Thai patients often perceive their illness as being controlled by themselves, other persons and the supernatural. This notion supports the results that health problems and psychological symptoms were positively related to problem-focused coping. However, in some situations the problem-focused coping may not be appropriate. As Bulman and Wortman (1977) pointed out, when people feel that they can influence and control their outcomes, this may have maladaptive consequences for individuals who are faced with outcomes that are uncontrollable. Because these patients maintained the illusion of control over their lives, from an attributional point of view, it would be more important to help these patients feel and behave appropriately in accordance with the realistic interpretations of their situations.

As a consequence of illusion of control over their illness, health professionals should reinforce patients' efforts by encouraging an active role in the treatment process. They should let patients know what alternatives they have in relation to the many aspects of the treatment regimen and provide them with the information necessary for sound decision-making. They should also give positive feedback when patients' demonstrate appropriate efforts to control their environment. The intervention program should include:

- specific guidelines for dealing with emotions,
- how to handle changes in family roles and relationships,
- encouragement of family involvement in care,
- the need to discuss treatment with other patients,
- the need to communicate with physicians and family
- development specific coping skills.

5.5 Recommendations

Further studies in the following areas are suggested as follows:

(1) Development of a more reliable and valid measures of emotion-focused coping skills. The reliability of emotion-focused coping in the present study just exceeded the minimum criteria (.60) and the construct validity test did not fit the data. Therefore, scales with more items per dimension which are more specific to the Thai culture need to be constructed.

(2) Application of the present study to different health types (such as heart disease) of patients in order to explore the variation in the process from one type of patient to the next.

(3) Control of the present study for individual differences prior to or during therapy to include nutritional status and historical health background as these conditions affect the severity of therapy side-effects.

(4) Improvement of the explanatory power of the existing attribution model. A major goal of social science research is explaining variations in behaviour and other variables, not included in the existing model, might strengthen its power. Attributional dimensions might be useful in explaining the relationship between variables. For example, Vitaliano et al. (1990a) found appraised changeability of a stressor to be related to an individuals' level of psychological state.

(5) In addition to the advocated conceptual synthesis of health and coping advocated, some study design applications are needed. The limitations of self-report measures have been widely debated in the social sciences. Besides, psychological symptoms and coping skills are not always conscious, and indirect assessment of

these factors may be necessary to supplement self-report questionnaires. Experimental designs or longitudinal studies could largely dissolve this shortcoming.

(6) Evaluation of subsequent behaviour, social support, psychological symptoms and health problems as a result of chemotherapy, using the causal modelling approach. Research should be more extensive than the two occasions of measurement utilised in the present study. The findings may be beneficial in case of delayed effect changes.

Appendices

Appendix A Questionnaires

You are invited to participate in a research study which aims to examine the interrelationships between social support, psychological condition, and coping skills in relationship to how healthy you feel after receiving your treatments.

The purpose of this study is to determine the relationship between health status, social support, psychological symptoms and coping skills in patients undergoing chemotherapy and radiotherapy. It is to determine your health status and how this relates to coping, levels of support and psychological symptoms. As a participant, I ask that you complete the following questionnaires today. The questionnaire should not take you more than 15 minutes to complete.

PLEASE ANSWER ALL THE QUESTIONS ON THE FOLLOWING PAGES AND SELECT A RESPONSE THAT YOU THINK MOST NEARLY APPLIES TO YOU. REMEMBER THAT WE WANT TO KNOW ABOUT PRESENT EXPERIENCE, AND NOT EXPERIENCE OF THE PAST.

Your co-operation in providing this information should assist in enhancing the quality of future treatment. In addition, it will further add to the medical knowledge of how people cope with illness, psychological reactions to the illness and important levels of social support. The ultimate outcome of this study is intended to improve services through an increased understanding of patients. The data collected from these questionnaire will be kept confidential, and your name will not appear in any reported material. If you have any questions regarding the nature of this study or wish to give me some comments on the questionnaire, please feel free to call me. My telephone number is 075-381053. If you wish to withdraw from participation in this study at any time you are free to do so. Finally, please understand that your participation in this study will have no effect on your current medical treatments.

Please read the questions carefully before answering it.

Thank you very much for you co-operation.

Please turn to the next page to begin answer the questions

Part 1

The following questions relate to how you feel after receiving your present treatment. Please read each one carefully. Then tick the box that best suit your answer to each question. Please answer all question as best as you can. Remember, there are no right or wrong answers.

Are you:

	Not at all	No more than usual	Rather more than usual	much more than usual
	1	**2**	**3**	**4**
1) feeling perfectly well				
2) in need of a good tonic				
3) run down				
4) feeling ill				
5) pains in your head				
6) pressure in your head				
7) hot or cold spells				
8) busy and occupied				
9) taking longer over things				
10) doing things well				
11) satisfied with carrying out task				
12) playing a useful part				
13) capable of making decisions				
14) enjoying normal activities				

Part 2

The following questions relate to people in your environment who actually provide help or support after receiving your present treatment. Each question has two parts. For the first part, list all the people you know, excluding yourself, whom you can count on for help or support in the manner described. Please give the person's relationship to you list only person in each of the spaces beneath the question.

For the second part, tick how satisfied you are with the overall support you have from each person. If you have no support for a question, write " **no one**", but still rate you level of satisfaction. You may list as few people as you wish, but do not list more than nine persons per question. Remember, there are no right or wrong answers

Examples: persons you talk with frankly, without having to watch what you say

level of satisfaction

person	great dissatisfied	fairly dissatisfied	a little dissatisfied	a little satisfied	fairly satisfied	great satisfied
father						x
mother						x
sister					x	
friends			x			
nurses				x		
doctor					x	

1) persons give you information about your illness:

level of satisfaction

persons	great dissatisfied	fairly dissatisfied	a little dissatisfied	a little satisfied	fairly satisfied	great satisfied

2) persons who provide useful suggestions that help you to avoid making mistakes in your treatment:

level of satisfaction

person	great dissatisfied	fairly dissatisfied	a little dissatisfied	a little satisfied	fairly satisfied	great satisfied

3) persons help you feel better when you are very irritable, ready to get angry at almost anything in your treatment:

level of satisfaction

person	great dissatisfied	fairly dissatisfied	a little dissatisfied	a little satisfied	fairly satisfied	great satisfied

4) persons support you in major decisions you make about your illness:

level of satisfaction

person	great dissatisfied	fairly dissatisfied	a little dissatisfied	a little satisfied	fairly satisfied	great satisfied

5) persons who care about you, regardless of what is happening to you:

level of satisfaction

person	great dissatisfied	fairly dissatisfied	a little dissatisfied	a little satisfied	fairly satisfied	great satisfied

6) persons who tell you, in a thoughtful manner, when you need to improve in some way:

level of satisfaction

person	great dissatisfied	fairly dissatisfied	a little dissatisfied	a little satisfied	fairly satisfied	great satisfied

Part 3

The following questions relate to your activities. Please read each one carefully. Then tick the box that best suit you answer to each question. Remember, there are no right or wrong answers.

I cope by:

	disagree	a little disagree	a little agree	agree
1) concentrated on something good that could come out of the whole thing.				
2) changed something so things would turn out all right.				
3) just took things one step at a time.				
4) come up with a couple of different solutions to the problem.				
5) changed something about myself so I could deal with the situation better.				
6) talked to someone about how I was feeling				
7) talked to someone to find out about the situation.				
8) accepted sympathy and understanding from someone.				
9) got professional help and did what they recommended.				
10) asked someone I respected for advice and followed it.				
11) blamed yourself				
12) criticised yourself				
13) realised you brought the problem on yourself.				
14) hoped or a miracle would happen.				
15) wished I was a stronger person.				
16) daydreamed or imagined a better time or				

place than the one I was in.				
17) had fantasies or wishes about how things might turn out.				
18) wished the situation would go away somehow be finished.				
19) went on as if nothing had happened.				
20) felt bad that I couldn't avoid the problem.				
21) refused to believe it had happened.				
22) got mad at other people or things that caused the problem.				
23) tried to make myself feel better by eating, drinking, smoking, taking medications.				

Part 4

The following questions relate to your feeling after receiving your present treatment. Please read each one carefully. Then tick the box that best suit your answer to each question. HOW YOU HAVE BEEN FEELING DURING YOUR PRESENT TREATMENT. Remember, there are no right or wrong answers.

You are:

	disagree	a little disagree	don't know	a little agree	agree
1) nervousness or shakiness inside					
2)feeling critical of others.					
3)trouble remembering things.					
4) feeling easily annoyed or irritated					
5) thoughts o fending your life					
6) crying easily					
7) suddenly scared for no reason					
8) feeling of being trapped or caught					
9) trouble concentrating					
10) feeling blocked or stymied in getting thing done					
11) feeling lonely					
12) feeling no interest in things					
13) feeling fearful					
14) your feelings being easily hurt					
15) feeling others of not understand you or are unsympathetic					
16) having to do things very slowly in order to be sure you are doing them right					
17) heart pounding or racing					
18) trouble getting your breath					
19) having to avoid certain places or activities because they frighten you					
20) your mind going blank					

Demographic data

1 What is your age...

2 Gender: Male............Female...................

3 Marital status

single...........................

married...........................

divorce...........................

4 Your occupation...

5 Your education..

6 How many time have you received the treatment?(including this time)..............

7 What side-effects have you got this time?

nausea................................

vomiting...............................

anorexia...............................

hair loss...............................

stomatitis..............................

headache..............................

others please specify.............................

(office use only)

code.........................

H.N..................................

Medicine...........................

....

Appendix A (continued)

Questionnaires Thai version

ท่านได้รับเชิญให้มีส่วนร่วมในการวิจัย เพื่อศึกษาความสัมพันธ์ ระหว่างทักษะการคิดค้นภาวะทางด้านจิตใจ และการเกื้อกูลทางสังคม ที่สัมพันธ์กับสุขภาพทั่วไปของท่าน หลังจากที่ท่านได้รับการรักษา สำหรับการเจ็บป่วยของท่านในปัจจุบัน

จุดมุ่งหมายของการศึกษามีขึ้น เพื่อค้นคว้าภาวะทางร่างกายที่ท่านได้รับหลังจากการรักษา พร้อมกับภาวะเกื้อกูลทางสังคม สิ่งเหล่านี้มีผลโดยตรงต่อการเลือกวิธีการที่ท่านใช้แก้ปัญหาและภาวะทางจิตใจของท่าน กรณีที่ท่านมีส่วนเข้าร่วม ท่านจำเป็นต้องกรอกข้อมูลในแบบสอบถามที่ได้รับในวันนี้ให้สมบูรณ์ และในการรักษาอีก 2 ครั้งถัดไป ท่านจะใช้เวลาในการกรอกแบบสอบถามแต่ละฉบับให้สมบูรณ์ในเวลาไม่มากกว่า 15 นาที

ความร่วมมือของท่านในการให้ข้อมูลครั้งนี้ จะช่วยเพิ่มคุณภาพการรักษาในอนาคต นอกจากนี้ ยังเป็นการเพิ่มพูลความรู้ทางการแพทย์ในเรื่องความสัมพันธ์ ระหว่างความคิดในการปฏิบัติตัวของผู้ป่วย ปฏิกิริยาของภาวะจิตใจที่มีต่อความเจ็บป่วยและการเกื้อกูลทางสังคมให้กว้างขวางยิ่งขึ้น ประโยชน์สูงสุดของการศึกษาครั้งนี้เพื่อปรับปรุงภาวะสุขภาพทั่วไปให้ดีขึ้น โดยเพิ่มความเข้าใจของผู้ป่วย

ข้อมูลที่ได้จากแบบสอบถามจะถูกเก็บเป็นความลับส่วนตัว ชื่อของท่านจะไม่ปรากฏในสิ่งตีพิมพ์รายงานใดๆ การตอบสนองของท่านต่อแบบสอบถามจะเป็นเครื่องแสดงว่าท่านอนุญาตให้ดิฉันสามารถนำข้อมูลนี้ ไปศึกษา หากท่านมีคำถามใดๆ ที่เกี่ยวข้องกับการศึกษาครั้งนี้ หรือมีคำแนะนำใดๆเกี่ยวกับแบบสอบถาม กรุณาติดต่อดิฉัน ทางหมายเลข 075-381053 ได้อย่างสะดวกใจ หากท่านต้องการถอนความร่วมมือของท่านในการศึกษาครั้งนี้ ท่านก็กระทำได้ทันทีเช่นกัน โปรดเข้าใจว่าการมีส่วนร่วมของท่านในการศึกษาครั้งนี้ จะไม่มีผลใดๆต่อการรักษาของท่าน กรุณาอ่านแบบสอบถามอย่างละเอียดก่อน ตอบคำถาม

กรุณาตอบคำถามในหน้าถัดไปและเลือกคำตอบที่เหมาะสมที่สุดสำหรับท่าน คำถามทุกข้อเป็น ข้อมูลการประสบการณ์ในปัจจุบันที่ท่านประสบอยู่ไม่ใช่ประสบการณ์ในอดีตที่ผ่านมา คำถามทุกข้อ ไม่มีคำตอบที่ผิดหรือถูก

ขอบคุณในความร่วมมือของท่าน

กรุณาพลิกหน้าถัดไปเพื่อเริ่มตอบคำถาม

ส่วนที่ 1 คำชี้แจง

คำถามต่อไปนี้เป็นคำถามเกี่ยวกับสุขภาพของท่านที่มีหลังการรับการรักษาในปัจจุบัน เราต้องการทราบว่าท่านเคย มีอาการอย่างใดอย่างหนึ่งหรือไม่และสุขภาพของท่านเป็นอย่างไรในช่วงที่ท่านได้รับการรักษา โปรดตอบคำถามทุกข้อ ที่ท่าน เห็นว่าเข้าได้กับท่านมากที่สุด กรุณาอ่านอย่างละเอียดถี่ถ้วนก่อน จึงทำเครื่องหมาย √ ในคำตอบที่ตรงกับคำ ตอบของท่านมากที่สุดในแต่ละคำถาม กรุณาตอบคำถามทุกข้อเท่าที่ท่านสามารถทำได้

ในระยะนี้ท่าน

ก1 รู้สึกว่าสุขภาพของท่าน	ดีกว่าเดิม	เหมือนเดิม	แย่กว่าเดิม	แย่กว่าเดิมมาก
ก2 รู้สึกว่าต้องการยาบำรุง	ไม่เลย	ไม่มากกว่าเดิม	มากกว่าเดิมพอสมควร	มากกว่าเดิมมาก
ก3 รู้สึกอ่อนแรง และทรุดโทรมลง	ไม่เลย	ไม่มากกว่าเดิม	มากกว่าเดิมพอสมควร	มากกว่าเดิมมาก
ก4 รู้สึกว่าไม่สบาย	ไม่เลย	ไม่มากกว่าเดิม	มากกว่าเดิมพอสมควร	มากกว่าเดิมมาก
ก5 มีอาการปวดศีรษะ	ไม่เลย	ไม่มากกว่าเดิม	มากกว่าเดิมพอสมควร	มากกว่าเดิมมาก
ก6 รู้สึกหนักหรือมึนศีรษะ	ไม่เลย	ไม่มากกว่าเดิม	มากกว่าเดิมพอสมควร	มากกว่าเดิมมาก
ก7 มีอาการเดี๋ยววูบหนาว หรือเดี๋ยววูบร้อน	ไม่เลย	ไม่มากกว่าเดิม	มากกว่าเดิมพอสมควร	มากกว่าเดิมมาก

ในระยะนี้ท่าน

ข1 มีกิจกรรมทำและไม่อยู่ว่าง	มากกว่าเดิม	เท่าเดิม	น้อยกว่าเดิมพอสมควร	น้อยกว่าเดิมมาก
ข2 ต้องใช้เวลานานขึ้นในการทำงาน	เร็วกว่าเดิม	เท่าเดิม	นานกว่าเดิม	นานกว่าเดิมมาก
ข3 รู้สึกว่าโดยทั่วไปท่านทำงานได้ดี	ดีกว่าเดิม	เท่าเดิม	แย่กว่าเดิม	แย่กว่าเดิมมาก
ข4 พอใจในวิธีการปฏิบัติงานที่ได้ทำไปแล้ว	พอใจมากกว่าเดิม	เท่าเดิม	พอใจน้อยกว่าเดิม	พอใจน้อยกว่าเดิมมาก
ข5 รู้สึกว่าตัวเองเป็นส่วนหนึ่ง ที่มีประโยชน์ในงานต่างๆ	มากกว่าเดิม	เท่าเดิม	มีส่วนน้อยกว่าเดิม	มีส่วนน้อยกว่าเดิมมาก
ข6 รู้สึกว่าท่านสามารถตัดสินใจได้	ดีกว่าเดิม	เท่าเดิม	น้อยกว่าเดิม	น้อยกว่าเดิมมาก
ข7 มีความสุขในกิจวัตรประจำวัน	มากกว่าเดิม	เท่าเดิม	น้อยกว่าเดิม	น้อยกว่าเดิมมาก

ส่วนที่ 2 คำชี้แจง

คำถามต่อไปนี้เป็นคำถามเกี่ยวกับบุคคลซึ่งได้ช่วยเหลือท่าน ในด้านต่างๆ แต่ละคำถามจะแบ่งออกเป็น 2 ส่วน ส่วนแรก เป็นรายชื่อผู้ที่ช่วยเหลือท่าน (ถ้าหากไม่มีบุคคลดังระบุ ช่วยเหลือกรุณาขีดออก) ส่วนที่ 2 เป็นส่วนที่ท่านแสดง ระดับความพอใจต่อบุคคลดังกล่าว กรุณาแสดงเครื่องหมาย (✓) ในช่องว่างให้ตรงกับบุคคลดังกล่าว

ตัวอย่าง

ผู้ซึ่งท่านคิดว่า เขาฟังท่านเมื่อท่าน ต้องการที่ปรึกษา

บุคคล	ไม่พอใจอย่างมาก	ค่อนข้างไม่พอใจ	ไม่พอใจเล็กน้อย	พอใจเล็กน้อย	ค่อนข้างพอใจ	พอใจอย่างมาก
พ่อ					✓	
แม่						✓
พี่			✓			
น้อง			✓			
เพื่อน				✓		
แพทย์					✓	
พยาบาล				✓		
อื่นๆระบุ						
ไม่มี						

1. บุคคลที่ท่าน สามารถเชื่อถือได้เกี่ยวกับข้อมูลความเจ็บป่วยของท่าน ในครั้งนี้

บุคคล	ไม่พอใจอย่างมาก	ค่อนข้างไม่พอใจ	ไม่พอใจเล็กน้อย	พอใจเล็กน้อย	ค่อนข้างพอใจ	พอใจอย่างมาก

2. บุคคลที่ช่วยแนะนำและช่วยให้ ท่านได้หลีกเลี่ยง ต่อการกระทำ ผิดพลาด ที่อาจเกิดขึ้นเกี่ยวกับการรักษาในครั้งนี้

บุคคล	ไม่พอใจอย่างมาก	ค่อนข้างไม่พอใจ	ไม่พอใจเล็กน้อย	พอใจเล็กน้อย	ค่อนข้างพอใจ	พอใจอย่างมาก

3. บุคคลที่ช่วยให้ท่าน รู้สึกดีขึ้นเวลา ท่านโกรธ หรือโมโห

บุคคล	ไม่พอใจอย่างมาก	ค่อนข้างไม่พอใจ	ไม่พอใจเล็กน้อย	พอใจเล็กน้อย	ค่อนข้างพอใจ	พอใจอย่างมาก

4. บุคคลที่ช่วยเหลือต่อการตัดสินใจที่สำคัญ เกี่ยวกับการรักษาครั้งนี้

บุคคล	ไม่พอใจอย่างมาก	ค่อนข้างไม่พอใจ	ไม่พอใจเล็กน้อย	พอใจเล็กน้อย	ค่อนข้างพอใจ	พอใจอย่างมาก

5. บุคคลที่ช่วยดูแลสิ่งต่างๆ เมื่อมีเหตุการณ์ เกิดขึ้นต่อท่าน

บุคคล	ไม่พอใจอย่างมาก	ค่อนข้างไม่พอใจ	ไม่พอใจเล็กน้อย	พอใจเล็กน้อย	ค่อนข้างพอใจ	พอใจอย่างมาก

6. บุคคลที่ช่วยกระตุ้นความคิดแก่ท่าน เมื่อ ท่านต้องการปรับปรุงบางสิ่ง บางอย่าง

บุคคล	ไม่พอใจอย่างมาก	ค่อนข้างไม่พอใจ	ไม่พอใจเล็กน้อย	พอใจเล็กน้อย	ค่อนข้างพอใจ	พอใจอย่างมาก

ส่วนที่ 3 คำชี้แจง

แบบสอบถามวิธีการแก้ปัญหา

แบบสอบถามวิธีการแก้ปัญหานี้ ประกอบด้วยข้อคำถามเกี่ยวกับการคิดและพฤติกรรมที่ท่านใช้เมื่อมีสถานการณ์ที่ก่อให้เกิดภาวะเครียดทางจิตใจซึ่งพบได้ในบุคคลทั่วไป การตอบแบบสอบถาม ให้ท่านเขียนเครื่องหมาย (✓) ในช่องแต่ละข้อที่ท่านเลือกให้ซึ่งเป็นคำตอบที่ถูกต้องตรงกับความเป็นจริงในขณะนี้มากที่สุด

ท่าน แก้ปัญหาโดยวิธี

	ไม่เคยใช้ 1	ใช้บ้างเล็กน้อย 2	ใช้บ่อย 3	ใช้บ่อยมาก 4
1. เอาใจจดจ่อต่อสิ่งที่ดีๆ เพื่อแก้ปัญหาที่เกิดขึ้น	☐	☐	☐	☐
2. ได้เปลี่ยนแปลงบางอย่างเพื่อให้ปัญหาต่างๆลงเอยด้วยดี	☐	☐	☐	☐
3.วางแผนการกระทำและดำเนินการตามแผนนั้น	☐	☐	☐	☐
4.เปลี่ยนแปลงหรือพัฒนาตนเองในทางที่ดีขึ้น	☐	☐	☐	☐
5.หาวิธีแก้ปัญหาหลายๆวิธี	☐	☐	☐	☐
6.พูดคุยกับคนอื่นเพื่อให้ได้ข้อมูลเกี่ยวกับสถานการณ์ให้มากขึ้น	☐	☐	☐	☐
7.พร้อมรับความเห็นอกเห็นใจและความเข้าใจจากบุคคลอื่น	☐	☐	☐	☐
8.ได้รับความช่วยเหลือ จากบุคคลที่มีประสบการณ์	☐	☐	☐	☐
9.ขอคำแนะนำจากญาติหรือเพื่อนที่ข้าพเจ้าเคารพนับถือ	☐	☐	☐	☐
10.พูดคุยกับบุคคลอื่นเกี่ยวกับความรู้สึกของตัวเอง	☐	☐	☐	☐

	ไม่เคยใช้	ใช้บ้างเล็กน้อย	ใช้บ่อย	ใช้บ่อยมาก
	1	2	3	4
11.ตำหนิตัวเองเกี่ยวกับสิ่งต่างๆที่เกิดขึ้น	[ ]	[ ]	[ ]	[ ]
12.วิพากษ์วิจารณ์หรือสอนตนเอง	[ ]	[ ]	[ ]	[ ]
13.ตระหนักดีว่าตัวเองเป็นผู้สร้างปัญหา	[ ]	[ ]	[ ]	[ ]
14.หวังว่าคงมีปฏิหารย์ที่จะช่วยได้บ้าง	[ ]	[ ]	[ ]	[ ]
15.คิดว่าจะเป็นบุคคลที่เข็มแข้งกว่านี้	[ ]	[ ]	[ ]	[ ]
16.หวังว่าเหตุการณ์คงจะดีกว่าที่เป็นอยู่อีกไม่ช้า	[ ]	[ ]	[ ]	[ ]
17.คิดว่าเหตุการณ์นี้คงจะมีทางแก้ไขได้	[ ]	[ ]	[ ]	[ ]
18.หวังว่าเหตุการณ์นี้คงจะมีทางออกด้วยวิธีใดวิธีหนึ่ง	[ ]	[ ]	[ ]	[ ]
19.ทำเป็นทองไม่รู้ร้อนเหมือนไม่มีอะไรเกิดขึ้น	[ ]	[ ]	[ ]	[ ]
20.รู้สึกไม่สบายใจที่ไม่สามารถหลีกเลี่ยงปัญหาต่างๆที่เกิดขึ้นได้	[ ]	[ ]	[ ]	[ ]
21.แสดงอารมณ์โกรธต่อบุคคลซึ่งเป็นต้นเหตุของปัญหา	[ ]	[ ]	[ ]	[ ]
22.ไม่เชื่อว่าสิ่งนี้จะเกิดขึ้นกับตัวเอง	[ ]	[ ]	[ ]	[ ]
23.ใช้วิธีทำให้ตนเองรู้สึกดีขึ้นโดยการ รับประทานอาหาร ดื่มสุรา สูบบุหรี่ หรือใช้ยาชนิดต่างๆ เป็นต้น	[ ]	[ ]	[ ]	[ ]

ส่วนที่ 4 คำชี้แจง

คำถามต่อไปนี้เป็นคำถามเกี่ยวกับความรู้สึกของท่านเองซึ่งอาจจะเกิดขึ้นกับท่านหลังจากได้รับการรักษา การตอบแบบสอบถาม

ให้ท่านเขียนเครื่องหมาย (✓) ในช่องแต่ละข้อที่ท่านเลือกให้ซึ่งเป็นคำตอบที่ตรงกับ

ความเป็นจริงในขณะนี้มากที่สุด

ท่านรู้สึก :

	ไม่เลย 1	เล็กน้อย 2	ปานกลาง 3	ค่อนข้างมาก 4	มากที่สุด 5
1.ใจคอไม่ปกติ กระวนกระวาย	( )	( )	( )	( )	( )
2.วิตกว่าคนอื่นจะตำหนิ	( )	( )	( )	( )	( )
3.ยุ่งยากในการจดจำ	( )	( )	( )	( )	( )
4.หงุดหงิดขี้รำคาญ	( )	( )	( )	( )	( )
5.คิดอยากจะตาย	( )	( )	( )	( )	( )
6.ร้องไห้ง่ายเกินไป	( )	( )	( )	( )	( )
7.กลัวโดยไม่มีเหตุผล	( )	( )	( )	( )	( )
8.เหมือนถูกกักขัง หรือถูกควบคุม	( )	( )	( )	( )	( )
19.ยุ่งยากในการทำสิ่งต่างๆ ให้สำเร็จ	( )	( )	( )	( )	( )

	ไม่เลย	เล็กน้อย	ปานกลาง	ค่อนข้างมาก	มาก ที่ สุด
	1	2	3	4	5
10.เหงา	( )	( )	( )	( )	( )
11.ไม่สนใจในสิ่งต่างๆรอบตัว	( )	( )	( )	( )	( )
12.หวาดกลัว	( )	( )	( )	( )	( )
13.สะเทือนใจง่าย	( )	( )	( )	( )	( )
14.เกิดความรู้สึกว่าไม่มีคนเข้าใจ	( )	( )	( )	( )	( )
15.ต้องทำงานช้าๆเพื่อให้แน่ใจว่าถูกต้อง	( )	( )	( )	( )	( )
16.ใจสั่น	( )	( )	( )	( )	( )
17.รู้สึกว่าตัวเองไม่มีค่า	( )	( )	( )	( )	( )
18. หลีกเลี่ยง บางสถานที่หรือ กิจกรรมบางอย่าง เพราะ รู้สึกกลัว	( )	( )	( )	( )	( )
10. สมองว่างเปล่า-คิดอะไรไม่ออก	( )	( )	( )	( )	( )
20.ไม่มีสมาธิ	( )	( )	( )	( )	( )

ข้อมูลประวัติส่วนตัว

1. อายุ

2. เพศ ชาย........หญิง............

3. สถานะภาพสมรส

โสด

แต่งงาน

หย่า

4. อาชีพ ______

5. ระดับการศึกษา _______

6. ท่านได้รับการรักษามาจำนวนกี่ครั้งแล้ว(รวมทั้งครั้งนี้)_______

7. ผลข้างเคียงที่ได้รับจากการรักษา

วิงเวียน

อาเจียน

เบื่ออาหาร

ผมร่วง

ปวดท้อง

ปวดหัว

อื่นๆ โปรดระบุ

(สำหรับเจ้าหน้าที่)

(โค๊ด).........................

H.N............................

ยา..............................

....

Appendix B ECOG Scale and Patients' diagnosis

Table B1 The Eastern Cooperative Oncology Group (ECOG) Performance Status Scale

Grade	Level of Activity
0	Fully active, able to carry on all pre-disease performance with out restriction
1	Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature, e.g., light house work, office work
2	Ambulatory and capable of all self-care but unable to carry out any work activities; up and about more than 50% of waking hours
3	Capable of only limited self-care, confined to bed or chair more than 50% of waking hours
4	Completely disabled. Cannot carry on any self-care; totally confined to bed or chair

From Skeel, R. T. (1987). Handbook of cancer chemotherapy. Boston: Little Brown. p18.

Appendix C Letters

October 18, 1996

The Director of Songklanagarind hospital,
Faculty of Medicine,
Prince of Songkla University
Songkla, Thailand 90190

The Director of Songklanagarind hospital,

My name is Vatinee Sukmak. I am currently working on my doctoral degree in Psychology at Victoria University of Technology, Australia. I had a previous appointment as a Registered Nurse at Songklanagarind Hospital, Prince of Songkla University from 1983 to 1993. I am conducting a research study on the relationship between health status, coping skills, social support and psychological status among patients receiving chemotherapy. I request your permission to include your patients undergoing chemotherapy and radiotherapy in my study. The participants in the study will be informed of the purpose of the study and asked for their consent to be included in the study. Their confidentiality is ensured. As participants, they will be asked to complete questionnaires on three occasions over a period of six months following treatments in your hospital.

You may contact me through the Department of Psychology, Faculty of Arts, Victoria University of Technology, Victoria, Australia.

Thank you for your support and co-operation.

Yours Sincerely,

Vatinee Sukmak
Ph.D. student
Ph.03 93652751
Fax 03 93652218

Wally Karnilowicz Ph.D.
Senior Lecturer
Department of Psychology
Ph 03 9216 8106
(Principal Supervisor)

FACULTY OF MEDICINE
KHON KAEN UNIVERSITY

Our ref: K.K.U.0507.23/123
NOVEMBER 25, 1996

VATINEE SUMKAM
VICTORIA UNIVERSITY OF TECHNOLOGY
Mc KECHNIE STREET
ST ALBANS PO BOX 14428
M.C.M.C. MELBOURNE
VICTORIA 8001 AUSTRALIA

Dear MS Vatinee Sukmak

I would be please to let you use the KKU version of Thai GHQ-28 as part of your research. Unfortunately, we have not published the results yet. However, I enclosed the abstract of our research which was presented in the Asean Congress of Psychiatry, 1996 with this letter.

The reliability and validity of this questionnaire are as below:

1. Internal consistency: -Standardised Alpha=0.91
-Guttman Split-half=0.73

2. Cutting Point:	Sensitivity	Specificity
4/5	85%	71%
5/6	84%	76%
6/7	80%	85%

For your reference, there is another study that validated the GHQ-60 that conducted in Bangkok by a group of psychiatrist at Ramathibodi Hospital, I also enclosed a copy of their abstract with this letter.

If you have any inquiry, please do not hesitate to contact me. My e-mail address is

nawanant@kku.1 kku.ac.th or
nanwana-p@medlib.kku2.kku.ac.th

Your Sincerely

Dr. Newanant Piyavhatkul
Department of Psychiatry
Faculty of Medicine
Khon Kaen University
Thailand 40002 Tel. 043-348384, Fax 043-348375

Ref 0033.103/ 1107

November 14, 1996

To Vatinee Sukmak
Ph.D.Student
Ph.03 93652751

According to your letter showing interest in conducting a research study among patients undergoing chemotherapy and radiotherapy in Hatyai Hospital, I would like to inform you that I am pleased to co-operate with you to include our patients in your study. I wish you complete your study soon.

For furthur information please contact Head of Academic department, Hatyai Hospital.

Yours Sincerely,

Kamol Veerapradist M.D.
Director of Hatyai, Hospital
Songkha, Thailand 90110

โรงพยาบาลสงขลานครินทร์ คณะแพทยศาสตร์ มหาวิทยาลัยสงขลานครินทร์
อ.หาดใหญ่ จ.สงขลา 90110 โทร. 074-212070-9 ต่อ 1011, 1012 โทรสาร 074-212912
SONGKLANAGARIND HOSPITAL FACULTY OF MEDICINE PRINCE OF SONGKLA UNIVERSITY
HATYAI, SONGKHLA 90110 THAILAND TEL. 66-074-212070-9 EXT. 1011, 1012 FAX. 66-074 212912

February , 1997

Vatinee Sukmak
Ph.D. student
Department of Psychology
Faculty of Arts, Victoria University of Technology,
Victoria, Australia.

According to your letter shows you are interested in conducting a research study of Songklanagarin hospital, Songklanagarin hospitol is pleased to confirm you to include patients undergring chemotherapy and radiotherapy. Please contact Nursing Department, radiological Department and cancer committee.

Songklanagarine hospital wish you success in your study.

Yours Sincerely,

Sutham pinjaroen, M.D.
Hospital Director and Associate Dean

Appendix D Supplementary Table

Table D1 Summary for Item Means and Standard Deviation on Health Status Scale

Item/Subscale	Chemotherapy Time 1	Chemotherapy Time 2	Radiotherapy
Somatic Symptoms			
1) feeling perfectly well	.73 (.94)	.56(.92)	.61(.78)
2) in need of a good tonic	1.17 (.74)	.97(.71)	1.18(.81)
3) run down	1.51 (.78)	1.25(.87)	1.13(.87)
4) feeling ill	1.05 (.90)	.98(.83)	.82(.88)
5) pains in your head	.63 (.84)	.53(.71)	.52(.76)
6) pressure in your head	.96 (.96)	.82(.83)	.77(.86)
7) hot or cold spells	.95 (.93)	.78(.76)	.81(91)
Social Dysfunction			
8) busy and occupied	2.10 (.81)	1.80(.72)	2.02(.75)
9) taking longer over things	1.59 (.64)	1.44(.59)	1.50(.67)
10) doing things well	1.59 (.68)	1.33(.68)	1.39(.64)
11) satisfied with carrying out task	1.52 (.75)	1.23(.71)	1.26(.68)
12) playing a useful part	1.56 (.75)	1.26(.66)	1.25(.63)
13) capable of making decisions	1.27 (.57)	1.16(.58)	1.10(.50)
14) enjoying normal activities	1.55 (.61)	1.34(.63)	1.34(.58)

Note: standard deviation in parenthesis

a four-point scale running from 0 to 3

Table D2 Summary for Item Means and Standard Deviation on Social Support Scale

Item/Subscale	Chemotherapy Time 1	Chemotherapy Time 2	Radiotherapy
Number of Support Persons			
1) number of persons give you information about your illness	1.81 (1.38)	2.01(1.06)	1.83(1.04)
2) number of persons who provide useful suggestions that help you to avoid making mistakes in your treatment	2.13 (1.31)	2.88(.98)	2.65(1.08)
3) number of persons help you feel better when you are very irritable, ready to get angry at almost anything in your treatment	3.12 (1.99)	4.37(1.58)	3.80(1.78)
4) number of persons support you in major decisions you make about your illness	1.30 (1.49)	1.70(1.61)	1.39(1.34)
5) number of persons who care about you, regardless of what is happening to you	3.39 (1.74)	4.28(1.34)	3.78(1.58)
6) number of persons who tell you, in a thoughtful manner, when you need to improve in some way	2.81 (1.65)	3.94(1.20)	3.62(1.51)

Support Satisfaction			
1) levels of satisfaction with persons who give you information about your illness	4.87 (.93)	5.06(.68)	5.03(.81)
2) levels of satisfaction with persons who provide useful suggestions that help you to avoid making mistakes in your treatment	4.75 (.99)	5.16(.61)	5.12(.77)
3) levels of satisfaction with persons who help you feel better when you are very irritable, ready to get angry at almost anything in your treatment	5.11 (.74)	5.24(.58)	5.12(.76)
4) level of satisfaction with persons who support you in major decisions you make about your illness	4.95 (.94)	5.05(.85)	5.06(.76)
5) levels of satisfaction with persons who care about you, regardless of what is happening to you	5.03 (.74)	5.12(.61)	5.08(.72)
6) levels of satisfaction with persons who tell you, in a thoughtful manner, when you need to improve in some way	4.86 (.84)	4.96(.67)	5.00(.77)

Note: standard deviation in parenthesis

a six-point scale running from 1 to 6 for level of satisfaction

Table D3 Summary for Item Means and Standard Deviation on Psychological Symptom Scale

Item/Subscale	Chemotherapy Time 1	Chemotherapy Time 2	Radiotherapy
Obsessive-Compulsive			
1) trouble remembering things.	1.35 (.58)	1.41(.71)	1.37(.73)
2) trouble concentrating	1.43 (.70)	1.20(.50)	1.44(.79)
3) feeling others of not understand you or are unsympathetic	1.46 (.68)	1.42(.75)	1.61(.89)
4) having to avoid certain places or activities because they frighten you	1.29 (.58)	1.19(.49)	1.18(.47)
5) your mind going blank	1.29 (.61)	1.28(.63)	1.23(.53)
Interpersonal Sensitivity			
6) feeling critical of others.	1.39 (.68)	1.32(.65)	1.59(.82)
7) feeling easily annoyed or irritated	2.00 (.72)	1.75(.75)	1.82(.84)
8) feeling fearful	2.01 (.90)	1.58(.79)	1.78(.89)
9) your feelings being easily hurt	1.75 (.92)	1.44(.70)	2.00(.93)
10) heart pounding or racing	1.33 (.66)	1.15(.41)	1.30(.61)

Depression			
11) thoughts o fending your life	1.30 (.64)	1.08(.36)	1.17(.49)
12) crying easily	1,38 (.76)	1.20(.61)	1.33(.75)
13) feeling of being trapped or caught	1.66 (.78)	1.28(.55)	1.33(.65)
14) feeling blocked or stymied in getting thing done	2.25 (.91)	2.04(.99)	1.96(.89)
15) feeling lonely	1.42 (.73)	1.19(.45)	1.41(.70)
Anxiety			
16) nervousness or shakiness inside	2.16 (.76)	2.02(.76)	1.91(.68)
17) suddenly scared for no reason	1.18 (.55)	1.05(.22)	1.11(.42)
18) feeling no interest in things	1.76 (.89)	1.40(.68)	1.31(.56)
19) having to do things very slowly in order to be sure you are doing them right	1.56 (.71)	1.50(.70)	1.42(.63)
20) trouble getting your breath	1.13 (.43)	1.19(.55)	1.32(.70)

Note: standard deviation in parenthesis

a five-point scale running from 1 to 5

Table D4 Summary for Item Means and Standard Deviation on Coping Skill Scale

Item/Subscale	Chemotherapy Time 1	Chemotherapy Time 2	Radiotherapy
Problem-Solving			
1) concentrated on something good that could come out of the whole thing.	2.87(.71)	3.00(.67)	2.95(.69)
2) change something so things would turn out all right.	2.68(.90)	2.96(.87)	2.73(.90)
3) just took things one step at a time.	2.02(.86)	2.25(.87)	2.11(.90)
4) come up with a couple of different solutions to the problem.	2.56(.91)	2.94(.82)	2.80(.86)
5) changed something about myself so I could deal with the situation better.	2.15(.97)	2.39(.89)	2.24(.94)
Seeking Support			
6) talked to someone about how I was feeling.	3.18(.93)	3.28(.85)	3.19(.85)
7) talked to someone to find out about the situation.	3.35(.72)	3.28(.71)	3.18(.78)
8) accepted sympathy and understanding from someone.	2.56(.73)	2.65(.66)	2.59(.74)
9) got professional help and did what they recommended.	2.74(.77)	2.77(.76)	2.67(.79)
10) asked someone I respected for advice and followed it.	3.40(.71)	3.22(.84)	3.15(.86)

Blaming Selves			
11) blamed yourself.	2.08(.98)	1.61(.79)	1.98(.89)
12) criticised yourself	1.94(.92)	1.67(.86)	1.97(.94)
13) realised you brought the problem on yourself.	1.96(.98)	1.59(.82)	1.78(.90)
Wishful Thinking			
14) hoped for a miracle would happen.	2.66(1.07)	2.43(1.07)	2.50(1.06)
15) wished I was a stronger person.	3.27(.71)	3.32(.78)	3.23(.79)
16) daydreamed or imagined a better time or place than the one I was in.	3.38(.78)	3.28(.77)	3.27(.78)
17) had fantasies or wishes about how things might turn out.	3.25(.82)	3.21(.79)	3.27(.81)
18) wished the situation would go away somehow be finished.	3.15(.84)	3.10(.82)	3.16(.86)

Avoidance			
19) went on as if nothing had happened.	1.39(.74)	1.37(.69)	1.34(.70)
20) felt bad that I couldn't avoid the problem.	2.32(.72)	2.11(.75)	2.32(.79)
21) refused to believe it had happened.	1.31(.62)	1.34(.62)	1.38(.67)
22) got mad at the people or things that caused the problem.	2.69(1.12)	1.73(.98)	2.25(1.10)
23) tried to make myself feel better by eating, drinking, smoking, taking medications.	1.41(.78)	1.38(.78)	1.40(.73)

Note: standard deviation in parenthesis

a four-point scale running from 1 to 4

Appendix D (cont.)

Table D 5 Estimated Correlation Matrix for the Initial Chemotherapy Test

	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	X1	X2
Y1	1.000										
Y2	.593	1.000									
Y3	.035	.033	1.000								
Y4	-.104	-.142	-.073	1.000							
Y5	-.243	-.218	-.061	.375	1.000						
Y6	-.131	-.077	-.159	.360	.476	1.000					
Y7	-.111	-.033	-.044	.503	.371	.493	1.000				
Y8	.239	.125	.217	-.149	-.171	-.251	-.153	1.000			
Y9	.190	.123	.100	-.014	-.066	-.133	-.021	.366	1.000		
X1	-.104	.019	-.095	.364	.180	.265	.402	-.099	.126	1.000	
X2	-.101	-.092	-.113	.318	.213	.283	.261	-.124	.030	.325	1.000

X1=somatic problems
X2=social dysfunction
Y1=satisfaction with informational support
Y2=satisfaction with emotional support
Y3=number of support persons
Y4=obsessive-compulsive
Y5= interpersonal sensitivity
Y6= depression
Y7= anxiety
Y8= problem solving
Y9= seeking support

Table D 6 Estimated Covariance Matrix for the Initial Chemotherapy Test

	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	X1	X2
Y1	2.890										
Y2	2.611	6.702									
Y3	.327	.474	30.001								
Y4	-.260	-.543	-.591	2.187							
Y5	-.762	-1.041	-.619	1.022	3.398						
Y6	-.391	-.350	-1.527	.931	1.533	3.059					
Y7	-.312	-.142	-.397	1.230	1.130	1.426	2.734				
Y8	.959	.764	2.804	-.522	-.744	-1.037	-.597	5.589			
Y9	.634	.623	1.074	-.040	-.237	-.456	-.067	1.695	3.844		
X1	-.376	.102	-1.101	1.139	.704	.981	1.407	-.496	.522	4.483	
X2	-.325	-.447	-1.169	.884	.739	.930	.813	-.553	.112	1.294	3.539

Table D 7 Estimated Correlation Matrix for the Second Chemotherapy Test

	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	X1	X2
Y1	1.000										
Y2	.576	1.000									
Y3	.127	.193	1.000								
Y4	.065	.078	-.082	1.000							
Y5	-.086	-.059	-.127	.461	1.000						
Y6	-.139	-.100	-.144	.427	.528	1.000					
Y7	-.116	-.151	-.071	.331	.487	.466	1.000				
Y8	.152	.124	.262	-.006	-.028	.055	.001	1.000			
Y9	.130	.069	.188	-.070	.075	.061	.081	.435	1.000		
X1	-.177	-.047	-.020	.107	.225	.262	.296	.060	.088	1.000	
X2	-.140	-.108	-.011	.039	.168	.202	.266	.085	.178	.503	1.000

X1=somatic problems
X2=social dysfunction
Y1=satisfaction with informational support
Y2=satisfaction with emotional support
Y3=number of support persons
Y4=obsessive-compulsive
Y5= interpersonal sensitivity
Y6= depression
Y7= anxiety
Y8= problem solving
Y9= seeking support

Table D 8 Estimated Covariance Matrix for the Second Chemotherapy Test

	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	X1	X2
Y1	1.386										
Y2	1.409	4.318									
Y3	.665	1.782	19.800								
Y4	.118	.251	-.566	2.414							
Y5	-.155	-.187	-.871	1.102	2.367						
Y6	-.244	-.310	-.959	.990	1.212	2.226					
Y7	-.154	-.355	-.355	.581	.845	.784	1.271				
Y8	.403	.585	2.635	-.022	-.099	.186	.002	5.115			
Y9	.285	.269	1.558	-.204	.216	.171	.170	1.832	3.473		
X1	-.350	-.165	-.152	.278	.581	.654	.561	.228	.276	2.812	
X2	-.286	-.389	-.084	.105	.447	.521	.520	.333	.574	1.461	2.996

Table D 9 Estimated Correlation Matrix for the Radiotherapy Test

	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	X1	X2
Y1	1.000										
Y2	.521	1.000									
Y3	-.016	.213	1.000								
Y4	-.020	-.015	-.083	1.000							
Y5	-.082	-.143	.033	.231	1.000						
Y6	-.068	-.141	-.264	.339	.339	1.000					
Y7	.001	-.085	-.014	.256	.403	.409	1.000				
Y8	.085	.100	.320	.118	.039	-.186	.033	1.000			
Y9	.144	.081	.249	.030	.095	-.180	.032	.461	1.000		
X1	-.116	-.075	-.040	-.002	.045	.240	.272	-.012	-.027	1.000	
X2	-.051	-.188	-.288	-.032	.075	.114	.121	-.285	-.095	.155	1.000

X1=somatic problems
X2=social dysfunction
Y1=satisfaction with informational support
Y2=satisfaction with emotional support
Y3=number of support persons
Y4=obsessive-compulsive
Y5= interpersonal sensitivity
Y6= depression
Y7= anxiety
Y8= problem solving
Y9= seeking support

Table D 10 Estimated Covariance Matrix for the Radiotherapy Test

	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	X1	X2
Y1	1.948										
Y2	1.648	5.139									
Y3	-.109	2.419	25.166								
Y4	-.048	-.057	-.710	2.922							
Y5	-.233	-.657	.339	.800	4.112						
Y6	-.144	-.487	-2.024	.885	1.050	2.329					
Y7	.002	-.223	-.084	.506	.945	.721	1.336				
Y8	.282	.535	3.789	.476	.188	-.670	.091	5.579			
Y9	.396	.361	2.470	.100	.381	-.543	.073	2.152	3.898		
X1	-.307	-.325	-.383	-.007	.174	.695	.598	-.052	-.101	3.617	
X2	-.114	-.687	-2.335	-.087	.245	.281	.226	-1.088	-.303	.477	2.608

Appendix D (continued)

Table D11 Parameter Estimates (Maximum Likelihood) for Items of the GHQ Measurement Model

Items	Factor loading	*t*
feeling perfectly well	.326	6.275*
in need of a good tonic	.336	6.487*
run down	.606	12.484*
feeling ill	.663	13.877*
pains in head	.511	10.238*
pressure in your head	.572	11.675*
hot or cold spells	.624	12.918*
busy and occupied	.581	13.011*
taking longer over things	.604	13.663*
doing things well	.728	17.426*
satisfied with carrying out task	.857	22.106*
playing a useful part	.859	22.212*
capable of making decisions	.477	10.337*
enjoying normal activities	.706	16.687*

Note: *p<.0001

Table D12 Parameter Estimates (Maximum Likelihood) for Items of the SSQN Measurement Model

Items	Factor loading	*t*
information about illness	.159	3.267
suggestions about treatment	.408	8.734*
help when irritable	.854	22.112*
support decisions about illness	.285	5.946*
care given	.905	24.150*
help given in a thoughtful manner	.867	22.629*

Note: *p<.0001

Table D13 Parameter Estimates (Maximum Likelihood) for Items of the SSQS Measurement Model

Items	Factor loading	*t*
information about illness	.635	13.861*
suggestions about treatment	.608	13.124*
help when irritable	.660	14.541*
support decisions about illness	.632	13.763*
care given	.733	16.660*
help given in a thoughtful manner	.689	15.368*

Note: *p<.0001

Table D14 Parameter Estimates (Maximum Likelihood) for Items of the Psychological Symptoms Measurement Model

Items	Factor loading	*t*
remembering	.631	13.845 *
concentrating	.702	15.849*
unsympathetic	.646	14.251*
avoid places or activities	.718	16.317*
blank mind	.656	14.519*
critical of others	.341	6.843*
annoyed	.532	11.141*
fearful	.678	14.775*
easily hurt	.402	8.172*
heart pounding	.550	11.575*
nervousness inside	.555	12.141*
thoughts of ending life	.645	14.458*
crying easily	.525	11.395*
being trapped	.438	9.320*
blocked	.428	9.107*
scared for no reason	.569	12.198*
lonely	.667	14.726*
no interest in things	.554	11.825*
to do thing very slowly	.464	9.680*
trouble getting your breath	.371	7.577*

Note: *p<.0001

Table D 15 Parameter Estimates (Maximum Likelihood) for Items of the Coping Skills Measurement Model

Items	Factor loading	*t*
concentrated on something good	.609	13.776*
change something	.826	20.885*
just took things one step at a time	.798	19.817*
come up with a couple of different solution	.862	22.295*
changed something about myself	.761	18.508.*
talked about feeling	.676	15.367*
talked to someone to find out	.771	18.308*
accepted sympathy	.567	12.346*
got professional help	.699	16.047*
asked someone for advice	.826	20.174*
blamed yourself	.904	22.446*
criticised yourself	.657	15.021*
realised you brought the problem on yourself	.857	20.888*
hoped for a miracle	.191	3.925
wished being a stronger person	.575	12.850*
daydreamed	758	18.359*
fantasies	.914	24.099*
wished the situation would go away	.827	20.734*
as if nothing had happened	.407	6.456*
felt bad that I couldn't avoid the problem	.482	7.478*
refused to believe	.404	6.422*
got mad at the people	.231	3.705
make myself feel better with smoking, drug, eating	.049	.784

Note: *p<.0001

Table D16 Standardised Parameter for Factors of the Measurement Model

Factors	Loading	*t*
somatic symptoms	.523	6.061**
social dysfunction	.520	(a)
satisfaction with informational support	.916	(a)
satisfaction with emotional support	.619.	4.351*
number of support persons	1.000$^{(b)}$	(a)
obsessive-compulsive	.505	7.482**
interpersonal sensitivity	.513	(a)
depression	.710	8.827**
anxiety	.706	8.817**
problem-solving	.852	4.353*
seeking support	.473	(a)

Note: *p<.0002, **p<.0001, (a) *t* was not computed because the item had been fixed to unity to scale the factor, (b) fix at 1.000.

Appendix D (continued)

Table D17 Matrix Specification for the Model

Structural model

$$\begin{bmatrix} sss \\ ssn \\ psy \\ pro \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ \beta_{31} & \beta_{32} & 0 & 0 \\ \beta_{41} & \beta_{42} & \beta_{43} & 0 \end{bmatrix} \begin{bmatrix} sss \\ ssn \\ psy \\ pro \end{bmatrix} + \begin{bmatrix} \gamma_{11} \\ \gamma_{21} \\ \gamma_{31} \\ \gamma_{41} \end{bmatrix} \left[health \right] + \begin{bmatrix} \zeta_1 \\ \zeta_2 \\ \zeta_3 \\ \zeta_4 \end{bmatrix}$$

Measurement model

$$\begin{bmatrix} y1 \\ y2 \\ y3 \\ y4 \\ y5 \\ y6 \\ y7 \\ y8 \\ y9 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ \lambda y2 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & \lambda y4 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & \lambda y6 & 0 \\ 0 & 0 & \lambda y7 & 0 \\ 0 & 0 & 0 & \lambda y8 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} sss \\ ssn \\ psy \\ pro \end{bmatrix} + \begin{bmatrix} \varepsilon 1 \\ \varepsilon 2 \\ \varepsilon 3^{*} \\ \varepsilon 4 \\ \varepsilon 5 \\ \varepsilon 6 \\ \varepsilon 7 \\ \varepsilon 8 \\ \varepsilon 9 \end{bmatrix}$$

$$\begin{bmatrix} x1 \\ x2 \end{bmatrix} = \begin{bmatrix} \lambda x1 \\ 1 \end{bmatrix} \begin{bmatrix} health \end{bmatrix} + \begin{bmatrix} \delta 1 \\ \delta 2 \end{bmatrix}$$

Note: sss=support satisfaction ssn=number of support persons; psy=psychological symptoms; pro=problem-focused coping; health=health status; y1 informational satisfaction; y2=emotional satisfaction; y3=number of support persons; y4=obsessive-compulsive; y5=interpersonal sensitivity; y6=depression; y7=anxiety; y8 problem solving; y9=seeking support; x1=somatic symptoms; x2=social dysfunction , *constrainted parameter; 1=fixed at 1.00

Table D18 Specification of the Stability of Health Status Variable

---

Structural model

$$\begin{vmatrix} h1 \\ h2 \end{vmatrix} = \begin{vmatrix} 0 & 0 \\ \beta_{21} & 0 \end{vmatrix} \begin{vmatrix} h1 \\ h2 \end{vmatrix} + \begin{vmatrix} \zeta_1 \\ \zeta_2 \end{vmatrix}$$

Measurement model

$$\begin{vmatrix} y1 \\ y2 \\ y3 \\ y4 \end{vmatrix} = \begin{vmatrix} 1 & 0 \\ \lambda y2 & 0 \\ 0 & 1 \\ 0 & \lambda y4 \end{vmatrix} \begin{vmatrix} h1 \\ h2 \end{vmatrix} + \begin{vmatrix} \varepsilon 1 \\ \varepsilon 2 \\ \varepsilon 3 \\ \varepsilon 4 \end{vmatrix}$$

Note: h1=heatlh status time 1, h2=health status time 2, y1=somatic time 1, y2=social dysfunction time 1, y3=somatic time 2, y4=social dysfunction time 2,

Appendix D (continued)

Table D19 Univariate ANOVAs and Descriptive Statistics for Health and Aged

		Chemo Time 1	Chemo Time 2	Radiotherapy	
Age	**N**	**Mean**	**Mean**	**N**	**Mean**
20-32 years	18	5.61	5.83	12	6.08
33-45 years	63	5.98	7.19	75	6.36
46-60 years	77	6.01	7.16	122	5.75
F	.95[1]	6.35[2]	.59[3]		1.23
p≤	.38	.01*[4]	.56		.29

Table D20 Univariate ANOVAs and Descriptive Statistics for the SSN and Aged

		Chemo Time 1	Chemo Time 2	Radiotherapy	
Age	**N**	**Mean**	**Mean**	**N**	**Mean**
20-32 years	18	13.61	11.78	12	10.92
33-45 years	63	14.50	10.03	75	12.52
46-60 years	77	14.27	11.52	122	12.76
F	.46	26.09	1.99		.74
p≤	.63	.00*	.14		.48

---

[1] between subject

[2] within subject

[3] interaction effect

[4] * significant at p≤.05

Table D21 Univariate ANOVAs and Descriptive Statistics for the SSQ and Aged

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Age	N	Mean	Mean	N	Mean
20-32 years	18	31.16	29.47	12	29.32
33-45 years	63	30.23	29.06	75	30.40
46-60 years	77	30.76	29.95	122	30.53
F	1.51	8.43	.34		.77
p≤	.22	.01*	.71		.47

Table D22 Univariate ANOVAs and Descriptive Statistics for Psychological Symptoms and Aged

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Age	N	Mean	Mean	N	Mean
20-32 years	18	17.06	19.61	12	16.50
33-45 years	63	16.78	18.73	75	18.03
46-60 years	77	16.81	17.87	122	18.26
F	.67	12.49	.79		.83
p≤	.51	.00*	.46		.43

Table D23 Univariate ANOVAs and Descriptive Statistics for Problem-focused Coping and Aged

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Age	N	Mean	Mean	N	Mean
20-32 years	18	16.89	16.28	12	15.17
33-45 years	63	17.48	16.81	75	17.08
46-60 years	77	17.65	16.79	122	16.57
F	.36	2.69	.04		1.50
p≤	.69	.10	.96		.23

Table D24 Univariate ANOVAs and Descriptive Statistics for Health and Marital Status

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Marital Status	N	Mean	Mean	N	Mean
single	14	6.57	6.57	20	5.40
married	129	5.81	5.74	163	5.99
divorced or widowed	15	6.60	7.20	26	6.42
F	1.18	5.13	.28		.82
p≤	.31	.03*	.76		.44

Table D25 Univariate ANOVAs and Descriptive Statistics for the SSN and Marital Status

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Marital Status	N	Mean	Mean	N	Mean
single	14	15.07	15.07	20	10.25
married	129	14.23	14.22	163	12.99
divorced or widowed	15	14.07	14.20	26	11.88
F	.86	27.19	.95		3.02
p≤	.42	.00*	.39		.05

Table D26 Univariate ANOVAs and Descriptive Statistics for the SSS and Marital Status

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Marital Status	N	Mean	Mean	N	Mean
single	14	31.95	31.97	20	29.83
married	129	30.41	30.43	163	30.60
divorced or widowed	15	30.87	30.73	26	29.67
F	.03	13.66	3.77		1.22
p≤	.97	.00*	.03*		.28

Table D27 Univariate ANOVAs and Descriptive Statistics for Psychological Symptoms and Marital Status

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Marital Status	N	Mean	Mean	N	Mean
single	14	17.64	17.64	20	18.90
married	129	16.77	16.74	163	18.17
divorced or widowed	15	16.53	16.80	26	16.88
F	2.28	11.37	1.27		1.27
p≤	.11	.00*	.28		.28

Table D28 Univariate ANOVAs and Descriptive Statistics for Problem-focused Coping and Marital Status

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Marital Status	N	Mean	Mean	N	Mean
single	14	17.14	17.14	20	15.45
married	129	17.57	17.57	163	16.78
divorced or widowed	15	17.20	17.20	26	16.92
F	1.07	4.48	.53		1.21
p≤	.34	.04	.59		.30

Table D29 Univariate ANOVAs and Descriptive Statistics for Health and Religion

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Religion	N	Mean	Mean	N	Mean
Buddhist	136	5.96	5.89	194	6.00
Muslim	22	5.95	6.36	15	5.80
F	.33	4.22	.66		.08
p≤	.57	.04	.42		.78

Table D30 Univariate ANOVAs and Descriptive Statistics for the SSN and Religion

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Religion	N	Mean	Mean	N	Mean
Buddhist	136	14.29	14.24	194	12.43
Muslim	22	14.27	14.64	15	14.73
F	.01	22.84	.01		.30
p≤	.91	.00*	.92		.08

Table D31 Univariate ANOVAs and Descriptive Statistics for the SSS and Religion

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Religion	N	Mean	Mean	N	Mean
Buddhist	136	30.60	30.59	194	30.30
Muslim	22	30.57	30.62	15	31.73
F	.00	4.20	.01		1.66
p≤	.98	.04	.93		.09

Table D32 Univariate ANOVAs and Descriptive Statistics for Psychological Symptoms and Religion

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Religion	N	Mean	Mean	N	Mean
Buddhist	136	17.04	17.00	194	18.02
Muslim	22	15.45	15.73	15	18.80
F	5.65	4.89	.21		.41
p≤	.02*	.03*	.64		.52

Table D33 Univariate ANOVAs and Descriptive Statistics for Problem-focused Coping and Religion

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Religion	N	Mean	Mean	N	Mean
Buddhist	136	17.64	17.65	194	16.65
Muslim	22	16.59	16.50	15	16.93
F	2.12	1.78	.03		.08
p≤	.15	.18	.86		.77

Table D34 Univariate ANOVAs and Descriptive Statistics for Health and Gender

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Gender	N	Mean	Mean	N	Mean
male	43	5.64	5.53	68	5.78
female	114	6.07	6.11	141	6.09
F	.25	13.41	.40		.60
p≤	.62	.00*	.52		.44

Table D35 Univariate ANOVAs and Descriptive Statistics for the SSN and Gender

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Gender	N	Mean	Mean	N	Mean
male	43	14.05	14.00	68	11.46
female	115	14.38	14.40	141	13.14
F	.02	33.86	.17		5.2
p≤	.88	.00*	.68		.02*

Table D36 Univariate ANOVAs and Descriptive Statistics for the SSS and Gender

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Gender	N	Mean	Mean	N	Mean
male	43	31.12	31.00	68	30.42
female	115	30.40	30.44	141	30.41
F	.75	9.51	.68		.03
p≤	.39	.00*	.41		.98

Table D37 Univariate ANOVAs and Descriptive Statistics for Psychological Symptoms and Gender

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Gender	N	Mean	Mean	N	Mean
male	43	17.07	17.00	68	18.26
female	115	16.73	16.76	141	17.99
F	.35	6.68	2.13		.17
p≤	.56	.01*	.15		.67

Table D38 Univariate ANOVAs and Descriptive Statistics for Problem-focused Coping and Gender

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Gender	N	Mean	Mean	N	Mean
male	43	16.50	16.77	68	16.12
female	115	17.85	17.77	141	16.94
F	3.01	1.79	1.34		2.24
p≤	.09	.18	.25		.14

Table D39 Univariate ANOVAs and Descriptive Statistics for Health and Education

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Education	N	Mean	Mean	N	Mean
4 years or less	86	6.02	7.35	143	6.08
5-12 years	41	6.02	6.95	45	6.00
above year 12	31	5.68	6.19	21	5.29
F	1.03	9.11	.65		.81
p≤	.36	.00*	.52		.45

Table D40 Univariate ANOVAs and Descriptive Statistics for the SSN and Education

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Education	N	Mean	Mean	N	Mean
4 years or less	86	14.49	10.85	143	12.90
5-12 years	41	13.76	11.80	45	11.58
above year 12	31	14.45	10.13	21	12.71
F	.15	38.38	1.56		1.19
p≤	.86	.00*	.21		.31

Table D41 Univariate ANOVAs and Descriptive Statistics for the SSS and Education

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Education	N	Mean	Mean	N	Mean
4 years or less	86	30.25	29.46	143	30.71
5-12 years	41	30.79	30.22	45	29.62
above year 12	31	31.28	28.87	21	30.06
F	.92	11.29	1.97		2.13
p≤	.40	.00*	.14		.12

Table D42 Univariate ANOVAs and Descriptive Statistics for Psychological Symptoms and Education

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Education	N	Mean	Mean	N	Mean
4 years or less	86	16.44	18.56	143	18.11
5-12 years	41	16.68	18.29	45	18.33
above year 12	31	18.06	18.16	21	17.29
F	.39	7.34	1.59		.39
p≤	.68	.01*	.21		.67

Table D43 Univariate ANOVAs and Descriptive Statistics for Problem-focused Coping and Education

	Chemo Time 1	Chemo Time 2			Radiotherapy
Education	N	Mean	Mean	N	Mean
4 years or less	86	17.36	16.35	143	16.62
5-12 years	41	17.17	16.68	45	16.22
above year 12	31	18.92	17.90	21	17.65
F	2.31	2.61	.32		1.60
p≤	.10	.11	.73		.20

Table D44 Univariate ANOVAs and Descriptive Statistics for Health and Occupation

	Chemo Time 1	Chemo Time 2			Radiotherapy
Occupation	N	Mean	Mean	N	Mean
farmer	30	5.83	5.87	87	6.69
women who work at home	56	5.80	5.82	30	5.57
civil servants	26	5.65	5.77	26	5.08
business	6	5.67	5.67	21	5.43
worker	25	6.60	6.44	33	5.45
unemployed	15	6.33	6.27	12	6.33
F	1.48	8.01	1.33		2.52
p≤	.20	.01*	.25		.03

Table D45 Univariate ANOVAs and Descriptive Statistics for the SSN and Occupation

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Occupation	N	Mean	Mean	N	Mean
farmer	30	13.60	13.40	87	12.39
women who work at home	56	14.43	14.50	30	13.37
civil servants	26	13.42	13.81	26	13.19
business	6	18.17	18.17	21	12.19
worker	25	14.44	14.16	33	12.61
unemployed r	15	14.83	14.80	12	11.50
F	.95	44.76	1.15		.38
p≤	.45	.00*	.34		.81

Table D46 Univariate ANOVAs and Descriptive Statistics for the SSS and Occupation

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Occupation	N	Mean	Mean	N	Mean
farmer	30	30.27	30.23	87	30.58
women who work at home	56	30.50	30.50	30	30.72
civil servants	26	31.42	31.19	26	29.82
business	6	31.12	31.12	21	30.79
worker	25	29.56	29.88	33	30.32
unemployed	15	31.67	31.60	12	29.25
F	2.98	8.96	2.49		.65
p≤	.01*	.00*	.04		.66

Table D47 Univariate ANOVAs and Descriptive Statistics for Psychological Symptoms and Occupation

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Occupation	N	Mean	Mean	N	Mean
farmer	30	15.67	13.40	87	18.32
women who work at home	56	16.11	16.13	30	18.73
civil servants	26	18.50	18.38	26	18.31
business	6	17.00	17.00	21	17.00
worker	25	18.56	18.80	33	17.67
unemployed	15	15.93	15.95	12	17.17
F	2.84	10.78	2.53		.57
p≤	.02*	.00*	.03*		.72

Table D48 Univariate ANOVAs and Descriptive Statistics for Problem-focused Coping and Occupation

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Occupation	N	Mean	Mean	N	Mean
farmer	30	16.30	16.30	87	16.81
women who work at home	56	18.20	18.09	30	15.90
civil servants	26	18.27	18.39	26	18.30
business	6	15.83	15.83	21	16.23
worker	25	16.72	16.72	33	16.96
unemployed	15	17.82	18.27	12	13.91
F	2.97	4.58	.71		2.84
p≤	.01*	.04	.62		.02*

Table D49 Univariate ANOVAs and Descriptive Statistics for Health and Side-effects

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Side-effects	N	Mean	Mean	N	Mean
nausea	12	6.17	6.17	77	5.49
nausea and vomiting	18	6.11	6.22	52	7.08
hair loss or itching	8	4.00	4.75	13	5.46
nausea vomiting and hair loss or itching	112	6.13	6.11	19	7.47
no side-effect	8	4.57	4.13	48	5.15
F		3.00	2.29	.40	6.12
p≤		.02*	.13	.81	.0001*

Table D50 Univariate ANOVAs and Descriptive Statistics for the SSN and Side-effects

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Side-effects	N	Mean	Mean	N	Mean
nausea	12	15.75	15.75	77	14.18
nausea and vomiting	18	12.94	12.50	52	13.48
hair loss or itching	8	14.38	14.75	13	7.85
nausea vomiting and hair loss or itching	112	14.30	14.35	19	8.21
no side-effect	8	15.00	14.88	48	12.10
F		1.41	7.68	3.47	10.65
p≤		.23	.01*	.01*	.001*

Table D51 Univariate ANOVAs and Descriptive Statistics for the SSS and Side-effects

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Side-effects	N	Mean	Mean	N	Mean
nausea	12	30.89	30.73	77	29.80
nausea and vomiting	18	30.75	30.53	52	30.38
hair loss or itching	8	32.25	33.00	13	32.53
nausea vomiting and hair loss or itching	112	30.30	30.30	19	29.63
no side-effect	8	32.50	32.31	48	31.15
F	2.11	5.86	.41		3.121
p≤	.08	.02*	.80		.016*

Table D52 Univariate ANOVAs and Descriptive Statistics for Psychological Symptoms and Side-effects

	Chemo Time 1		Chemo Time 2	Radiotherapy	
Side-effects	N	Mean	Mean	N	Mean
nausea	12	17.14	17.42	77	18.55
nausea and vomiting	18	18.28	18.00	52	18.00
hair loss or itching	8	14.38	15.88	13	14.85
nausea vomiting and hair loss or itching	112	16.60	16.63	19	17.95
no side-effect	8	17.14	16.88	48	18.33
F	1.33	2.17	.73		1.94
p≤	.26	.14	.57		.11

Table D53 Univariate ANOVAs and Descriptive Statistics for Problem-focused Coping and Side-effects

	Chemo Time 1		Chemo Time 2		Radiotherapy
Side-effects	N	Mean	Mean	N	Mean
nausea	17.47	16.67	17.00	77	16.48
nausea and vomiting	18.17	15.83	15.61	52	17.73
hair loss or itching	17.67	17.88	18.00	13	14.54
nausea vomiting and hair loss or itching	19.48	17.85	17.87	19	16.05
no side-effect	19.52	17.00	16.75	48	16.65
F	2.07	.31	.76		2.38
p≤	.09	.58	.55		.05

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