STIGMA, ANXIETY, DEPRESSION, SOCIAL SUPPORT AND QUALITY OF LIFE IN YOUNG WOMEN WITH BREAST CANCER UNDERGOING CHEMOTHERAPY: A PREDICTIVE MODEL

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by

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LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
BC	Breast Cancer
BCS	Breast-Conserving Surgery
BR	Breast Reconstruction
CSS	Cancer-Specific Survival
EORTC	European Organization for Research and Treatment
FACT-B	Functional Assessment of Cancer Therapy-Breast
HADS	Hospital Anxiety and Depression Scale
HER2	Human Epidermal Growth Factor Receptor 2
HIV	Human Immunodeficiency Virus
MLR	Multiple Linear Regression
HR	Hazard Ratio
OS	Overall Survival
QOL	Quality of Life
SEER	Surveillance, Epidemiology and End Results
SEM	Structural Equation Model
SIS	Social Impact Scale
SLR	Simple Linear Regression
SSRS	Social Support Rating Scale
SSS	Self-Stigma Scale-Short Form
TNM	Tumour, Nodes, and Metastases
WHO	World Health Organization

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STIGMA, KEBIMBANGAN, KEMURUNGAN, SOKONGAN SOSIAL DAN KUALITI HIDUP WANITA MUDA DENGAN KANSER PAYUDARA MENJALANI KEMOTERAPI: MODEL RAMALAN

ABSTRAK

Wanita muda yang didiagnosis dengan kanser payudara (BC) semakin meningkat setiap tahun dan mereka terdedah kepada masalah kesihatan mental, yang mengurangkan kualiti hidup (QoL) mereka dengan ketara. Sokongan sosial adalah penting untuk meningkatkan QoL pada pesakit BC. Walau bagaimanapun, hubungan antara stigma, kebimbangan, kemurungan, sokongan sosial dan QoL pada wanita muda dengan BC yang menjalani kemoterapi masih tidak jelas. Kajian ini bertujuan untuk mengkaji hubungan antara stigma, kebimbangan, kemurungan, sokongan sosial dan QoL dalam kalangan wanita muda dengan BC yang menjalani kimoterapi. Kajian keratan rentas ini dilakukan di *First Affiliated Hospital of Guangxi Medical University*, China dari Disember 2022 hingga Oktober 2023. Instrumen penyelidikan adalah Penilaian Fungsi Terapi Kanser-Payudara (FACT-B), Skala Penilaian Sokongan Sosial (SSRS), Skala Impak Sosial (SIS), dan Skala Kemurungan Kebimbangan Hospital (HADS). Analisis statistik menggunakan perisian SPSS26.0 dan AMOS28.0. Data telah dianalisis menggunakan deskriptif, univariat, analisis korelasi, model persamaan struktur (SEM) dan regresi linear berganda (MLR). 196 wanita dengan BC berumur ≤ 40 telah menyertai kajian ini. Purata skor QoL peserta adalah pada tahap sederhana, 98.01 (SD = 16.97). Penemuan menunjukkan QoL peserta dikaitkan dengan umur ($p = 0.005$), tahap pendidikan ($p = 0.010$), kediaman ($p = 0.004$), jenis pembedahan ($p = 0.021$), kitaran kimoterapi semasa ($p = 0.002$) dan masa selepas pembedahan ($p = 0.020$). Stigma (r = −0.590), kebimbangan (r = −0.344) dan kemurungan (r = −0.236) berkorelasi negatif dengan QoL dalam kalangan wanita

muda dengan BC. Walaubagaimanapun, sokongan sosial dan QoL mempunyai korelasi positif (r = 0.416). Di samping itu, sokongan sosial dengan ketara mengenahi kesan stigma (β = −0.214, p = 0.016) dan kemurungan (β = −0.084, p = 0.030) pada QoL. Walaubagaimanapun, sokongan sosial tidak mengantara hubungan antara kebimbangan dan QoL dengan ketara (β = 0.054, p = 0.105). 41.3% daripada varians dalam QoL di kalangan wanita muda dengan BC telah diterangkan oleh stigma, kebimbangan dan sokongan sosial. Kesimpulannya, interaksi yang ketara wujud antara stigma, sokongan sosial, kebimbangan, kemurungan dan QoL pada wanita muda dengan BC yang menjalani kimoterapi. Penemuan ini menyerlahkan kepentingan menilai cabaran psikologi yang dihadapi oleh wanita muda dengan BC sebagai sebahagian daripada penjagaan rutin. Tambahan pula, ia menggariskan keperluan untuk pembangunan masa depan dan pelaksanaan program sokongan kesihatan mental yang disesuaikan untuk wanita muda dengan BC yang menjalani kemoterapi.

STIGMA, ANXIETY, DEPRESSION, SOCIAL SUPPORT AND QUALITY OF LIFE IN YOUNG WOMEN WITH BREAST CANCER UNDERGOING CHEMOTHERAPY: A PREDICTIVE MODEL

ABSTRACT

Young women diagnosed with breast cancer (BC) are increasing annually, and they are prone to mental health problems, which significantly reduce their quality of life (QoL). Social support is crucial for enhancing the QoL in patients with BC. However, the relationship between stigma, anxiety, depression, social support, and QoL in young women with BC undergoing chemotherapy remains unclear. This study aims to examine the relationship between stigma, anxiety, depression, social support, and QoL among young women with BC undergoing chemotherapy. This cross-sectional study was done in the First Affiliated Hospital of Guangxi Medical University, China, from December 2022 to October 2023. The research instruments were the Functional Assessment of Cancer Therapy-Breast (FACT-B), the Social Support Rating Scale (SSRS), the Social Impact Scale (SIS), and the Hospital Anxiety Depression Scale (HADS). SPSS 26.0 and AMOS28.0 software were used for statistical analyses. Data were analysed using descriptive, univariate, correlation analysis, structural equation model (SEM) and multiple linear regression (MLR). 196 women with BC aged $\leq$ 40 were included in the study. The mean QoL score of participants was at a moderate level, 98.01 (SD = 16.97). The findings indicated participants' QoL was associated with education level (p = 0.010), residence (p = 0.004), surgery type (p = 0.021), current chemotherapy cycle (p = 0.002) and postoperative time (p = 0.020). Stigma (r = −0.590), anxiety (r = −0.344), and depression (r = −0.236) were negatively correlated with the QoL among young women

with BC. However, there was a positive correlation between social support and QoL (r = 0.416). In addition, social support significantly mediated the impact of stigma (β = −0.214, p = 0.016) and depression (β = −0.084, p = 0.030) on the QoL. However, social support did not significantly mediate the relationship between anxiety and QoL (β = 0.054, p = 0.105). 41.3% of the variance in QoL among young women with BC was explained by stigma, anxiety, and social support. In conclusion, a significant interaction exists among stigma, social support, anxiety, depression, and QoL in young women with BC undergoing chemotherapy. This finding highlights the importance of assessing the psychological challenges faced by young women with BC as part of routine care. Furthermore, it underscores the need for the future development and implementation of mental health support programs tailored to young women with BC undergoing chemotherapy.

CHAPTER 1

INTRODUCTION

1.1 Introduction to Chapter

This study aims to determine the relationship between stigma, anxiety, depression, social support, and quality of life (QoL) among young women with breast cancer (BC) undergoing chemotherapy. The first chapter of this study begins with the background, problem statement, research question, objectives (general and specific), hypotheses, significance, and operational definitions of the study.

1.2 Background

Globally, BC is the most prevalent malignant tumour and a significant contributor to cancer-related deaths among women (Rafat Munir Lawis et al., 2023). According to the Global Cancer Statistic 2022, BC became the most prevalent form of female cancer worldwide, with 2.29 million new cases, accounting for 11.7% of all cancer cases (Chhikara et al., 2023). In addition, in 2022, the incidence of BC among Chinese women was around 357,100 and the mortality cases were 75,000 (Han et al., 2024). Figure 1.1 provides the incidence and mortality of BC in females in 2022.

The fifth International Consensus Guidelines for BC in Young Women (BCY$_5$) defined young women as those aged 40 years or younger at the time of BC diagnosis (Paluch-Shimon et al., 2022). The incidence of BC in young women is relatively low worldwide, with an approximate annual incidence of 4%, compared to 13.6% in China (Cho et al., 2021; Co et al., 2020; Paluch-Shimon et al., 2022). However, it remains the most common malignancy in women 40 years of age and younger (Tesch et al., 2022). In addition, BC onset in China is younger than in the Western countries (Fan et al., 2014). About 4.8% of BC patients diagnosed yearly in the United States

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were younger than 40 (Fu et al., 2018). A relevant study conducted in China showed that the percentage of BC patients in this age group was 13.6% (Kwong et al., 2008).

Age-Standardized Rate (World) per 100 000, Incidence and Mortality, Females, in 2022
Breast
Continents

	Incidence	Mortality
Northern America	95.1	12.3
Oceania	91.5	15.4
Europe	75.6	14.6
LAC	52.0	13.2
Africa	40.5	19.2
Asia	34.3	10.5

140 120 100 80 60 40 20 0 20 40 60 80 100 120 140

ASR (World) per 100 000

Cancer TODAY | IARC - https://gco.iarc.who.int/today
Data version : Globocan 2022 (version 1.1)
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International Agency for Research on Cancer
World Health Organization
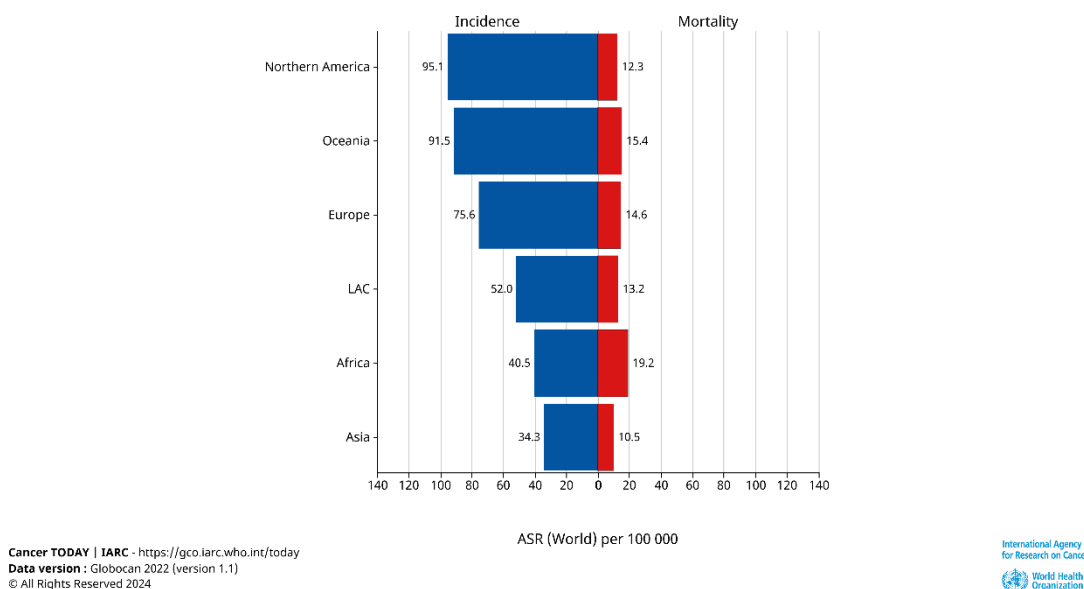
(Source: GLOBOCAN 2022)

Figure 1.1 Global Cancer Statistics 2022

According to a recent analysis based on the Surveillance, Epidemiology, and End Results (SEER) database from 2010 to 2015, it was found that the breast cancer-specific survival (CSS) were noticeably lower in women aged 30-39 years than in women aged 40-75 years, with a hazard ratio (HR) of 1.8(Kim et al., 2022). Compared to older women, BC in young women tends to exhibit more aggressive biological characteristics, including grade 3, triple-negative subtypes, and a higher proportion of Human Epidermal Growth Factor Receptor 2 (HER2) over-expression, lymphatic vessel infiltration, and lymphocyte infiltration. These factors contribute to an increased risk of early relapse and a poorer long-term prognosis for young women with BC (Ashing et al., 2018; Erić et al., 2018; Johnson et al., 2018; Zhang et al.,

2022a). Therefore, it is imperative and significant to investigate the cohort of young women with BC.

Chemotherapy is commonly recommended for the treatment of BC to improve disease-free survival. However, this therapy can result in immediate and long-term negative consequences (Azim et al., 2011). The response to chemotherapy varies according to the drug, dose, and individual differences, but all of them bring different degrees of distress or pain to patients with BC. Prior research has indicated that women with BC receiving chemotherapy have experienced adverse impacts on their QoL, overall health, and sexual function (Marino et al., 2016; Zamel et al., 2021).

Furthermore, a previous study has shown that chemotherapy can induce neutropenia, stomatitis, and nausea/vomiting in women with BC undergoing treatment (Al-Batran et al., 2015). Another study demonstrated that alopecia is a temporary consequence of chemotherapy but negatively impacts self-image and psychological well-being, such as depression, which women perceive as one of the most distressing aspects of receiving BC treatment (Choi et al., 2014). Patients may encounter the adverse effects of chemotherapy following completion (Beaver et al., 2016). Therefore, the above evidence suggests that women diagnosed with BC have substantial physical and psychological strain during their treatment, leading to a notable adverse effect on the QoL for these patients.

The 2024 Chinese Society of Clinical Oncology (CSCO) BC guidelines recommend the combination of trastuzumab and pertuzumab as a level 1 regimen for both neoadjuvant therapy and first-line treatment of indicted that for metastatic HER2-positive BC (Li et al., 2024). Additionally, pyrotinib is recommended as a grade I option for both first- and second-line therapy. Antibody-drug conjugates are also recommended for patients who experience progression after trastuzumab treatment.

For hormone receptor (HR)-positive BC, cyclin-dependent kinase 4/6 (CDK4/6) inhibitors are recommended at various stages, particularly as adjuvant therapy (Li et al., 2024).

Since the development of the Biopsychosocial Model, there has been an increased emphasis on the health of people and a growing recognition of the significance of QoL (Álvarez et al., 2012). Treating cancer patients encompasses objectives beyond enhancing survival rates and life extension. Improving the QoL is as important as survival, and the QoL will also affect the survival period of cancer patients. QoL is a broad conception that encompasses individuals' overall well-being (Kaplan et al., 1982). Several studies have shown moderate QoL of women with BC in China. Wang (2021) found a total score of the QoL of women with BC of 72.4±6.0. Lu et al (2009) evaluated changes in QoL among 2232 BC survivors, and the results showed that QoL deteriorated over time. Following the cancer diagnosis, patients will experience intense psychological distress and uncertainty, resulting in a negative impact on their overall QoL (Courneya et al., 2023). Throughout their treatment, women with BC suffer from alopecia, alterations in their appearance, heightened levels of anxiety and despair, and various other issues that significantly impact their QoL (Dinapoli et al., 2021). Therefore, it is of great clinical significance to investigate the QoL of women diagnosed with BC.

Women with BC face a range of psychological well-being challenges. One significant issue is stigma, which is commonly experienced by these women (Suwankhong et al., 2016). Stigma refers to a negative attribute or characteristic that results in a diminished social identity and profound feelings of shame (Goffman, 1963). It creates a social environment where an individual is excluded from social acceptance (Goffman, 1963). Among women diagnosed with BC, stigma is believed to be a

distinct and disease-specific component that contributes to the high occurrence of depressive mood (Amini-Tehrani et al., 2021; Tsai et al., 2019). Stigma arises when cancer survivors internalize and validate biased or discriminatory behaviors and ideas directed against them (Corrigan et al., 2002). For example, they may believe that because their disease was self-inflicted, it leads to the perception that others hold of them as unfavorable.

Several studies have confirmed that stigma has adverse consequences, such as the development of psychological and sleep disorders, a decrease in social interactions, delays or interruptions in receiving necessary medical care, and hindering the recovery process for patients (Stergiou-Kita et al., 2016; Warmoth et al., 2020; Wu et al., 2020). A recent systematic analysis comprising 45 studies revealed a correlation of medium strength between elevated levels of stigma and lower subjective QoL among psychiatric patients (Degnan et al., 2021). Sharifi et al. (2023) conducted a survey involving 223 individuals diagnosed with multiple sclerosis and discovered that social stigma might exert a substantial adverse influence on the QoL of patients. The relationship between stigma and QoL has also been established in individuals with cancer (Kim et al., 2023; Wood et al., 2017).

Next, the study will address another prevalent psychological condition closely associated with QoL: anxiety and depression. Anxiety and depression are prevalent psychological issues in women with BC (Kugbey et al., 2020). Studies showed that BC women experience varying levels of anxiety and depression (Lan et al., 2020; Tsaras et al., 2018). A previous study revealed that 42.4% of BC women and 50.5% of women experienced at least mild anxiety and depression, respectively (Ju et al., 2018). According to a systematic review, the global prevalence of depression among BC women is 32.2% (Pilevarzadeh et al., 2019).

In addition, a previous study indicated that younger women with BC exhibit a higher propensity for experiencing psychological problems than older women (Berhili et al., 2017). According to the research by Park et al. (2018), it showed that the occurrence rate of anxiety and depression in young patients with BC was as high as 44%. Patients with BC may experience anxiety and depression symptoms due to worries about side effects from therapy, uncertainty about the future, and anticipation of poor outcomes (Dinapoli et al., 2021). Anxiety and depression are essential factors of QoL, as individuals with higher levels of these disorders often report poor QoL. Studies have substantiated a robust correlation between the QoL of BC patients and anxiety and depression (Cáceres et al., 2022; Zhang et al., 2018b).

The social environment plays a crucial role in influencing the ability of cancer patients to manage stressful circumstances and maintain their overall health and well-being throughout the illness. Colvin et al. (2010) described social support as the financial or spiritual support people receive from friends and family due to their social surroundings. According to a Chinese scholar (Xiao, 1994), the term "social support" refers to the material or spiritual assistance given to individuals from all aspects of society, including family and friends, when they are under stress and can be roughly divided into three aspects: objective support, subjective support, and utilization of support.

Many evidences indicate a positive correlation between the degree of social support and health; as the level of social support increases, health improves (Iwanowicz-Palus et al., 2021; Kollerits et al., 2023). Meanwhile, previous research has demonstrated that social support from spouses, family, and friends has a substantial impact on reducing anxiety and depression levels in women (Akdag Topal et al., 2019; Hu et al., 2018). The Social Support Theory mentioned that positive social support can

buffer the adverse effect of stress events on physical and mental well-being and is crucial for preserving mental health (Cohen et al., 1985b). Moreover, social support is positively associated with QoL in BC women (Huang et al., 2013; Zamanian et al., 2021). Furthermore, it has been demonstrated that for cancer patients, social support is a crucial mediator between their negative feelings and their health (Bu et al., 2023). A systematic review of health-related QoL determinants of BC in Asia revealed that patients with limited social support experienced poor health-related QoL (Ho et al., 2018). It suggests that women with BC should be provided with suitable social support to enhance their well-being.

Previous studies have demonstrated that several demographic and disease variables, including age, marital status, having children, education, and types of surgery, can affect the QoL of BC patients (SH. et al., 2015; Yang et al., 2017). Schou et al. (2005) discovered that age significantly influenced the QoL of women with BC, and older women with BC had higher QoL. The QoL of retired/unemployed patients is lower than that of employed patients, potentially because retired/unemployed patients have less economic pressure, physical activity, and various support aspects than employed patients (Herbert et al., 2023). In addition, the presence or absence of a spouse was also a factor affecting QoL, with patients who had a spouse experiencing a greater QoL than those without (Taira et al., 2011). Therefore, BC patients have to face many problems, including the disease itself, treatment, family, and society, all of which substantially negatively influence their QoL. Although extensive studies have reported variables associated with the QoL of women with BC, there is a scarcity of research explicitly examining young women with BC (Mejía-Rojas et al., 2020; Wang et al., 2020).

At present, several studies have examined the relationship between stigma, anxiety and depression, social support, and QoL in women with BC (Iioka et al., 2020; Salakari et al., 2017; Wong et al., 2019). However, there is still a lack of research investigating the relationship between stigma, anxiety and depression, social support, and QoL in young women with BC undergoing chemotherapy. This study aims to utilize correlation analysis, the structural equation model (SEM), and linear regression to explore the relationship between stigma, anxiety and depression, social support, and QoL in young women with BC undergoing chemotherapy and to analyze the relationships and pathways between these factors comprehensively.

SEM has been widely applied across various disciplines, including psychology, sociology, behavioral sciences, and others (Hwang et al., 2022; Peng et al., 2023; Simmons et al., 2024). The most significant characteristic of the SEM lies in its ability to demonstrate that variables and factors are integrated together. It allows for the analysis of the relationship between variables and potential factors and enables the analysis of the relationship between potential and the variables themselves (Deng et al., 2018). SEM also estimates the direct and indirect effect of the interaction between variables (Stein et al., 2017; Xing et al., 2003). Therefore, one of the objectives of this study is to examine whether social support mediates the effect of stigma, anxiety, and depression on the outcome of QoL among young women with BC undergoing chemotherapy based on the SEM. Mediate effect refers to a third variable that explains the relationship between an independent variable and a dependent variable (Sidhu et al., 2021). By identifying the mediate effect of social support, we can gain insights into the underlying mechanisms of how stigma, anxiety, and depression affect QoL.

Previous studies have demonstrated that stigma, anxiety, and depression have also shown a significant relationship with cancer patients' QoL (Schleife et al., 2014;

Wu et al., 2023). Moroever, social support was associated with QoL levels among cancer patients (Tsai et al., 2018). However, most research has focused on a specific predictor (Imran et al., 2019; Wei et al., 2021). Due to the complexity of the clinical features of BC patients and the inability to consider the relevant interactions a priori (Kang et al., 2023), few studies have constructed individual models for personalized prediction of QoL among young women with BC undergoing chemotherapy. Therefore, one objective of this study is to construct the predictive model of stigma, anxiety, depression, social support, and demographic and clinical variables on QoL among young women with BC undergoing chemotherapy. After controlling for confounding demographic and clinical variables in the model, it helped us more directly evaluate the predictive effect of stigma, anxiety, depression, and social support for QoL in young BC patients undergoing chemotherapy.

1.3 Problem Statement & Study Rationale

BC not only brings physical discomfort to patients but also has a detrimental effect on their mental well-being, making them more susceptible to depression, anxiety, and other unpleasant feelings, which impact the overall well-being of patients and the progress of the disease (Tsaras et al., 2018). Studies have indicated that stigma is a crucial factor in hindering the detection of cancer and significantly reduces the QoL of patients with BC, negatively impacting their ability to work and their relationships with family members (Stergiou-Kita et al., 2016; Suwankhong & Liamputtong, 2016). At present, most studies on the stigma focus on mental diseases, AIDS, and lung cancer (Kaushik et al., 2016; Letshwenyo-Maruatona et al., 2019; Scharnetzki et al., 2021).

Anxiety and depression are prevalent psychological symptoms among BC patients, which will adversely affect their symptom burden, treatment compliance, self-care, and QoL(Boing et al., 2019). According to the Social Support Theory (Cohen

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& Wills, 1985b), positive social support can mitigate the adverse effect of stressful events on both body and mind, which is significant for maintaining mental health. Healthcare professionals have highly deemed the QoL of cancer patients as a crucial measure for assessing treatment efficacy (Islam et al., 2023). Studies have demonstrated that stigma, anxiety, and depression are linked to a decrease in QoL in BC patients (Rosenberg et al., 2020; Wong et al., 2019). Conversely, social support has been recognized as an essential protective factor against stressful events (Zamanian et al., 2021). However, the relationship between stigma, anxiety, and depression in young women with BC undergoing chemotherapy remains poorly understood.

Young women with BC are particularly vulnerable to mental health challenge, which will severely affect their QoL (Kim et al., 2021; Krasne et al., 2022). Furthermore, while social support is generally considered a protective factor (Wang et al., 2023), its potential mediating role in the impact of stigma, anxiety, and depression on QoL has not been fully explored. This gap in the existing literature underscores the need for further investigation into how these factors interact and influence QoL in young women with BC undergoing chemotherapy, with the aim of developing more effective interventions to improve their health and well-being. Therefore, this study aims to utilize an SEM to get a comprehensive understanding of the relationship between stigma, anxiety, depression, social support, and QoL in young women with BC undergoing chemotherapy. It quantifies both the direct and indirect effects of the interactions between variables, assessing how stigma, anxiety, and depression influence QoL through the mediating effect of social support in young women with BC undergoing chemotherapy.

The potential contribution of this study was to enhance the current understanding of QoL in young women with BC undergoing chemotherapy for multiple reasons. First, this model was established and evaluated in young women diagnosed with BC undergoing chemotherapy, and they may encounter elevated levels of stress as a result of environmental circumstances (Woods-Giscombé et al., 2015). This young group, due to their young age and life-limiting illness, and they have unique psychological characteristics and emotional experiences, may be concerned about their future, career, parenting responsibilities, and functioning, among other concerns (Yfantis et al., 2018). All this causes stress to young women with BC and lowers their QoL.

Based on the Social Support Theory, this study constructed an SEM, including stigma, anxiety, depression, social support, and QoL, and a prediction model of QoL of women undergoing chemotherapy, and clarifying the relationship mechanism between various variables and QoL of young women with BC undergoing chemotherapy. This study offers innovative strategies and approaches to enhance the QoL for young women with BC who are receiving chemotherapy. Additionally, it serves as a theoretical framework to enhance the Social Support Theory model and improve the management of clinical medical staff.

1.4 Research Questions

1) Are there relationships between QoL and demographic and clinical characteristics among young patients with BC undergoing chemotherapy?

2) Is stigma associated with QoL among young women with BC undergoing chemotherapy?

3) Are anxiety and depression associated with QoL among young women with BC undergoing chemotherapy?

4) Is social support associated with QoL among young women with BC undergoing chemotherapy?

5) Does social support mediate the effect of stigma, anxiety, and depression on the outcome of QoL in young women with BC undergoing chemotherapy?

6) Does stigma, anxiety, depression, social support, demographic, and clinical characteristics have a predictive effect on QoL for young women with BC undergoing chemotherapy?

1.5 Objectives

1.5.1 General Objective

The general objective is to determine the relationship between stigma, anxiety, depression, social support, and QoL among young women with BC undergoing chemotherapy.

1.5.2 Specific Objectives

1) To examine the relationship of the QoL with demographic and clinical characteristics among young women with BC undergoing chemotherapy.

2) To identify the relationship between stigma and QoL among young women with BC undergoing chemotherapy.

3) To identify the relationship between anxiety, depression, and QoL among young women with BC undergoing chemotherapy.

4) To identify the relationship between social support and QoL among young women with BC undergoing chemotherapy.

5) To examine whether social support mediates the effect of stigma, anxiety, and depression on the outcome of QoL among young women with BC undergoing chemotherapy.

6) To develop a predictive model of stigma, anxiety, depression, social support, demographic, and clinical characteristics on QoL among young women with BC undergoing chemotherapy.

1.6 Research Hypotheses

H_A1: Demographic variables and disease variables are associated with QoL among young women with BC undergoing chemotherapy.

H_A2: Stigma is negatively associated with QoL in young women with BC undergoing chemotherapy.

H_A3: Anxiety and depression are negatively associated with QoL in young women with BC undergoing chemotherapy.

H_A4: Social support is positively associated with QoL in young women with BC undergoing chemotherapy.

H_A5: Social support plays a mediating role in the effect of stigma, anxiety, and depression on QoL in young women with BC undergoing chemotherapy.

H_A6: Stigma, anxiety, depression, and social support can predict the QoL of young women with BC undergoing chemotherapy.

1.7 Significant of the Study

The potential contribution of this study was to enhance the current understanding of the psychological factors affecting the QoL in young women with BC undergoing chemotherapy for multiple reasons. First, this model was developed and tested in young women with BC undergoing chemotherapy, and they may experience high levels of stress due to contextual factors (Woods-Giscombé et al., 2015). This young group has unique psychological characteristics and emotional

experiences and may be concerned about their future, careers, childcare responsibilities, sexual function, and many more (Yfantis et al., 2018). These factors contribute to the psychological strain experienced by young women diagnosed with BC, ultimately diminishing their QoL. The prediction model developed in this study for the QoL of young women with BC received chemotherapy is of significant importance in directing the development and implementation of treatment, nursing, and rehabilitation strategies for patients.

Furthermore, this study employed SEM to investigate whether social support mediates the relationship between stigma, anxiety, depression, and QoL in young women with BC undergoing chemotherapy, based on the Social Support Theory. By identify the mediating role of social support, our work can inform targeted psychological and social interventions that better address the specific challenges young women face, ultimately enhancing their QoL and contributing to their overall well-being.

1.8 Definitions of Operational Terms

The following terms and their definitions were used throughout the study:

Table 1.1 Operational Definitions

Term	Operational definition
Stigma	It is defined as an attribute associated with a particular condition that creates a strong distrust of those perceived to be of lower social status, causing a feeling of isolation, exclusion, and demeaning to them throughout the social process (Goffman, 1963). In this study, stigma was categorized into four categories: social exclusion, economic discrimination, social isolation, and internalized stigma, which will be represented by the Social Impact Scale (SIS). An overall score ranging from 24 to 31 indicates a low level of stigma, 32 to 64 indicates a moderate level, and 65 to 96 indicates a high level of stigma (Liu et al., 2014).
Anxiety	A feeling of fear, dread, and uneasiness refers to a variety of psychological and physiological phenomena (Dutta, 1970). This was represented by the anxiety subscale of the Hospital Anxiety and Depression Scale (HADS-A), and it included seven items (Wondie et al., 2020). An overall score of 0–7 indicates normal levels, 8–10 mild anxiety, 11–15 moderate anxiety, and 16–21 severe anxiety (Snaith, 2003).
Depression	A state characterized by "low mood, diminished interest or pleasure, feelings of guilt or low self-esteem, poor sleep or appetite, reduced energy, and trouble focusing."(Ribeiro et al., 2018) This was assessed by the depression subscale of the Hospital Anxiety and Depression Scale (HADS-D), and it included seven items. An overall score of 0–7 indicates normal levels, 8–10 mild depression, 11–15 moderate depression, and 16–21 severe depression (Snaith, 2003).

Table 1.1 Continued

Social support	Social structures and relationships in an individual's life, including subjective support, objective support, and utilization of support, are represented by the Social Support Rating Scale (SSRS) (Xiao, 1994). An overall score of 12–22 indicates low level of social support, 23–44 indicates medium level and 45-66 indicates high level.
QoL	It relates to the experiences of people with various cultural backgrounds and value systems in relation to social functions, the environment, religion, physiology and psychology, and other facets of life (WHO, 1998). In this study, it contains five dimensions: physical well-being, social/family well-being, emotional well-being, functional well-being, and additional concern, which was represented by the Functional Assessment of Cancer Therapy-Breast (FACT-B). An overall score of 0-48 indicates low level of QoL, 49–99 medium level, and 110–148 high levels of QoL.
Young patients with BC	According to the Fifth International Consensus Guideline for BC in Young Women, young women with BC are typically defined as BC diagnosed pathologically in individuals aged 40 years or younger (Paluch-Shimon et al., 2022). This study's population of interest was young patients with BC.
Chemotherapy	Chemotherapy, the most widely used cancer treatment, employs medications to prevent or reduce cell development (Pérez-Herrero et al., 2015). In this study, participants must comprehensively understand the clinical term "chemotherapy."

Table 1.1 Continued

Modelling	A statistical relationship between one or more independent variables and other dependent variables. A statistical model is "a formal representation of a theory" (Burnham, 2002). In this study, SEM and multiple linear regression (MLR) were used to assess the relationships between stigma, anxiety and depression, social support, and QoL in participants.
Mediator	A third variable influences the strength or direction of the relationship between an independent variable (IV) and a dependent variable (DV) (Ong et al., 2018). In this study, the social support was chosen as the mediator.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction to Chapter

This part is divided into six parts to review the literature. The first part introduces the epidemiology of young patients with breast cancer (BC), followed by four parts systematically reviewing the QoL, stigma, anxiety, depression, and social support of women with BC undergoing chemotherapy, respectively. The sixth part describes the conceptual framework of this study based on comprehensive literature.

To systematically review the literature on stigma, anxiety, depression, social support, and QoL among BC women undergoing chemotherapy, a structured search strategy was developed. The databases including PubMed, Cochrane Library, Web of Science, Embase, China National Knowledge Infrastructure. The search was limited to peer-reviewed articles published in English between 2010 and 2023. The search terms were carefully chosen to capture the key concepts of the study and included combinations of the following:

① "Breast neoplasms OR breast cancer OR breast tumour OR breast carcinoma"

② "Chemotherapy OR cancer treatment"

③ "Stigma OR discrimination"

④ "Anxiety OR depression"

⑤ "Social support"

⑥ "Quality of life OR life satisfaction"

The literature search and selection process were conducted following the PRISMA 2020 guidelines. Initially, a total of 19,565 records were identified through

database searches. After the removal of duplicates, 13,979 unique articles remained. Following the screening of abstracts and titles, 274 articles were found to meet the inclusion criteria. Ultimately, after full-text review, a final set of 67 studies was included in the analysis. Figure 2.1 provide the flow chart of literature search.
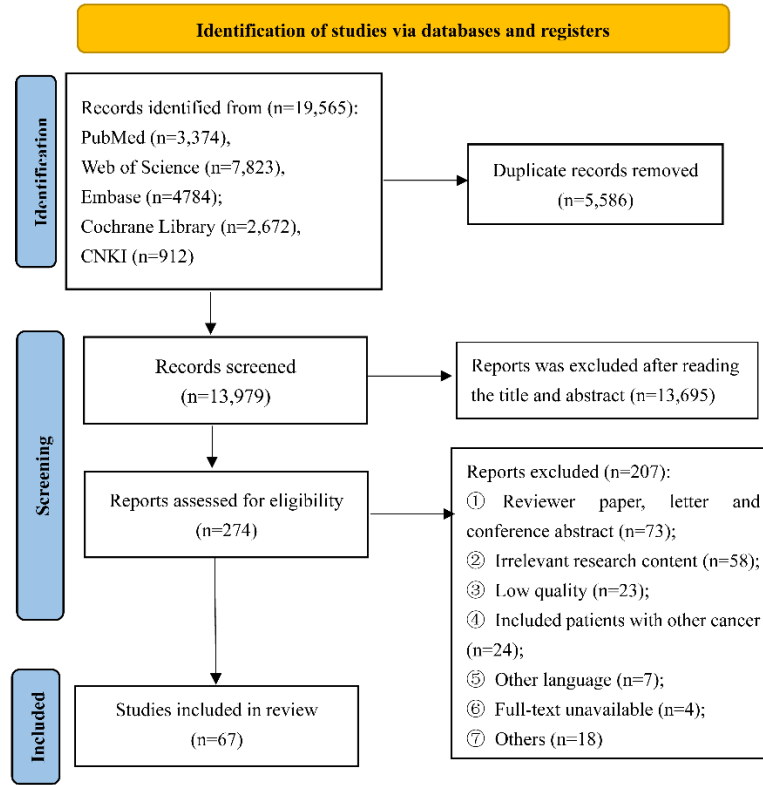
Figure 2.1 The flow chart of the literature search

2.2 Young Breast Cancer Epidemiology

2.2.1 Incidence and Prevalence of Young Breast Cancer

Young women with BC are considered a rare malignancy, accounting for less than 5% of cases (Tesch & Partridge, 2022). However, according to a 2019 report from the SEER database indicates that among women between the ages of 15 and 39, BC remains the primary cause of cancer-related mortality (Siegel et al., 2022). Furthermore, according to the study by Guo et al. (2018), the incidence of BC in patients between 20 and 39 years from 1975 to 2015 is rising at a rate of 0.5% per year.

Furthermore, the global incidence of young women with BC has increased by 16% since the 1990s, making it the most common cancer in this population (Zhu et al., 2023).

The incidence of BC in young women is approximately 5% in the United States (Cathcart-Rake et al., 2021). According to the report, the proportion of BC patients aged 40 and below in China ranges from 7.01% to 16.4%, which is higher than that observed in the United 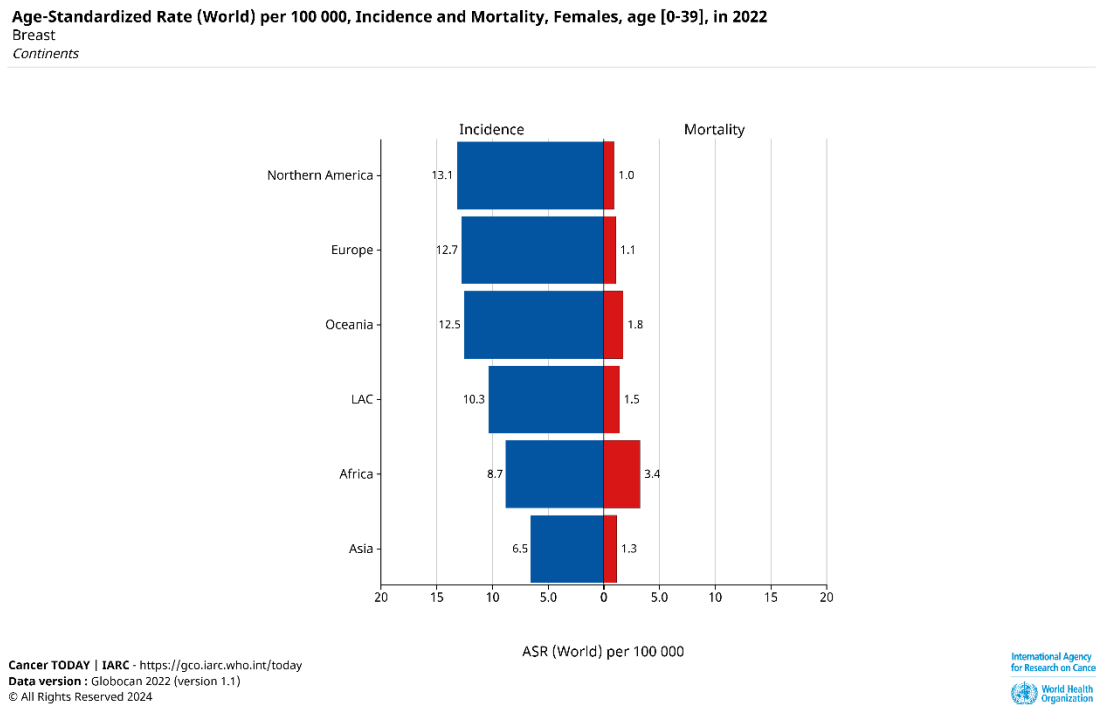States (Guo et al., 2019; Zhang et al., 2020a). It has been hypothesised that declining fertility, which reduces the protective effects of early pregnancy and breastfeeding, is associated with an increased risk of breast cancer at a younger age in China (Fan et al., 2014). Furthermore, environmental pollution, particularly exposure to endocrine-disrupting chemicals, has increased in China due to rapid industrialisation. Substances like benzene and polycyclic aromatic hydrocarbons are thought to disrupt the hormonal system, increasing the risk of BC (Co & Kwong, 2020; Labreche et al., 2010).

2.2.2 Prognosis of Young Breast Cancer

Young women with BC generally have a lower survival rate compared to older women (Guo et al., 2018). A recent study reported 5-year breast cancer-specific survival rates of 74.9%, 77.8%, and 71.4% for young, middle-aged, and elderly women, respectively (Tan et al., 2021). In addition, a 10-year follow-up study found that women with BC aged under 35 years and those aged 35–39 years had poorer survival rates, with survival rates of 69% and 76%, respectively, compared to a survival rate of 84% among women aged 40–49 years (Fredholm et al., 2016). A retrospective study conducted in China, involving 11,671 women with BC, suggests that young women have the lowest survival rate compared to patients of all ages (91.3% vs. 94.5%), as evidenced by a hazard ratio of 1.05 (Yang et al., 2022).

The unfavourable prognosis of young women with BC can be attributed to a multitude of factors. Multiple studies have demonstrated that BC in young women exhibits more aggressive clinicopathological features, including larger tumour size and a more significant number of metastatic sites, compared to BC in older women (Albasri, 2021; Gao et al., 2023; Liu et al., 2020; Zhu et al., 2023). A study comparing metastasis patterns between young and older women with BC revealed that the rates of bone metastasis, liver metastasis, and distant lymph node metastasis were significantly higher in young women than in their older counterparts (Sun et al., 2022). Other studies demonstrated that young women, compared with older patients, have higher malignancy grades, more likelihood of lymphovascular invasion, and more unfavourable subtypes (Guzmán-Arocho et al., 2022). Erić et al. (2018) the triple-negative subtype occurs more frequently in younger patients, with an incidence rate of 32%, compared to 10% in older patients. Figure 2.2 provides the incidence and mortality of young women with BC in 2022.

Age-Standardized Rate (World) per 100 000, Incidence and Mortality, Females, age [0-39], in 2022
Breast
Continents

(Source: GLOBOCAN 2022)

Figure 2.2 The incidence and mortality of young BC women in 2022

2.3 QoL of Breast Cancer

2.3.1 Definition of QoL

Quality of life (QoL) has gained significance in medical, social, and psychological research. Although the concept is widely used, it is often not clearly defined or understood, and its definitions need to be more consistent (Moons et al., 2006). Some scholars find it difficult to define it as it is affected by objective and subjective aspects (Gabriel et al., 2004). Currently, the consensus has been reached on the following aspects: QoL is a multidimensional concept (Cummins, 2005; Horner et al., 2008); it is dynamic and can vary among individuals and within individuals throughout their lifetime (Carr et al., 2001); is composed of both objective and subjective parts (Horner & Boldy, 2008). QoL, as defined by the World Health Organization (WHO), is a subjective assessment of individuals based on their values, aspirations, criteria, and level of consideration for emotional well-being (WHO, 1998).

Furthermore, according to Aaronson (1988), QoL is generally understood as a multidimensional concept that encompasses four key dimensions of health: physical health, mental health, social health, and functional health. Moreover, in addition to these core dimensions, certain specific diseases, such as BC, the definition of QoL often include sexual behaviour and body image concerns (Post, 2014).

2.3.2 QoL Status of Breast Cancer

Currently, patients with BC undergo surgery as part of the multimodal treatment strategies, combined with radiotherapy, chemotherapy, and endocrine therapy (Al-Hilli et al., 2021; Xinwu et al., 2019). However, postoperative breast loss or appearance change and multiple chemotherapy will affect patients with different degrees of psychosomatic symptoms, which is not conducive to the enthusiasm for treatment and QoL (Pellegrini et al., 2023). Extensive research has consistently

indicated that patients with BC who received chemotherapy often experience a decline in their emotional health (Phoosuwan et al., 2022; Whisenant et al., 2020). This decline is commonly characterized by varying degrees of melancholy, anxiety, and other related symptoms (Grayson et al., 2023).

Various studies have documented disparities in the level of QoL experienced by BC women undergoing chemotherapy. For example, Mirzaei et al. (2021) conducted a cross-sectional survey to assess the QoL levels in 190 BC women who were receiving chemotherapy, and it showed that the global score was 57.1 ± 25.8. Syed Alwi et al. (2022) investigated 160 women with BC from Malaysian; the results indicated that the global total of the women with BC was 60.50 ± 10.88, much higher than the study of Mirzaei. Another study conducted in India suggested that women with BC undergoing postoperative chemotherapy reported a mean QoL score of 45.94 ± 12.90 (Kshirsagar et al., 2021).

2.3.3 QoL Assessment Instruments for Breast Cancer

Several instruments have been developed to assess the QoL in women with BC. Internationally representative scales are as follows:

The Functional Assessment of Cancer Therapy-Breast (FACT-B) was developed by the Chicago Medical Centre in 1993 and comprise 36 items (Cella et al., 1993). The scale was composed of a general and BC-specific subscale, including physical well-being, social/family well-being, emotional well-being, functional well-being, and additional concerns (Matthies et al., 2019). Brady et al. (1997) tested the reliability and validity of this instrument, demonstrating an internal consistency of 0.90 and a correlation coefficient of 0.87, suggesting that it possesses good reliability and validity. In addition, Wan et al (2007) translated it into Chinese, and the Cronbach's α coefficient for the five domains of Chinese version ranged from 0.61 to 0.84, indicating

good reliability; meanwhile, the internal consistency coefficient ranged from 0.59 to 0.84, also suggesting satisfactory reliability; additionally, the most correlation coefficients are greater than 0.6, indicating good validity.

The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire – 30 Core Questionnaire (QLQ-C30) is a comprehensive assessment tool for cancer patients, consisting of 30 items, including five functional dimensions (physiological, role, emotional, cognitive, social), three symptom dimensions (fatigue, nausea, vomiting, pain), and six individual symptom items (dyspnoea, sleep disturbance, loss of appetite, constipation, diarrhoea, and economic conditions) and an overall QoL dimension (Wallwiener et al., 2017).

The European Organization for Research and Treatment of Cancer Quality of Life breast-specific module (QLQ-BR23) contains 23 items, a specific subscale supplemented for patients with BC (Sprangers et al., 1998). It primarily assesses the QoL of patients with BC about expectations, arm function, sexual function, breast appearance, adverse reactions, etc. It is a supplementary module of QLQ-C30. The two scales are often used together to assess QoL patients with BC. The initial scores for each scale dimension were converted into standardized values ranging from 0 to 100 using a linear formula. A positive correlation exists between the scores of each functional parameter and the patient's functional status. Higher scores in each functional dimension indicate an improved functional state of the patient; higher scores on symptom scales and individual items indicate more symptom burden and worse QoL. The Cronbach's α and KMO values for the QLQ-C30 were 0.988 and 0.989, respectively, while for the QLQ-BR23, the values were 0.988 and 0.989; these results, verified by Chinese scholars in 2015, suggest good reliability and validity (Zheng et al., 2015).