

Health-promoting Lifestyle Factors of Cancer Survivors in Taiwan

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ABSTRACT

This study sets out, using a prospective design, to examine the health-promoting lifestyle factors for cancer survivors. A questionnaire, based on the Health Promotional Model (HPM), is used to collect self-reported data during clinical visits on the health-promoting lifestyle factors related to cancer and the health locus of control. A total of 57 cancer patients were followed up from the date of their interview to the date of their death from the disease. After controlling for age, gender, type of cancer, operation, radiotherapy, chemotherapy and the number of months since cancer diagnosis, the external control and chance locus were identified as statistically significant preventive factors for these cancer patients. Although self-efficacy, social support and health promotion lifestyle were all found to have no significant influences on the survival of these cancer patients, the survivors were found to be more likely to have higher scores on health promotion lifestyle factors and lower scores on self-efficacy. These results contribute to the information required for consideration of the cultural variables aimed at caring for cancer patients.

Key words: health promotion, cancer, survivors

For many health professionals treating cancer patients, the focus has been steadily shifting towards promotion of health and maintenance of their patients' normal lifestyle during therapy. There has also been a similar shift over recent decades amongst cancer patients themselves, towards a much greater emphasis on wellness and health promotion, ultimately leading to improved survival rates ¹.

Nevertheless, cancer survivors are still carrying an increased risk of recurrence, metastases, occurrence of a second cancer and chronic disease. Such increased risk may be attributable to the natural course of cancer, age, genetic disposition, late treatment effects or lifestyle of a patient^{2,3}. An unhealthy lifestyle has been described as the pursuit, under poor personal control, of inappropriate types of health behavior and habits which can have a significant impact on personal health status. In contrast, some people may choose to pursue a health-promoting lifestyle, not because of any wish to avoid disease, but because such individuals regard such behavior as helping them and their families to enhance their well-being and to achieve their maximal health potential⁴.

One of the few studies on health-promoting activities amongst cancer patients undertaken by James et al.⁵ explored the effects of health behavior (regular fruit and vegetable intake and physical activity) on colorectal cancer (CRC) survivors and comparable non-CRC-affected participants. That study concluded that much greater

support for social behavior was discernible amongst the survivors, suggesting that different psychosocial constructs for promotion of behavioral change may result in substantial improvements in the health behavior of such cancer survivors.

Although a number of prior studies have reported that psychosocial sequelae are important prognostic factors, the independent effects of such psychosocial factors on survival are still undergoing lengthy evaluation. The same is not true, however, of health-promoting behavior amongst different cultures and ethnicities. Furthermore, cultural beliefs and attitudes may additionally contribute to the survival disadvantage amongst such patients⁶. In addition to general health status and social support, these beliefs may include the perception of lack of personal control over one's health or of one's own competence in promoting such health.

The impact of such cultural beliefs and the effects of a health-promoting lifestyle on one's personal experience of survivorship are issues which are virtually unexplored. Therefore, based upon the health promotion model, this study was to examine the health-promoting lifestyle factors which are likely to have impact upon the survival of cancer patients.

Methods

Sample

A sample of 60 cancer patients was obtained from a medical center in northern Taiwan.

All of the subjects undergoing chemotherapy for their disease were approached, and subsequently agreed to participate in the study. The cancer patients participating in this study were required to meet the following criteria: (1) suffering from a known cancer diagnosis; (2) physically, emotionally and mentally able to complete the research questionnaire; and (3) receiving operations, chemotherapy or radiotherapy as defined by the physician.

The subjects also agreed to participate in a two-year follow up after the first interview, aimed at providing a clear understanding of the survival analyses. Of the original sample of 60 patients, a total of 57 patients completed the follow-up, giving a response rate of 95 per cent.

Variable Measurement

The conceptual framework for this study was Pender's⁷ revised health promotion model. Pender identified the individual characteristics and experiences as being the personal factors and prior health behaviors. These factors including cognitive-personal factors, interpersonal and situational influences may be mediated by behavior-specific cognitions and affects. It was decided that some of the variables in the Health Promotion Model would not be measured, essentially because of the potential fatigue of the subjects undergoing treatment for their cancers. The appropriate variables in the Health Promotion Model were therefore chosen on the basis of their conceptual and theoretical

importance. In this study, cognitive-personal factors were identified as self-efficacy and perceived health locus of control. The interpersonal and situational influences included social support, symptom distress, perceived health status, and mental health.

Instruments

A seven-part survey was used to collect the data. The structured questionnaire included (1) perceived health locus of control, (2) perceived self-efficacy, (3) perceived health status, (4) perceived symptom distress, (5) perceived psychological health, (6) perceived social support, (7) and health promotion lifestyle.

Perceived health locus of control

This questionnaire, taken from Wallston et al.⁸ comprised of three scales, each containing 18 items, designed to measure the three dimensions of internality, chance locus and externality (powerful others). The format used was a five-point Likert response scale. Scores on each subscale can range from 5 to 30, with higher scores indicating a stronger belief in that type of control. The reliability and validity of the questionnaire were supported in a Chinese hemodialysis sample⁹. The coefficient alpha for the total health locus of control in this study was 0.75.

Perceived self-efficacy

Perceived self-efficacy was based on the patients' confidence in executing health promotion activities¹⁰. The self-efficacy of health promotion comprised of six items:

the maintenance of normal daily life, motion relaxation, balanced diet intake, regular exercise, external relationships and symptom management. The responses were again recorded by means of a five-point Likert scale, rated from 5 to 1, with a higher score representing higher self-efficacy. The coefficient alpha for the overall self-efficacy of health promotion in this study were 0.76.

Perceived health status

The perceived health status scale comprised of five items scored on a four-point Likert scale. Five items included that doctor said I am in good health status, I feel better than before, I feel some problems with health, I feel I am in good health, and I feel not well recently. The ratings reflected health experience, with higher scores indicating better health status. The reliability coefficient in the study of healthy adolescence has ranged from 0.85 to 0.90^{11,12}. The coefficient alphas for the dimension of health status in this study were 0.83. Content validity was established by a panel of experts.

Perceived symptom distress

This questionnaire, which was taken from Longman et al.¹³ and Larsen et al.¹⁴ comprised of ten items employing a four-point Likert scale, with a higher score indicating greater symptom distress. The symptoms included skin irritation, change in appetite, fatigue, vomiting, nausea, oral ulcer, and sleep disturbance. The coefficient alphas for the overall symptom interruption in this study were 0.7.

Perceived psychological health (general health questionnaire)

The General Health Questionnaire¹⁵, which contained 12 items, was used as the measure of the mental health status of the patients. The responses were again recorded using a four-point Likert response format, with a higher score indicating better perceived mental health status. The internal consistency of the instrument in this study was 0.9.

Perceived social support

Social support questionnaire was modified from the interpersonal support evaluation list (ISEL)¹⁶. The questionnaire focuses on the support of the patients' family and relatives (18 items) and that of the medical staff (14 items), with each part including emotional, informational, tangible and appraisal dimensions¹⁶. This questionnaire again employed a four-point Likert response format with possible responses of 'never' (0), 'sometimes' (1), 'often' (2) and 'routinely' (3). A higher score represents better social support.

Health promotion lifestyle

This questionnaire, taken from Walker et. al.¹⁷, comprised of 41 items under the six dimensions of self-actualization (8 items), health responsibility (11 items), exercise (5 items), nutrition (5 items), interpersonal support (6 items), and stress management (6 items). A four-point Likert response format was once again employed, with possible

responses of 'never' (0), 'sometimes' (1), 'often' (2) and 'routinely' (3). A higher score represents better health-promotion lifestyle. The scores on the total instrument and on each of the subscales were subsequently computed. Walker reported total reliability coefficient of this questionnaire as 0.94 with the six subscales coefficient ranging from 0.79 to 0.87¹⁷. In the present study, the alpha reliability coefficient for the total scale was 0.88, whilst the alphas for the subscales ranged from 0.72 to 0.86.

Data Collection Procedure

The collection of the data for this study was undertaken at the chemotherapy outpatient department within an academic medical center in northern Taiwan. After ethical approval was required from hospital, the researchers identified those patients meeting the criteria for inclusion in this study, obtained permission for their inclusion in the research, and then explained the general purpose of the study.

Each subject was interviewed in order to obtain demographic information and to provide them with information on how to carry out the personal assessment of their health-promotion related variables. All subjects were asked to complete the questionnaire during their clinical visit and then return it to the researchers. The researcher assisted unable patients to complete and record the patients' answers on the questionnaire. The data collection was carried out between February 2005 and April 2005. The prospective design of the study involved the subsequent follow up of the

patients over a two-year period from the date of the interview.

Statistical Analysis

The basic comparisons between the 'alive or censored' and the 'died from cancer' groups were undertaken by primary examination of the demographic characteristics and the cancer clinic/therapeutic issues using independent t-tests for the continuous variables and Chi-square tests for the categorical variables, with no consideration of the parameter referring to the follow-up period.

The 'alive or censored' group included those patients who had survived to the end of the follow-up period, those who had been lost to follow up during the study period, as well as those patients who had died, but where the underlying cause of death in their death certificates was from causes other than cancer. Furthermore, because of the nature of the prospective design study setting, we applied the survival analyses on the influencing factors generated by Pender's health promotion model to the deaths from cancer as the endpoint.

The duration of the follow up, in months, was defined as the period from the date of the interview to the date of death from cancer (the 'event' in the survival analyses), the date lost to follow up, the end of the follow-up period, or where the patient had died from other causes. Specifically, the health locus of control, social support and health-promoting lifestyle factors potentially predicting the prognosis of cancer deaths

were the issues of major concern in this study.

Hazard ratios (with 95% confidence intervals) were estimated for the relative risks of the prediction factors. Univariate Cox regressions were then applied to estimate the hazard ratios for these factors vis-à-vis the occurrences of death from cancer. Thereafter, the age and gender of the patient, the type of cancer, operation, radiotherapy, chemotherapy, and months since the cancer diagnosis were considered as potential confounders in the multivariate analyses, although they do not seem to represent any remarkable effects on survival in the current study.

However, bearing in mind the need to avoid highly correlated variables being enrolled in a single model, the factors were examined for collinearity. Furthermore, for the purpose of clarifying the overlapping effects of health locus of control, social support and health promotion lifestyle on cancer survivors, these factors of major interest were to be treated as parallel concepts in the construction of the final models for the multivariate analyses. The SPSS 15.0 program for Windows was utilized to perform all of the statistical analyses in this study, with the significance level (α value) being set at 0.05.

Results

A total of 57 patients suffering from various types of cancers were involved in the analytical frame, of which 29 (50.88 per cent) were female, with an average age of

61.49 years (SD=13.07). The comparisons of the demographic characteristics of the study subjects are presented in Table 1, by their cancer survival status at the end of the study period ('alive or censored' or 'died from cancer'). No remarkable discrepancies were found with regard to the age of the patients or other basic characteristics. Significant differences were, however, found between different types of cancer. ($p < 0.05$ by Chi-square test) Also shown in Table 1, the cancer health locus of control and chance control between the two groups were significantly different.

The outcomes of the univariate analyses by Cox regressions are shown in Table 2. Where the follow-up time was also considered as a parameter in the model, there was a vague effect (approximately two-fold) of radiation therapy on the risk of death (borderline significance).

Unfortunately, no particular findings were identified for cancer types, although cases of lung cancer and GI system cancer revealed slightly poorer prognoses (borderline significance), relative to breast cancer. Meanwhile, higher health control and chance control locus were found to have preventive effects on cancer deaths amongst the current study subjects, with statistical significance. The outcomes of the multivariate analyses are presented in Table 3, which shows that after controlling for potential confounders, the health locus of control (HR = 0.73, 95% CI: 0.63 – 0.85), powerful others (HR = 0.72, 95% CI: 0.53 – 0.98), and chance control (HR = 0.60, 95%

CI: 0.48 – 0.75) were identified as statistically significant preventive factors.

Discussion

The primary purpose of the prospectively designed study was to estimate the hazard ratios of the factors influencing the occurrences of death from cancer. Survival analysis was applied to the factors generated by Pender's health promotion model to follow up cancer prognoses. By avoiding the highly correlated variables and examining their co-linearity, we present some remarkable effects on survivors. Parallel concepts were utilized in the construction of the final model to clarify the overlapping effects of perceptual factors and health-promoting lifestyle.

Our results show that after adjusting for the age and gender of the patients, type of cancer, operation, radiotherapy, chemotherapy and months since cancer diagnosis, the most significant preventive factor was not health-promoting lifestyle, but the health locus of control. Although this result cannot confirm the cause and effect relationship that may exist between health-promoting lifestyle factors and patient survival, we can confirm that the health locus of control is a consequence of morbidity relating to cultural variables amongst diverse cancer survivor groups.

The health locus of control refers to the extent to which a person believes that their personal health is controlled or influenced by their own actions, by the actions of healthcare staff, or by luck or fate. The health locus of control includes internal,

external and chance locus; the internal locus is related to the level of control which one may experience over their own health, the external locus is the extent to which a person attributes their own health to powerful others (such as doctors and other medical staff), and the chance locus is the extent to which a person believes that their personal health status and any illnesses they may suffer are purely matters of luck¹⁸.

After controlling for potential confounders, this study finds significant changes in the external control and chance locus amongst Taiwanese cancer survivors (Table 3). There is a potential correlation between this result and those patients whose cancer diagnoses were made over two years earlier, since health providers would clearly be assisting such patients to receive chemotherapy or radiotherapy, as well as other forms of treatment, such as symptom assessment and drug instruction. In such a situation, there would clearly be an inclination for some external control over the health of these cancer survivors¹⁹.

This result is not, however, consistent with the finding reported by Weis Farone et al.²⁰. In that study, there were associations between internal locus of control and more favorable health outcome for elder Latina cancer survivors. Most of the studies indicated that internal locus of control was associated with adjustment to cancer, positive coping, and cancer-related behaviors^{21,22,23}.

Analyses of the differences here suggest that they may be attributable to cultural

variables. As compared to people in most western societies, Taiwanese people perceive a lower level of personal control over their own health, believing that it is influenced by luck, and not by themselves. Such perception of lack of a control over the situation may dictate that these patients simply cope with their cancer as the means of indirectly facing their disease. Our results therefore indicate that consideration of cultural variables is important in the care of cancer survivors.

This study demonstrates the perception amongst cancer survivors that their health is controlled by chance or 'powerful others' and finds higher scores for the health-promoting lifestyle factors (Table 1). It would, however, seem unreasonable, or illogical, to find that individuals who believe they have less control over their health would have more reasons to engage in health-promoting behavior; indeed, this finding is at odds with the findings of the prior studies in which an examination of the relationship between health behavior and the health locus of control was undertaken²⁰.²⁴ The role of health-promoting lifestyle in this study was regarded as an intervening variable between the health locus of control and cancer survival, so as to provide a better understanding of the relationship.

The cancer survivors in this study described good health as the absence of any disease or symptoms, and therefore adopted behavior aimed at avoiding sickness of illness. Similar to the leading theorists⁷, cancer patients asserted that minimization of

health risks was a crucial factor influencing the promotion of health. Nevertheless, whilst the behavior of these patients clearly sought to enhance the positive potential for health, this study confirms that the most important factors potentially extending the lifespan of these cancer patients were the external control and chance locus.

The concept of self-efficacy can be viewed as the extent to which individual's perception that they are capable of adopting positive action on health promotion²⁵. This study indicates that the cancer survivors were inclined to have lower scores on self-efficacy (Table 1), although not significant, a result which is inconsistent with most of the prior studies in which self-efficacy was reported to have a negative correlation with physical and/or psychological symptoms.

The findings of this study show that the cancer survivors had lower scores on symptom interruption, but higher scores on psychological health. Our analysis included a unique examination of health-promoting factors aimed at estimating the hazard ratios for these factors vis-à-vis the occurrences of death from cancer. The focus of the cancer survivors in this study was on adaptation to their cancer diagnoses; however, their lower self-efficacy scores, to some extent, precluded their participation in health-promoting behavior. After adjusting for age, gender, type of cancer, operation, radiotherapy, chemotherapy and months since the diagnosis, all of which were considered as potential confounders in the multivariate analyses, our findings suggest that the health locus of

control had a significant impact on the cultural variables of the cancer survivors.

This is one of only a few studies to examine the health behavior of cancer survivors vis-à-vis the occurrences of death from cancer. The findings suggest that internal control over personal health may be enhanced by health providers, information which may be useful for the development of appropriate intervention by health providers to promote behavioral change. Thus, it would seem that health communication aimed at improving survivals amongst cancer patients may need to be tailored to different psychosocial constructs.

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