Prevalence of and factors related to anxiety and depression symptoms among married patients with gynecological malignancies in China

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ABSTRACT

Objective: This study aims to investigate the prevalence of anxiety and depression among married patients with gynecological malignancies in China and then explores factors related to anxiety and depression.
Methods: A cross-sectional study was conducted from July 2016 to July 2017 in Jilin Province. A total of 394 married patients with gynecological malignances completed the Hospital Anxiety and Depression Scale (HADS). Univariate analysis and multivariate logistic regression analysis were used to evaluate the association between influencing factors of anxiety and depression. Back propagation neural networks (BP neural networks) were used to examine the ranking of these influencing factors.
Results: The prevalence of anxiety and depression was 79.95% and 94.16% in married patients with gynecological malignancies. Multivariate logistic analysis revealed that patients' anxiety showed significant relationships with low income, frequency of chemotherapy, diagnostic results and low sleep quality ($P < 0.05$), and patients' depression showed significant relationships with low quality sleep and frequency of chemotherapy ($P < 0.05$). Using BP neural networks, the order of importance of these factors in influencing anxiety, from high to low, was determined to be sleep quality, frequency of chemotherapy, monthly income, diagnostic results, age and fertility demand.
Conclusions: It is important to reduce anxiety and depression in these patients by improving sleep quality and clinical treatment.

1. Introduction

Gynecologic malignancies are a serious and potentially life-threatening illness that has negative effects on the physical and psychological health of patients, and they are the leading cause of death in females. Over a million people are diagnosed with gynecological cancers, and a half million of them die every year (Siegel et al., 2014; Vistad et al., 2006). Gynecologic malignancies mainly include uterine tumors, ovarian cancer, tubal tumors, vulvar tumors and vaginal tumors. In particular, the incidence of ovarian cancer is ranked third, and its mortality rate is the highest, among all the female reproductive system malignant tumors, typically with relapse occurring within 12–18 months (Torre et al., 2015; Ferlay et al., 2015; Sjoquist et al., 2013). In addition to physical pain, patients who are suffering from cancer often experience enormous mental stress and financial burden (Al and Al, 2014; Azzani et al., 2015; Burrai et al., 2014; Cheng and Lee, 2011;

Chino et al., 2014; Nipp et al., 2015). A study by Linden et al. showed that approximately half of patients with cancer developed anxiety- or depression-related disorders, and 58% of cancer patients were reported to have the feeling of anxiety (Linden et al., 2012). The combination of cancer and psychological symptoms contributes to a heavier burden of disease (Recklitis and Pirl, 2011).

Many studies have focused on the adverse outcomes of gynecological cancers, however, few studies have focused on the mental health of married patients with gynecologic malignancies in China. Chinese women are influenced by a 5000-year history of culture that has given priority to men in this patriarchal society. A considerable number of married women with cancer or a history of cancer have reported frustration and guilt because of their limitations in daily functioning, family economic status and sexual function (Baumgart et al., 2013; Zebrack et al., 2010). Given the great disparity of economy and culture between western countries and mainland China, it is difficult to infer the

X   P   Y

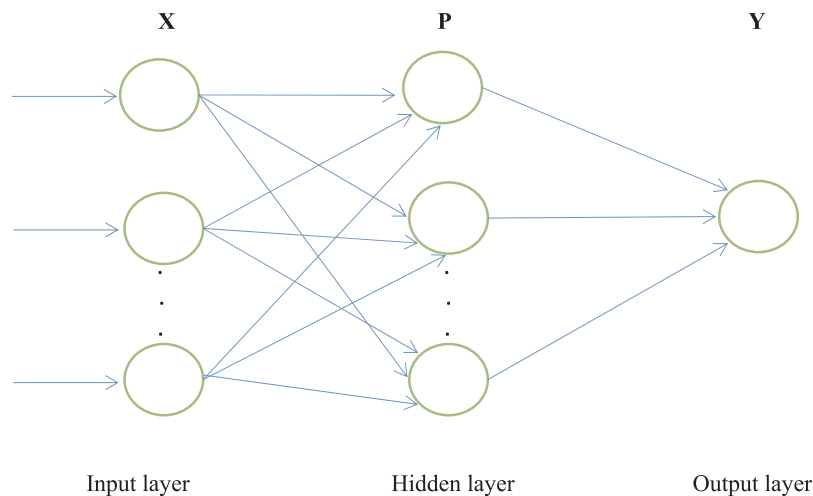Input layer   Hidden layer   Output layer

Fig. 1. BP Neural Network Topology.
Sleep quality, frequency of chemotherapy, economic status, diagnostic result, age, and fertility demand were selected as the input layer, and the output layer was anxiety.

conditions in China from the findings obtained in western countries. Therefore, research on married patients with gynecologic malignancies in China is of great importance.

In this study, we aimed to examine predictors of anxiety and depression symptoms among married patients with gynecological malignancies, which could provide a foundation for offering effective psychosocial services.

2. Material and methods

2.1. Participants

A cross-sectional study was conducted in a Jilin Province hospital from July 2016 to July 2017. This study was approved by the Ethics Committee of the School of Public Health, Jilin University. Particpants in this study was voluntary, and the respondents were all over 18 years old, married, and diagnosed with gynecological malignancies. In addition, they all had the ability to communicate with others normally. Patients with mental illness, a history of anxiety or depression, serious complications or other active cancers were excluded from the study. Written informed content was obtained from all participants. In addition to the clinical information collected by medical records, other data were collected by questionnaire. Of the 396 participants initially involved in this study, two participants were excluded due to incomplete questionnaires, resulting in 394 participants finally being included in this study.

2.2. Measures

Demographic variables included age, nationality, working status, job, residence, educational status, monthly income, medical insurance, and sleep quality. Clinical characteristics included diagnostic results, frequency of chemotherapy and fertility demand. Diagnostic results were divided into four categories: cervical cancer, endometrial cancer, ovarian cancer and others.

The Hospital Anxiety and Depression Scale (HADS) was created by Zigmond and Snaith in 1983 (Snaith, 1983) and was used to measure anxiety and depression. It has been widely used in cancer patients but also in patients with other somatic diseases, and it was demonstrated to have high reliability and validity (Rajandram et al., 2011). The 14-item questionnaire was divided into a depression subscale (7 items) and an anxiety subscale (7 items). Each subscale ranged from 0 to 21, and it had a 4-point scoring method with higher scores representing a higher degree of anxious or depressive symptoms. Participants were grouped

as follows: patients who scored 0–7 had no obvious symptoms; patients who scored 8–10 potentially had symptoms; and patients who scored more than 10 were diagnosed with symptoms. Similar to a previous study, if the score on a subscale was greater than or equal to 8, patients were considered to have a tendency for anxiety or depression.

2.3. Back propagation neural networks

A back propagation neural networks (BP neural networks) is a multilayer feed-forward neural-network algorithm based on error back propagation, which is one of the most widely used neural network models (Cao et al., 2016). The basic principle is to transform the input vector through hidden layers, resulting in an output vector, to build mapping between input and output. Each layer influences the next layer. Anxiety and the potential influencing factors were used in the BP neural network. When developing the model, the influencing factors were selected as the input layer, and the output layer was anxiety (Xie et al., 2014). The BP neural network was established with the SPSS 24.0 software. The input layer contained 6 input neurons, the hidden layer contained 2 neurons, and the output layer contained 1 output neuron. The number of hidden layer neurons was determined through trial and error, since no accepted protocol currently exists for predetermining the optimal number of hidden layer neurons. The data set was randomly divided into two parts: 70% (276 cases) as the training set for learning and 30% (118 cases) as the unseen data for validation. Within medicine, BP neural networks have been used to diagnose disease, predict mortality risk and identify risk factors for some diseases. In this study, BP neural networks were used to examine the ranking of influencing factors. Then, these factors were identified as health issues to determine which should be prioritized. Regarding the implementation of this process, the methodological framework is shown in Fig. 1.

2.4. Statistical analysis

SPSS 24.0 was used to conduct the statistical analyses. Medians, means (M), standard deviations (SD), number (N) and percentage (%) were used to describe the demographic, clinical and influencing variables. Chi-square tests were used to compare the differences in depression and anxiety symptom scores between different demographic and diagnostic groups. In addition, we performed multivariate logistic regression analysis to explore factors related to anxiety and depression symptoms. A P-value < 0.05 was considered to be statistically significant.