

Analysis of the Current Status and Influencing Factors of Psychological Distress in Malignant Tumor Patients during Chemotherapy

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Abstract: *Objective:* To systematically evaluate the current status of psychological distress among patients with malignant tumors during chemotherapy and analyze its multidimensional influencing factors. *Methods:* Evidence from domestic and international crosssectional and longitudinal studies over the past decade was integrated. Evidence was reviewed hierarchically from individual, disease/treatment, and social/environmental perspectives, and a multifactor path model was constructed. *Results:* The incidence of severe psychological distress during chemotherapy ranged from 20% to 35%. Independent risk factors included low economic status, high grade of treatment-related side effects, metastatic disease, and low social support. Fatigue and sleep disturbance exerted significant mediating effects between treatment-related factors and psychological distress. Moreover, economic hardship and deficient family support showed synergistic amplifying effects. *Conclusion:* Psychological distress is driven by multifactor interactions. The fatigue/sleep disturbance mediating chain and social buffering system constitute key intervention targets. A “two-step screening and three-tier intervention” system is recommended. Psychological distress management should be valued equally with somatic treatment to improve the effectiveness of integrated care.

Keywords: Malignant tumor; Chemotherapy; Psychological distress; Influencing factors; Social support

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1. Introduction

Chemotherapy is a relatively common type of treatment for cancer that can extend life. At the same time, there will be physical pain and other emotions. This distress will reduce the willingness to participate in treatment and may worsen the course of illness and quality of life. However, the identification and intervention rates of psychological distress in current clinical practice are still relatively low due to a lack of systematic knowledge about its many causes. Psychological distress results from a combination of various reasons, such as personal traits, health conditions, demands of medical care, and living environments.

Therefore, all-encompassing studies of the present situation and multiple factors affecting psychological distress during chemotherapy can offer practical support for developing personalized psychological support plans. Based on the assessment tool and epidemiological data, this paper investigates the reasons for changes at the individual, disease-treatment, and social-environmental levels, presents integrated models and intervention ideas, and offers a system of theoretical support for clinical work.

2. Assessment and current status of psychological distress

2.1. Definition and measurement tools of psychological distress

Psychological distress refers to a negative emotion caused by many reasons, which may include changes in thinking, behavior, and relationships with others, etc., and ranges from slight mood swings to serious mental illness. The Distress Thermometer (DT) is frequently used in clinical research as a quick-screening tool to measure the level of distress on a 0-10 scale, and a score of 4 or higher is considered clinically significant distress. The Hospital Anxiety and Depression Scale (HADS) and Brief Symptom Inventory-18 (BSI-18) are also frequently employed to assess the extent of anxiety, depression, and somatization. Different Instruments have different sensitivities and specificities. Due to its simplicity, the DT is suitable for regular screening in oncology departments, and multi-dimensional scales can be used to investigate various manifestations of distress. The selected measuring device will affect both the rate at which data are collected and the precision of the resulting factor analysis; therefore, it should meet the requirements of the study. Recently, some electronic adaptive assessment systems have begun to be introduced for dynamic observation and provide technical support for monitoring changes in patients' conditions during chemotherapy in time and space. Further research needs to be conducted to verify the practical value of these methods ^[1].

2.2. Overall incidence of psychological distress during chemotherapy

Based on multiple domestic and foreign cross-sectional studies and meta-analyses, the general prevalence of psychological distress among cancer patients undergoing chemotherapy is between 45% and 65%, and severe distress (DT score ≥ 7) occurs at about 20%–35% of this rate. The frequency of occurrence changes with chemotherapy stage: distress is relatively high before the first cycle of chemotherapy due to the shock of diagnosis and fear of treatment; by the middle of chemotherapy, many people have developed side effects. Although some patients' symptoms have eased after chemotherapy, about 30 percent still feel moderately to severely distressed. The proportion of distress detected is relatively high among inpatients receiving chemotherapy compared with outpatients, and this may be due to indicators of serious illness and feelings of social isolation in the hospital environment. In short, most people are stressed during chemotherapy. Regularly check whether the oncology nurse has added anything new. Strengthen dynamic assessment to identify a high-risk period. Proactive psychological support can be provided before the peak of side-effect accumulation to reduce overall distress and improve the quality of life for patients.

2.3. Distribution characteristics of psychological distress across cancer types and stages of treatment

Psychological distress varies among different types of cancer. Generally speaking, patients with head-and-neck cancer and pancreatic cancer experience more distress due to changes in their bodies and severe digestive problems. Although the survival rate of breast and prostate cancer patients is relatively high, they

still face certain psychological problems caused by reduced sexual function and altered body image. In terms of the stage of treatment, patients who have undergone adjuvant chemotherapy after surgery have better survival prospects and are less distressed than those who have received neoadjuvant or palliative chemotherapy; the latter are concerned about whether the treatment will work and how soon they will be ill again. Patients with recurrent or metastatic disease who have received re-chemotherapy show significantly higher levels of psychological distress than new patients, mainly in the form of hopelessness and fear of death. A larger number of chemotherapy cycles is associated with increased distress and cumulative side effects, especially at cycles 3–4. Therefore, different psychological support systems need to be designed according to the features of cancer and the stage of treatment, and resources should be concentrated on high-risk cancer types and advanced-stage groups.

3. Individual patient-related factors and psychological distress

3.1. Effects of age, gender and educational level

Age is related to psychological distress in a U-shaped manner: young patients experience severe distress due to disrupted social roles and fertility concerns; older patients have increased distress because they are physically weaker and feel a stronger sense of loss; middle-aged patients are relatively stable. Female patients generally report a higher proportion of distress compared to men, possibly because women are more emotionally expressive and sensitive to changes in their bodies. Educationally disadvantaged patients are at risk of developing catastrophic thinking due to a lack of health literacy and thus cannot understand the purpose of chemotherapy. At the same time, well-educated people have good access to information but are also more anxious about bad news on the Internet and face an “information paradox.” Therefore, the association between age or educational level and psychological distress is not linear. Address intragroup subcultural differences and provide targeted psychological education for patients of all ages, paying particular attention to the special needs of young and old people ^[2].

3.2. Roles of economic status and medical insurance

A large-scale macro-environmental stressor for psychological problems in cancer patients undergoing chemotherapy is financial pressure. Patients with high out-of-pocket expenses or household incomes below the local average have shown significantly higher distress scores, and this gap has been increasing over time after treatment. Medical insurance coverage reduces the sense of decision-making conflict among patients facing expensive targeted drugs; therefore, those who are fully insured (by both public and private health insurance) experience less psychological stress compared to those with only basic medical insurance. Fear of poverty caused by illness leads to ongoing financial worries. Even if the present expenses are low, there will still be some anxiety. Economic reasons increase people’s psychological burden directly and, at the same time, reduce their ability to live well by cutting off access to food and healthcare. Economic toxicity indicators should be added to clinical assessment. Provide information on medical assistance and cost-sharing schemes for disadvantaged patients to reduce the financial stress and improve the willingness to receive treatment.

3.3. Impact of previous psychological history and personality traits

Patients who have had anxiety disorders, depression or other mental health problems in the past are at a much

higher risk of experiencing psychological distress during chemotherapy, and this distress is often about twice as severe as that experienced by people without such a history. Neuroticism is associated with poor emotion regulation and thus increased susceptibility to somatization of chemotherapy side effects in individuals. Extraverted and conscientious people are more likely to use adaptive coping behavior and experience less stress. Optimism is generally considered to be protective; however, if a person has not received effective treatment and is still optimistic, they will be disappointed when their hopes are not realized and may suffer from “optimism-induced despair”. At the start of chemotherapy, conduct a baseline psychological assessment to identify vulnerable subgroups and offer preventive psychological education; thereby reducing the risk of psychological distress and promoting adaptive coping for high-risk individuals.

4. Disease- and treatment-related factors

4.1. Cancer stage, disease course and metastatic status

Patients with advanced-stage (Stage III–IV) cancer experience much higher levels of psychological distress compared to those at earlier stages of the disease, mainly due to a loss of hope resulting from changes in the goal of treatment from cure to relief. Disease duration and distress are not linearly related; acute stress is more likely to occur in the first year after diagnosis, and burnout-related depression tends to appear in chronically ill patients who have had their disease for more than two years. Distant metastases, especially bone and brain metastases, cause severe pain or other neurological disorders; thus, they directly lead to strong death anxiety and a sense of loss of control. A relatively large number of metastatic sites are associated with severe distress. Multiple organ metastases can cause various physical problems and reduce one’s ability to cope with stress. Based on the above characteristics, oncology teams need to provide different levels of psychological support at different times during the course of illness and spread of tumor. Early introduction of palliative care concepts for patients with advanced metastatic cancer can help them maintain their sense of self-worth and purpose in life during a short time.

4.2. Chemotherapy schedules, cycles and severity of side effects

High-intensity regimens that contain platinum or taxane drugs cause more severe neurotoxicity, myelosuppression, and gastrointestinal reactions, and thus result in more significant psychological distress compared with oral targeted or endocrine therapies. Accumulated side effects are exacerbated by extended chemotherapy cycles and increase distress. When the total amount of drugs reaches a certain level, people will feel tired, nauseated, and vomit repeatedly due to learned negative associations. A relatively high frequency of side effects indicates that the dose may be too large and thus causes psychological harm. Alopecia and hand-foot syndrome are also relatively common changes in physical appearance that affect one’s sense of self-worth. Frequent changes in the treatment plan indicate poor response to therapy and may lead to feelings of hopelessness and powerlessness ^[3]. Document the degree of side effects and record any discomfort experienced by patients after taking different medications to assess the psychological impact. Promptly address and treat anticipatory nausea caused by highly emetogenic drugs to prevent conditioning of aversion.

4.3. Mediating effects of pain, fatigue and sleep disturbance

Pain, cancer-related fatigue and sleep disorders are relatively frequent adverse reactions to chemotherapy

that may also affect one's emotional state. Based on structural equation modeling, chemotherapy-induced side effects cause about 40 percent of the variation in psychological distress through increased fatigue and disruption of circadian rhythm. Pain leads to sympathetic activation, reduced mobility, and thus poor emotion regulation. Sleep disorders reduce the function of the prefrontal cortex and weaken inhibition of negative thoughts; thus, a vicious cycle occurs. The above three symptoms often occur together and exacerbate psychological distress. Based on intervention studies, exercise-based fatigue management and cognitive-behavioral therapy for insomnia can reduce this mediator effect to some extent. Clustered symptom management should be used clinically to address psychological distress effectively, and among these, fatigue and sleep disorders need to be treated first to interrupt the vicious cycle.

5. Social support and healthcare-environment-related factors

5.1. Family support and attitudes of primary caregivers

Good family support can provide emotional and practical help to reduce stress for people receiving chemotherapy. All the above results are consistent with those from other research. Primary caregivers' attitudes are important; overprotection or negative comments will make the patient feel dependent and guilty, but calm acceptance and open communication can help them feel more in control. Spouse support also matters; infrequent talk between spouses and lack of empathy are linked to higher depression risk in older adults. A family's poor functioning due to conflict or emotional neglect increases a person's stress. Include families in the therapeutic system and organize caregiver communication training as part of the intervention plan. Optimize the pattern of intra-familial interaction to boost patients' sense of safety and adaptability.

5.2. Physician-patient communication quality and information support

The quality of physician-patient communication is relatively easy to improve in the hospital environment. Physicians can inform patients about the goals of chemotherapy, its possible side effects, and other treatment options, listen to their concerns sympathetically, and thus reduce both uncertainty and stress for the patients. If there is a lack of information or too much medical jargon, people will be confused and anxious. Information support provides patients with relevant health knowledge and ways to manage symptoms, as well as referral services for mental health professionals. Based on research, patients who receive organized information have been found to have a 25 percent lower pre-chemotherapy anxiety level. Communication satisfaction is positively correlated with consultation length; however, the extent to which deep-seated needs are met is more influential than how long they are consulted. The quality of communication should be emphasized over quantity in clinical practice. Organize special courses for doctors and nurses on communicating with patients effectively, help them learn how to talk to patients better, and so on.

5.3. Peer support and socialization

Peer support refers to communicating with other people who have been treated with the same type of chemotherapy, providing emotional support and sharing experiences to help rebuild a sense of self-worth and alleviate loneliness. Patients in mutual-aid groups or online patient communities have significantly lower psychological distress levels than those who are socially isolated, and this effect is even stronger for young and female patients. Social integration is negatively correlated with the severity of distress; however, too many social demands can lead to energy exhaustion and thus need to be regulated. Stigma often leads

to social exclusion. Patients with obvious changes in their bodies may feel embarrassed about going out and thus become more isolated. Motivate some high-quality peer interactions and promptly address signs of social withdrawal at the first opportunity. A hospital can build a platform for patients to communicate with each other and assess how long they can continue living independently ^[4].

6. Multi-factor comprehensive analysis and intervention implications

6.1. Independent risk factors derived from multi-factor regression analysis

Based on the results of large-scale regression analysis, the five independent risk factors for psychological distress during chemotherapy identified are: low household income, high-grade side effects, metastatic disease, previous psychiatric disorders, and low social support; most of these have odds ratios between 2.0 and 4.5. After adjusting for other factors, the individual impact of age and education is generally reduced, and they are likely to operate via cognitive appraisal and socio-economic paths. Sleep disturbance appears in all the models as a final equation and has the highest standardized regression coefficient; thus, it is considered a mediator. Identify the independent risk factors to develop a simple screening tool that can identify high-risk individuals for targeted intervention. Avoid multicollinearity among the variables to prevent overfitting of the model and ensure the stability and applicability of the screening tool for clinical promotion.

6.2. Path model of psychological distress and interaction effects

Path models built by Structural Equation Modeling show that disease severity affects psychological distress through two parallel paths: a direct path and an indirect path mediated by the chain of “treatment side effects → fatigue → sleep disturbance,” and this indirect path accounts for about 45 percent of the total effect. Interaction analysis shows that economic hardship and lack of family support work together to increase distress; together, they cause much more severe harm than either would alone. A neurotic personality is more likely to feel tired due to side effects and thus feels vulnerable. Good communication between doctors and patients reduces anxiety caused by information asymmetry. The above path model has identified the primary intervention sites: the fatigue-sleep axis and the social buffering system. It verifies the philosophy of intervention that gives equal weight to symptom relief and social support, and offers a clear theoretical basis for subsequent specific clinical studies ^[5].

6.3. Practical recommendations for clinical psychological intervention strategies

Based on the above overall model, the construction of a “two-step screening and three-tier intervention” system is proposed. First, regularly perform DT tests for all chemotherapy patients. Screen-positive cases will be further examined for fatigue, sleep disorders, and lack of social support. Patients who are mildly distressed will be given psychological education and self-care instructions. Those with moderate distress will be offered combined cognitive-behavioral therapy and family communication classes. Patients with serious distress need psychiatric help and other drugs. Strengthen training in physician-patient communication skills and hold information review meetings at key times. Fatigue management and sleep-hygiene education will be added to the daily work process of nurses to break the chain of causality at its origin. Oncology centers should build multi-disciplinary psychological support teams to carry out regular case reviews and adjust interventions dynamically according to changes in circumstances for continuous efficacy and personalized care.

7. Conclusion

Psychological distress in patients with cancer during chemotherapy is a multifaceted problem resulting from the combined effects of individual factors, illness severity, side effects of treatment, and social environment. This study systematically summarizes the prevalence and multiple dimensions of determinants, and explores the mediating effect of fatigue-sleep disturbance and the buffering function of social support. Most of the existing research uses cross-sectional data and cannot determine causality; therefore, there has been little exploration of why different chemotherapeutic drugs cause varying degrees of distress. In the future, some research will use extended follow-up and ecological momentary assessment to observe changes over time in distress, and randomized controlled intervention trials based on path models will also be conducted. Only when psychological distress management is given the same weight as physical disease treatment can the ideal of patient-centered integrated care be realized, and thus the aim of all-encompassing oncology care achieved.

Disclosure statement

The author declares no conflict of interest.

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