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REVIEW

# Factors Associated with Psychological Well-Being Among Children Under 18 Years Old with Cancer: A Scoping Review

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**Background:** Cancer diagnosis and treatment can have severe psychological impacts on children that can affect various aspects of their emotional, social and cognitive functioning. Many children with cancer experience long-term psychological distresses. The psychological well-being (PWB) is a critical aspect of their overall health. Understanding the factors that influence their psychological state can help in developing effective interventions to support them.

**Purpose:** This scoping review aimed to identify and summarize the factors associated with PWB among children with cancer.

**Methods:** This study applied a scoping review using the guidelines outlined in the PRISMA Extension for Scoping Reviews (PRISMA-ScR). A comprehensive literature search was conducted across multiple databases, including PubMed, CINAHL, Taylor and Francis, and Scopus. Inclusion criteria were included by keywords Psychological well-being OR Psychological AND Children OR Child OR Pediatric OR Childhood AND Adolescent OR Teenagers OR Youth AND Cancer OR Neoplasms OR Tumors OR Malignancy OR Cancer Survivors AND predictor OR factors OR determinant. Studies were included if they investigated psychological well-being in children (aged 0–18 years) with cancer. The Arksey and O'Malley framework for scoping reviews guided the methodology, including study selection, data extraction, and thematic analysis. The quality of the evidence was evaluated using the Joanna Briggs Institute (JBI) and the Mixed Methods Appraisal Tool (MMAT) critical appraisal checklist.

**Results:** 12 articles met the inclusion criteria and were included in the review. The factors most frequently reported in several categories are age (sociodemographic), psychological function (individual factors), age at diagnosis (health and history), parent attachment and school status (environmental factors).

**Conclusion:** This review found several aspects that describe the PWB of the articles reviewed. These aspects consist of anxiety, depression, distress, well-being, and self-esteem. From these aspects, many predictors were obtained, which were classified into four categories of factors related to the PWB of children with cancer.

**Keywords:** cancer, children, psychological well-being

## Introduction

The threat of cancer continues to increase every year in line with the increase in the number of people with cancer, especially children.[1] Children are defined as person under the age of 18 years.[2,3] World Health Organization (2021) reports that around 400,000 children aged 0–18 years are diagnosed with cancer each year.[1] In a study of 62 countries from 2001–2010, it was found that the incidence of cancer in children aged 0 to 14 years was 140.6 million per year, and 155.8 million children aged 0 to 19 years per year.[1] The most common cancers in children are acute lymphoblastic leukaemia (ALL) (26%), tumours of the brain and central nervous system (CNS) (21%), neuroblastoma (7%), and non-Hodgkin's lymphoma (NHL) (6%).[1]

A cancer diagnosis in children is a life-changing event for children with cancer and their families.[4,5] When a child is diagnosed, The treatment and rehabilitation process for cancer patients is very comprehensive and takes a long time.[4] However, this cancer can be cured even over the long term and requires regular treatment.[6] Chemotherapy is the most

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common therapeutic method used in the treatment of children with cancer, aiming to control the number of cancer cells and prevent further spread.[7–9] Treatment time for cancer, especially leukaemia, usually takes 2–3 years to complete, so it will usually cause side effects and the impact of the treatment both physically and psychologically.[10,11]

Cancer diagnosis and treatment present significant psychological challenges for children. Encountering cancer during development can disrupt normal growth and have a significant impact on their mental wellbeing. The psychological aspect needs to be considered because many children experience a decrease in quality of life and psychological problems.[12] Previous studies reported that patients with cancer had a mental health burden and experienced five times greater depression.[13] More than 50% of cancer patients experience anxiety and depression, which can lead to adverse disease outcomes such as decreased health-related quality of life, delayed treatment, non-adherence to care, and worse survival rates.[13–15]

The adverse psychological impacts were initially thought to arise due to the psychological trauma of the cancer diagnosis and treatment itself.[11] In addition, other factors, such as treatment often being intense and toxic, as well as the cancer diagnosis, cause significant stress and anxiety to the child's mental and psychological health.[16] This can cause the psychological state of these children to be disrupted by long recovery times, frequent hospitalizations, challenges in adapting to social life, and the side effects of chemotherapy.[17]

The psychological aspect that needs to be considered in children with cancer is psychological well-being (PWB).[18] PWB is a state where individuals can accept themselves positively and negatively, have healthy relationships with other people, direct themselves, control their environment, and have clear life goals.[19] A child's PWB is a crucial aspect of cancer care, given the significant impact of cancer treatment and diagnosis itself on a child's mental health mental health during the therapeutic process.[20]

PWB in children with cancer is an important component that needs to be considered because it has a significant impact on various aspects of their lives.[21] PWB will have an impact on the child's developmental stage and mental health condition.[22] Children with poor PWB often experience stress and anxiety.[23–25] In addition, this also affects children's development where children often experience developmental delays due to the child's social interaction.[26] So, this can inhibit their ability to engage in normal peer activities, affecting their social skills, cognitive development, and emotional growth.[27,28] Children with low levels of PWB tend to be quiet, gloomy and ultimately result in a lack of socialization with their surroundings.[4,12,24,29] Then, PWB levels may also influence how well children with cancer adhere to their treatment.[21,25] Previous research has concluded that low psychological well-being can hinder treatment adherence.[21,25,30]

Several factors can influence PWB in children with cancer. Previous studies reported that age, gender, age at diagnosis, and type of treatment have a significant influence on PWB in pediatric patients with cancer.[24,26,31–34] Age at diagnosis can influence PWB, where younger children have a limited understanding of the disease and the treatment process, causing anxiety and uncertainty in undergoing heavy and painful treatment.[24–26] The type of treatment also influences PWB because various types of treatment often cause serious physical side effects, which can disrupt physical comfort and impact the PWB of children.[33,34] Then, Long periods of separation from friends or loved ones are one of the main factors that can cause depression.[35] This can impact a child's quality of life and PWB.[35]

Despite the growing recognition of the importance of PWB, there remains a gap in comprehensive reviews that map out the various factors affecting it among children with cancer. Then, to date there are no studies have summarized and analyzed the factors related to PWB in children with cancer. Previous reviews discussed the impact of cancer treatment on the physical and quality of life only but did not focus on the mental or psychological conditions of survivors.[14,28,36–40] Therefore, this scoping review aims to fill this gap by systematically identifying and synthesizing the factors associated with PWB among children with cancer. By categorizing out these factors, this review aims to provide a comprehensive overview that can inform future research, clinical practice, and policy development. Ultimately, the goal is to enhance the quality of life for young cancer patients by addressing the complex interplay of factors that contribute to their PWB.

# Materials and Methods

## Design

This scoping review was conducted following the framework outlined by Arksey and O'Malley (2005), with enhancements by Levac, Colquhoun, and O'Brien (2010). A scoping review is a methodological approach that provides

flexibility to explore rapidly emerging topics.[41] This approach has a broader conceptual scope so that it can explain various relevant research results. In addition, scoping reviews are suitable for exploring large or complex areas of research that may not have been researched in depth.[41] In the context of the psychological well-being of children with cancer, many factors are diverse and interrelated, so this exploratory approach helps identify aspects that may not have been described in detail in the literature. The methodology includes five key stages: identifying the research question, identifying relevant studies, study selection, charting the data, and collating, summarizing, and reporting the results.[41] In this literature review, PRISMA Extension for Scoping Reviews (PRISMA-ScR) was used to identify factors associated with psychological well-being in children with cancer. This review has not received a protocol registration number and has not been registered on any official database.

## Eligibility Criteria

The articles for this review were selected using the PRISMA Extension for Scoping Reviews (PRISMA-ScR) guidelines.[42] Research questions and article eligibility criteria use the PCC (Population, Concept, and Context) approach.

P (Population): Children with Cancer
C (Concept): Psychological well-being
C (Context): Predictors of Psychological well-being

Inclusion criteria in this review consisted of accessible full-text articles, articles in English, articles with observational study designs and mixed methods; the sample was children. To reduce the high level of heritability, researchers chose a study design with observational and mixed methods only. Observational studies allow direct observation of phenomena without manipulation of variables, while mixed methods help bring together qualitative and quantitative perspectives, providing more comprehensive and contextually appropriate results. In addition, exclusion criteria were articles that were not in English, full-text articles that could not be accessed, samples that did not involve children, and secondary research.

## Data Collection and Analysis

### Search Strategy

The articles were systematically identified across six primary databases: CINAHL, PubMed, Scopus, Taylor and Francis, and one search engine, Google Scholar. The keywords used were "Psychological well-being OR Psychological AND Children OR Child OR Pediatric OR Childhood AND Adolescent OR Teenagers OR Youth AND Cancer OR Neoplasms OR Tumors OR Malignancy OR Cancer Survivors AND predictor OR factors OR determinant". Synonyms are employed to retrieve all potentially relevant articles for each term validated by MeSH (Medical Subject Headings). The author does not use the filter feature on all databases used because this will reduce the search results for identified articles.

For increasing the number of relevant articles, the authors used the trim and fill technique from existing keywords. Trim: Removes irrelevant or overly specific keywords that can limit the number of search results. Fill: Adds new keywords or variations of existing keywords, such as synonyms, related terms, or term variations (eg, using words from other languages if relevant). This method helps to add articles that are relevant to the topic even though the original search volume is limited. In the context of literature search and keyword use, this term can refer to techniques that modify and expand keywords to increase the search coverage of relevant articles.

### Study Selection and Quality Appraisal

All authors (F.P.A, S.H, and H.S.M) selected studies that met the eligibility criteria. Using manager references, the authors checked for duplication in the initial selection process (Mendeley). It then checks the title, abstract, and full text for relevance to the research topic and establishes inclusion and exclusion criteria. In the final process, the author (F.P.A and S.H) examines each text with a critical assessment using the Joanna Briggs Institute (JBI) checklist tools.[43] Then, it was checked again by a third author (H.S.M).

There are eight statements for articles with a cross-sectional design and 11 statements for articles with a cohort studies design. Each statement has answer choices: yes, no, not applicable, and unclear. Researchers eliminated articles if the JBI

score was <70%. As for mixed method design, the checklist tool from MMAT (Mixed Methods Appraisal Tools) is used. This tool is used to assess the methodological quality of five research categories: qualitative research, randomized controlled trials, non-randomized studies, quantitative descriptive studies, and mixed methods studies. Each question has answer choices: yes, no, and cannot tell.[44]

Studies that meet most of the JBI and MMAT quality criteria may be included in the review (score >70%). This checklist covers important aspects such as clarity of the research question, appropriate methodology, sample representativeness, and data validity.[43,44] If a study has significant weaknesses (eg unclear or inadequate methodology), this may be a basis for excluding it. In addition, the quality score generated from the MMAT will help determine whether a study is worthy of inclusion in the review. If a study has weak methods or lacks transparency in combining qualitative and quantitative data, it may influence the inclusion or emphasis of its results in the thematic analysis.[44]

## Data Extraction and Analysis

In this review, data extraction from studies is analyzed using tables that can describe in detail all results related to the topic discussed. Data extraction for this review was carried out by the first author (F.P.A) and rechecked by the other authors (S.H and H.S.M). The information presented in the extraction table relates to study design (country, research design, sample, psychological measures), characteristics of participants (age, diagnosis, gender), and psychological well-being, including description of PWB and predictors of PWB to ensure consistency.

Data analysis was conducted using thematic and qualitative analysis. The data analysis process begins with identifying and presenting the data obtained in tabular form based on the articles reviewed. After obtaining data, the author analyzed and explained each finding based on factors that can affect psychological well-being. The determination of each specific predictor theme or category was derived through a systematic analysis process. First, the extracted predictor data were studied to identify emerging patterns or trends to determine the PWB predictor categories. Then, similar categories were grouped to form broader themes. Each step in this process was discussed collaboratively by the research team to ensure that the resulting themes were consistent, transparent, and in line with the research objectives.

# Results

## Study Selection

In initial search, 1728 articles were obtained from five databases: PubMed (n=809), Scopus (n=411), CINAHL Medline Ultimate (n=51), Taylor and Francis (n=357), and the first 100 relevant articles were obtained via Google Scholar. Duplication checking was carried out on 1728 articles, excluding 88 articles and the remaining 1640 articles. Furthermore, 1584 articles were excluded because the title and abstract did not match the research objectives, and 56 remained. Then, the selection process was carried out by looking at compliance with the inclusion criteria, including critical assessment of articles using the JBI tool and MMAT (see Table 1). The screening process based on inclusion criteria and JBI resulted in 44 articles being excluded and the remaining 12 articles being continued for analysis (see Figure 1).

## Study Characteristics

In this review, most of the studies analyzed were observational studies (n=9) conducted in several countries such as Canada (n=1), South Korea (n=1), Hong Kong (n=3), Italy (n=3), Egypt (n=1), China (n=1), New Zealand (n=1), and Romania (n=1). Participants in this review were 3312 patients with ALL, leukaemia, and cancer, ranging in age from 0 to 18 years, and most were male. The minimum number of participants was 18 in the study of Bogdan (2018), and the most was 2160 in the study of Heo et al (2022). Several studies report that most patients have been diagnosed for five months to 5 years. More details can be seen in Tables 2 and 3.

The results of the critical assessment of nine articles using JBI Tools show that all the research analyzed is of good quality (>70%) (see Tables 1 and 2). Then, three mixed-method articles analyzed with MMAT showed that all three also had good scores, namely two articles with a score of 100% and one with a score of 80%.

**Table 1** Critical Appraisal Result

| Study | Design | Critical Appraisal |
|---|---|---|
| **JBI** | | |
| [15] | Cohort | 9/11 (81.8%) |
| [32] | Cohort | 8/11 (72.7) |
| [33] | Cross-Sectional | 7/8 (87.5%) |
| [25] | Cohort | 8/11 (72%) |
| [31] | Cross-Sectional | 6/8 (75%) |
| [26] | Cohort | 9/11 (81.8%) |
| [46] | Cross-Sectional | 6/8 (75%) |
| [24] | Case-Control | 8/10 (80%) |
| [47] | Cross-Sectional | 8/8 (100%) |
| **MAT** | | |
| [23] | Mixed methods | 5/5 (100%) |
| [34] | Mixed methods | 5/5 (100%) |
| [48] | Mixed methods | 4/5 (80%) |

## Psychological Well-Being Aspects

Five aspects of psychological well-being (PWB) are identified in this review (see Table 3). The aspects most discussed as PWB were depression (n=6), well-being (n=4), self-esteem (n=4), anxiety (n=3), and distress (n=2). The PWB level categories in each aspect are very diverse and mostly use numerical data. It can be concluded that the majority of participants tend to moderate to severe aspects of PWB (depression, well-being, self-esteem, anxiety and distress).

The many aspects of PWB are due to the use of a variety of instruments used to study PWB. Several instruments were utilized to assess various aspects of psychological well-being among children with cancer. Anxiety and depression were measured using tools like the Beck Youth Inventories-Anxiety and Depression (BYI-AD) and the Children's Depression Inventory (CES-DC). Distress was assessed using the Distress Thermometer (DT), while functional health was evaluated through self-rated scales like the 16D. Self-esteem was commonly measured with the Rosenberg Self-Esteem Scale (RSES). Additionally, standardized diagnostic criteria from the ICD-10 were used to categorize anxiety, depression, and stress/adjustment disorders. Psychological well-being and its impact were examined through semi-structured interviews and scales like the KIDSCREEN-27, WHO-5, and the Psychological Well-Being Scale (PWBS by Ryff and Keyes). Other instruments, such as the Brief Symptom Inventory (BSI-18) and the Cognitive Problems Scale, addressed specific issues like somatization and cognitive problems. Interpersonal relationships were assessed using the TRI, and memory of traumatic events was captured through the CES.

## Predictors of Psychological Well-Being

Several categories of factors influence PWB in pediatric patients with leukaemia and cancer. This review divides it into four categories, namely sociodemographic, individual factors, health and history, and environmental factors (see Table 4).

Sociodemographic characteristics factors include gender, age, economic conditions, and parent educational level. The factor most frequently associated with PWB is age.[24,26,31,32] Besides that, other factors are individual factors, which consist of physical functions (sleeping, HRQOL, fatigue, activity intolerance), psychological functions (hope, fear, mood, depression, uncertainty, lower self-esteem, mental function), personality factors, and coping strategies. Then, the third-factor category is health and history, which consists of time and age at diagnosis, type of treatment, and years of therapy.

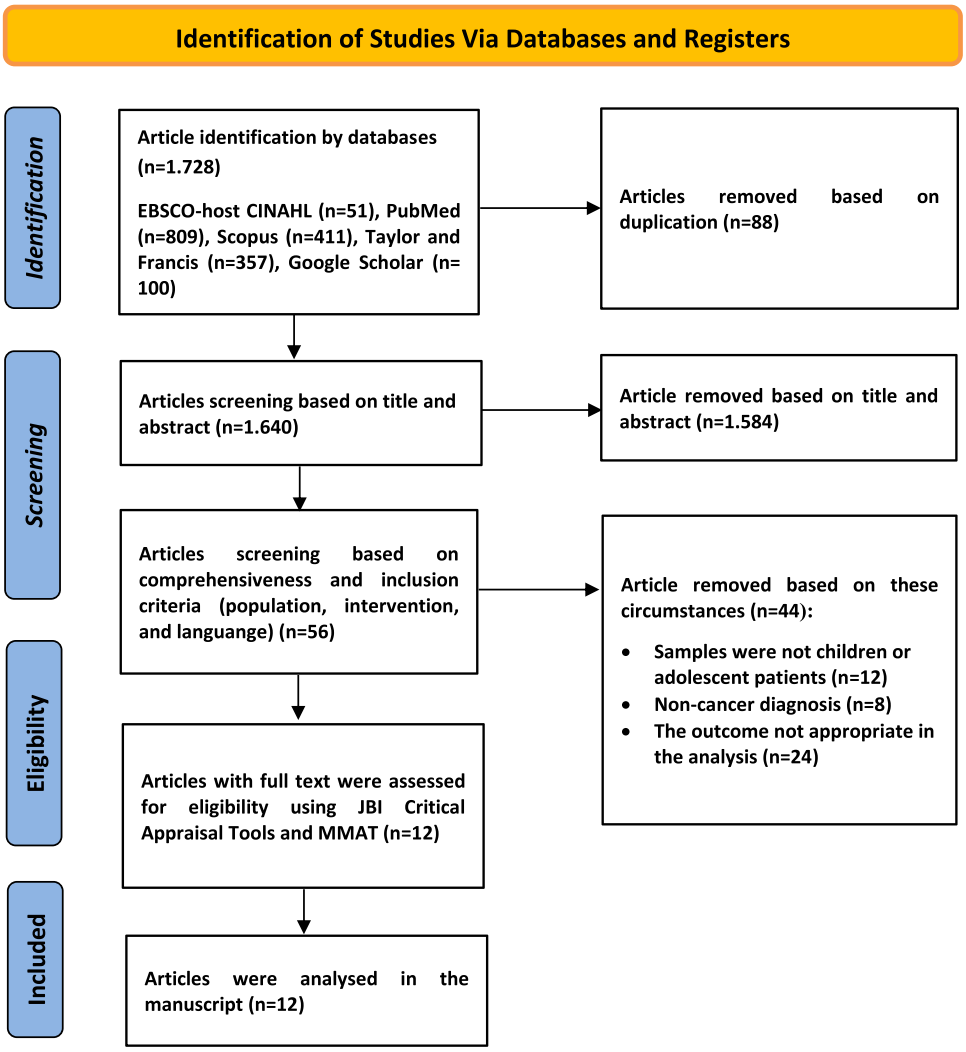


**Figure 1** PRISMA Flow Diagram.
**Notes**: Adapted from Page MJ, McKenzie JE, Bossuyt PM et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*. 2021;372:n71. Creative Commons.[45]

The last category of factors that influence PWB is environmental factors. This factor consists of parent attachment, spouse relationship, and school status. This review also divides predictors based on aspects of PWB, which can be seen in detail in Table 5.

Predictors that influence PWB in children with cancer interact with each other in a complex manner. Sociodemographic factors such as age, gender, and economic conditions can strengthen or reduce the impact of individual and environmental factors. The interaction between these factors suggests that each category, whether socio-demographic, individual, health, or environmental, cannot be understood in isolation. Instead, PWB in children with cancer is influenced by a complex combination of these factors, where changes in one factor can worsen or alleviate the impact of another factor.

## Discussion

This scoping review identifies factors that can influence PWB in children with cancer. Participants in this study were child patients with cancer who were conducted in various countries, the most common being Hong Kong and Italy. The predictors classified into four categories: demographic, individual factors, health and history, and environmental factors. This predictor is multifactorial. The authors observed that almost every sample in every article reviewed

**Table 2** Characteristics of Study

| Author (Year) | Study Design | | | | Participants | | | Psychological Well Being (PWB) | |
|---|---|---|---|---|---|---|---|---|---|
| | Desain | Country | Sample size | Psychological Measures | Age | Diagnosis | Gender | Description of PWB | Predictors of PWB |
| [15] | Cohort | Canada | 105 | • Anxiety & Depression (BYI-AD)<br>• Distress (DT)<br>• Functional Health (The self-rated 16D) | 13–18 years | ALL (>5 years after diagnosis) | Female 52(49.5) | **Mild–severe anxiety, depression, and distress** were 14%, 21%, and 30%<br>**Functional Health**<br>(0.91 ± 0.08) | **Anxiety**<br>• Sleeping (p=0.002)<br>• Mental function (p<0.0001)<br>**Depression**<br>• Mental function (p<0.0001)<br>**Distress**<br>• Sleeping (p=0.004)<br>• Mental function (p<0.0001) |
| [32] | Cohort | South Korea | 2160 | • Anxiety (ICD-10 code for ALL: F32 & F33)<br>• Depression (ICD-10 code for AL: F40 & F41)<br>• Stress/adjustment disorder (ICD-10 code for ALL: F43) | 0–18 years | ALL (>1 years after diagnosis) | Male 59.1% | **Anxiety**<br>(0.6 (0.3–1.1)<br>15 (0.7%)<br>**Depression**<br>(1.3 (0.9–1.9)<br>30 (1.4%)<br>**Stress/adjustment**<br>1.3 (0.9–1.9)<br>30 (1.4%) | **Depression**<br>• Age (p=0.004)<br>**Stress/adjustment**<br>• Age (p=0.022) |
| [33] | Cross-Sectional | Hong Kong | 176 | • Depression (CES-DC)<br>• Self-esteem (RSES) | 10–16 years | Leukemia & Solid Tumors | Male 94 (53.4%) | **Depressive symptoms**<br>(16.54 ± 8.95)<br>**Self-esteem**<br>(25.85 ± 6.32) | **Depressive symptoms**<br>• Diagnosis (p<0.01; r = −0.026)<br>• Type of treatment (p<0.01; r = −0.24)<br>• HRQOL (p<0.01; r = −0.54)<br>• Hope (p<0.01; r = −0.53)<br>**Self-esteem**<br>• Diagnosis (p<0.01; r = 0.30)<br>• HRQOL (p<0.01; r = 0.56)<br>• Hope (p<0.01; r = 0.52)<br>• Depressive symptoms (p<0.01; r = −0.50) |

(*Continued*)

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**Table 2** (Continued).

| Author (Year) | Study Design | | | | Participants | | | Psychological Well Being (PWB) | |
|---|---|---|---|---|---|---|---|---|---|
| | Desain | Country | Sample size | Psychological Measures | Age | Diagnosis | Gender | Description of PWB | Predictors of PWB |
| [25] | Cohort | Italy | 60 | Depression, somatization, and anxiety (BSI-18) | 8–18 years | Leukemia (6–12 months after diagnosis) | Male 7.66 (1.43) | **Depression** (1.8) | **Depression**<br>• Hope (p=0.03)<br>• Mood problems (p=0.02)<br>**Socio-demographic**<br>• Gender (p=0.02)<br>• Age at diagnosis (p<0.05)<br>• Economic condition (p=0.02) |
| [31] | Cross-Sectional | Egypt | 178 | Self-esteem (RSES) | 6–18 years | ALL (<1 - >1 years after diagnosis) | Female 51% | **Self-esteem**<br>Low level of self-esteem (84.83%) | **Sociodemographic**<br>• Age (p<0.05)<br>• Gender (p<0.05)<br>• Duration of diagnosis (p<0.05)<br>**Self-esteem**<br>• Parents attachment (p=0.048)<br>• Spouse relationship (p=0.017) |
| [26] | Cohort | Italy | 205 | • Lader of Life (CCSS)<br>• Depression (BSI-18)<br>• Cognitive Problems (Scale of Cognitive Problems derived from CCSS) | <18 years | Cancer (5 years after diagnosis) | Male 61.5% | **Depression** (0.99 ± 0.78) | **Sociodemographic**<br>• Gender (p=0.02)<br>• Age at diagnosis (p=0.02)<br>• Years off therapy (p=0.03) |
| [23] | Mixed methods | China | 135 | Psychological well-being (Semi-structured Interviews) | 8–18 years | Leukemia | Female 52.3% | **Psychological well-being** | **Sociodemographic**<br>• Types of treatment (p<0.001)<br>**PWB (interview)**<br>• Learning and school issues<br>• Uncertainty |


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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| [34] | Mixed methods | Hong Kong | 80 | • Depression (CES-DC)<br>• Self-esteem (RSES)<br>• Physical, psychosocial well-being and QoL (Semi-structured Interviews) | 8–16 years | Cancer | Male 43 (53.8) | **Depressive symptoms** (15.24 ± 6.95)<br>**Self-esteem** (26.94 ± 4.13) | **Depressive symptoms**<br>• Types of treatment ($p<0.01$; $r = 0.29$)<br>• Time since treatment ($p<0.01$; $r = 0.24$)<br>• Parent's educational level ($p<0.01$; $r = -0.17$)<br>**Self-esteem**<br>• Depression ($p<0.01$; $r = 0.76$) |
| [48] | Mixed methods | Hong Kong | 137 | • Depression (CES-DC)<br>• Self-esteem (RSES)<br>• Impact of cancer and treatment on the psychological well-being (semi-structured interviews | 9–16 years | Cancer (>6 months after diagnosis) | Male 70 (51.1) | **Depression** (16.39 ± 7.91)<br>**Self-esteem** (25.74 ± 5.43) | **Depression**<br>• Healthy school children ($p=0.01$)<br>**Self-esteem**<br>• Healthy school children ($p=0.01$)<br>**Secondary outcome**<br>• Physical: fatigue, activity intolerance<br>• Psychological: Uncertainly, Fear, Lower self-esteem |
| [46] | Cross-Sectional | Italy | 78 | Well-being (KIDSCREEN-27)<br>• Memory of a stressful and traumatic event (CES)<br>• Interpersonal relationships (TRI) | 11–24 years | Cancer | Male 54.8% | **Well-being total** (56.7%) | **Interpersonal Relationships**<br>• Mother ($p<0.01$)<br>• Father ($p<0.01$) |
| [24] | Case-control study | New Zealand | 170 | Psychosocial well-being (WHO-5) | 12–18 years | Cancer | Male 57% | **Well-being (89%)** | • Age ($p=0.02$)<br>• Age at diagnosis ($p=0.05$) |
| [47] | Cross-sectional | Romania | 18 | Psychological Well-Being (PWBS by Ryff and Keyes) | 11–18 years | Cancer | 10 Female | **PWB** 67.97 ± 23.74 | • Personality factors ($p<0.001$)<br>• Coping strategies (positive reappraisal) ($p<0.0010$) |

**Abbreviations**: BYI-AD, Beck Youth Inventories – Anxiety and Depression; BSI, Brief Symptom Inventory; CCSS, Childhood Cancer Survivor Study; CES, Centrality of Events Scale; CES-DC, Centre for Epidemiological Studies Depression Scale for Children; DT, Distress Thermometer; GSI, Global Symptom Index; ICD-10, International Classification of Diseases-Tenth Revision; PWBS, Psychological Well Being Scale; RSES, Rosenberg Self Esteem Scale; TRI, Test of Interpersonal Relations; WHO-5, World Health Organization Five Well-being Index.

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**Table 3** Summary of Study Characteristics

| Study Characteristics | | Study |
|---|---|---|
| **Design** | Observational study (n=9) | [15,24–26,31–33,46,47] |
| | Mixed Method (n=3) | [23,34,48] |
| **Country** | Canada (n=1) | [15] |
| | South Korea (n=1) | [32] |
| | Hong Kong (n=3) | [23,34,48] |
| | Italy (n=3) | [25,26,46] |
| | Egypt (n=1) | [31] |
| | China (n=1) | [32] |
| | New Zealand (n=1) | [24] |
| | Romania (n=1) | [47] |
| **Sample size** | Minimum (n=18) | [47] |
| | Maximum (n=2.160) | [32] |
| **Diagnosis** | ALL & Leukemia (n=6) | [15,23,25,31–33] |
| | Cancer (n=6) | [24,26,34,46–48] |
| **Aspects of PWB** | Anxiety (n=3) | [15,32] |
| | Depression (n=6) | [15,25,26,32–34,48] |
| | Distress (n=2) | [15,32] |
| | Well-being (n=4) | [23,24,46,47] |
| | Self-esteem (n=4) | [31,33,34,48] |

**Abbreviations**: HRQOL, Health Related Quality of Life; ALL, Acute lymphoblastic leukemia.

**Table 4** Predictors of PWB

| Category of Predictors | Sub-category of Predictors | Study |
|---|---|---|
| **Demographic Characteristics** | Gender | [26,31] |
| | Age | [24,26,31,32] |
| | Economic condition | [25] |
| | Parents educational level | [34] |
| **Individual Factors** | Physical function (sleeping, HRQOL, fatigue, activity intolerance) | [15,33,48] |
| | Psychological functions (hope, fear, mood, depressive, uncertainly, lower self-esteem, mental function) | [15,23,26,33,34,48] |
| | Personality factors (Coping strategies) | [47] |

(*Continued*)

**Table 4** (Continued).

| Category of Predictors | Sub-category of Predictors | Study |
|---|---|---|
| **Health and History** | Since diagnosis | [31,33] |
| | Age at diagnosis | [24–26] |
| | Type of treatment | [33,34] |
| | Years off therapy | [26,34] |
| **Environmental Factors** | Parents attachment | [31,46] |
| | Spouse relationship | [31] |
| | School status | [23,48] |

**Abbreviation**: HRQOL, Health Related Quality of Life.

**Table 5** Summary Aspects of Psychological Well-Being

| Aspects of PWB | Predictors |
|---|---|
| Anxiety | Sleeping dan mental function |
| Depression | Mental function, age, diagnosis, type of treatment, HRQOL, hope, mood problems, time since treatment, parent educational level, dan healthy school children |
| Distress | Sleeping, mental function, age, school status |
| Well-being<br>Self-esteem | Learning and school issues, uncertainty, age, age since diagnosis, personality factors, coping strategies, mother, father Diagnosis, HRQOL, hope, depressive symptoms, spouse relationship, healthy school children, Mood, physical (fatigue, activity intolerance), psychological (uncertainly, fear, lower self-esteem) |

**Abbreviation**: HRQOL, Health Related Quality of Life.

had more than one factor. These results indicate that a complex interaction of multiple factors influences PWB among children with cancer.

## Sociodemographic Factors

Age is one of the most frequently reported factors influencing PWB in children with cancer. As younger children (<10 years) may have a limited ability to understand a cancer diagnosis and the lengthy and painful treatment process associated with cancer.[17,32] In addition, children may not be able to express their physical and psychological symptoms adequately.[30,31] Adolescents may be better able to express their concerns about stress and difficulties adjusting to school life than younger children. However, adolescents are more at risk of being diagnosed with psychological distress.[24] Gender also influences PWB. Female may report weaker psychological, social, and cognitive functioning.[25] Some studies show that females tend to have lower of PWB in certain aspects, such as higher levels of stress or higher levels of depression.[25,26,31] Female reported more depressive symptoms, negative life perceptions and some cognitive difficulties such as difficulty concentrating and disorganization.[26] Therefore, female children with cancer who are younger are at risk of experiencing poor PWB.

Family economic conditions also influence PWB, with children from families with good economic conditions reporting more cognitive and mood problems compared to adolescents from families with moderate economic conditions.[49] In addition, economic conditions are related to the level of parental education, which is equally important for supporting children during the care process so that the developmental stages grow optimally.[34] Parents with a higher level of education tend to have greater knowledge about health and psychological issues so they can better understand and manage their child's medical conditions.[30]

## Individual Factors

Physical and psychological functions is an essential factors in influencing PWB.[50] Physical conditions such as fatigue, sleep problems, and poor HRQOL will cause feelings of anxiety, depression, discomfort, fear, feeling of uncertainty, lower self-esteem and reduce children's motivation and lead to poor PWB.[15,51] A decrease in psychological conditions is initiated by physical complaints experienced by the child during therapy or treatment in impact on Quality of life (QoL).[33] Children who experience a decline in physical and psychological function tend to lose their enthusiasm for life and have reduced social participation, which in turn can affect their ability to undergo optimal care or treatment.[52] Therefore, children with cancer need to have good coping strategies because coping strategies are essential for maintaining PWB. Effective coping strategies, such as seeking social support, participating in enjoyable activities, and practicing relaxation techniques, can help children deal with stress and improve their PWB.[47] This comprehensive coping approach can help improve PWB and overall QoL for children facing cancer diagnosis and treatment.[47]

## Health and History Factors

Since and age at diagnosis are essential predictors that influence the experience and prognosis of individuals with cancer.[23,31] Children diagnosed with cancer at a younger age may face challenges in understanding their disease, while teenagers may have difficulty adjusting to a diagnosis that disrupts their daily lives.[23,25] Previous study reported that children diagnosed with cancer in early adolescence appear to report poorer psychological adaptation than children who receive the diagnosis at a younger age.[25] Adolescents have more problem-solving strategies to deal with illness through more intense communication with adults (such as parents, health workers, and other adolescents who are also sick) compared to pre-adolescent children.[24]

The type of treatment and duration of therapy also affect children's PWB. Some forms of cancer treatment, such as chemotherapy and radiotherapy, can cause serious side effects that negatively impact their PWB.[31,33] Even after years of being free from therapy, even after treatment has been completed, children who have had cancer and their families often still feel high levels of anxiety and fear regarding the possibility of cancer recurrence or the long-term side effects of treatment.[53] Children with cancer may continue to experience emotional stress and tension, which can affect their PWB.[26]

## Environmental Factors

Environmental factors, which consist of parent attachment, spouse relationship, and school status can impact on PWB among children with cancer. The quality of the relationship between the child and parent, as well as the level of emotional support provided by the parent, can influence how the child copes with the stress and challenges associated with cancer diagnosis and treatment.[54,55] Children who have a strong and positive relationship with their parents tend to have better PWB as they feel supported and loved in their journey against their illness.[46] In addition, a good relationship between parents (husband and wife) will help reduce children's stress and anxiety, while conflict or lack of support adds to children's distress.[31] Then, a supportive and inclusive school environment can help children feel accepted and supported during the cancer treatment process.[48] Issues such as stigmatization or inability to attend school regularly due to medical treatment may cause additional stress to the child.[23]

Various factors were identified in this review, health workers, especially nurses who have a higher intensity of time with patients, it is essential to pay attention to the level of PWB in children with cancer and improve it. Based on the results of previous systematic reviews reported that there are several interventions that can improve psychological outcomes (depression, anxiety, self-esteem) in children with cancer. These interventions include cognitive behavioural therapy, physical exercise therapy, family therapy, therapeutic music therapy, self-coping strategies, and wish fulfilment intervention.[56] In addition, previous studies reported that art therapy has the potential to improve the PWB of children undergoing cancer treatment by reducing anxiety, fear, and pain.[57] Therapeutic games using virtual reality can also improve the PWB of children with cancer undergoing hospitalization.[58] The results of this study provide empirical evidence of the benefits of incorporating therapeutic play in helping children alleviate the psychological burden of cancer treatment and hospitalization.[58] Some of these interventions can effectively improve or enhance the psychological condition of children.

## Implications for Practice

The practical implications of this review emphasize the need for healthcare providers to adopt a holistic approach to caring for pediatric cancer patients. Given that age, physical function, psychological function, and age at diagnosis significantly influence PWB, interventions should be designed with these factors in mind. Physicians, nurses, and clinical psychologists should consider differences in patient age and developmental stage in developing a care plan that includes physical and psychological aspects. In addition, it is essential to involve the family in the care process, as parental support and environmental conditions significantly influence the patient's PWB. Intervention programs that involve the family can reduce children's emotional distress, so healthcare providers need to integrate social and environmental factors into care strategies to improve the quality of life of children with cancer.

Additionally, these findings emphasize the importance of increasing access to comprehensive psychological support services for children with cancer, which should be available in all health facilities, both centrally and regionally, without exception. In addition, policies that support multidisciplinary collaboration between health workers, such as doctors, psychologists, nurses, and social workers, are needed. The government is also expected to develop training programs for health workers to improve their ability to handle psychological factors in patients. On the other hand, policies that support community-based interventions can help ease the emotional burden on patients and their families during treatment.

## Strengths and Limitations

This review can help us understand that aspects of PWB can vary and cannot be easily categorized due to the risk of bias in interpreting the study results. The author conducted a systematic thematic analysis based on the joint discussion results to ensure categories from each predictor are included. Therefore, future research is fundamental to examine the level of PWB in children with cancer using a particular instrument so that PWB can provide relevant information. In addition, some research samples still need to be enlarged because this related research is still limited to specific continents, most of which are in Hong Kong (Asia) and Italy (Europe). So, with a small sample, the research findings may not represent a broader population, thus limiting the generalization of the results. Therefore, efforts should be made to increase the sample size in future studies to expand its generalization.

# Conclusion

This research shows that 12 articles from five databases discuss factors that influence PWB in child cancer patients. In this research, there are several aspects of PWB: anxiety, depression, distress, well-being, and self-esteem. Based on these aspects, there are several predictors which are classified into four factors: sociodemographic factors, individual factors, health and history factors, and environmental factors. Age, physical function, psychological function, and age at diagnosis are the factors that most influence the PWB of children with cancer. It is hoped that the many factors that can influence PWB can be taken into consideration by health workers to improve care and support for children with cancer in facing psychological challenges that may arise during treatment. Future researchers are advised to develop psychological interventions, conduct longitudinal studies, expand research to more diverse factors, use broader and more diverse samples, and collaborate multidisciplinaryly to better understand and improve the psychological well-being of children with cancer.

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