



# Cancer treatment-related financial toxicity experienced by patients in low- and middle-income countries: a scoping review

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Received: 27 September 2021 / Accepted: 3 March 2022 / Published online: 23 March 2022  
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## Abstract

**Purpose** In the past decade, literature has called attention to financial toxicities experienced by cancer patients. Though studies have addressed research questions in high-income countries, there remains a paucity of in-depth reviews regarding low- and middle-income countries (LMICs). Our scoping review provides an overview of treatment-related financial toxicities experienced by cancer patients in LMICs.

**Methods** A systematic search was conducted in MEDLINE, EMBASE and the Cochrane Central Register of Controlled Trials. English peer-reviewed articles that (a) explored patients' experience with financial toxicity due to cancer treatment (b) were specific to LMICs as defined by the World Bank and (c) focused on qualitative data were included. Details regarding participants and main findings were extracted and synthesized.

**Results** The search yielded 6290 citations, and 42 studies across 3 low-income, 9 lower-middle-income and 8 upper-middle-income countries. Main themes identified included cancer patients encountered various material hardships, managed costs with different coping behaviours and experienced negative psychological responses to their financial burden. Higher levels of financial toxicities were associated with patient characteristics such as lower socio-economic status and lack of insurance, as well as patient outcomes such as lower quality of life.

**Conclusion** Cancer patients in LMIC experience deleterious financial toxicities as a result of treatment. This comprehensive characterization of financial toxicities will better allow health systems to adopt evidence-based mitigation strategies to reduce the financial burden on patients.

**Keywords** Cancer treatment · Financial toxicity · Out-of-pocket costs · Low- and middle-income countries · Qualitative research

## Introduction

The term “financial toxicity” was coined to describe emotional and material distress and hardship that occur because of the financial burden of cancer treatment. In the past decade,

literature has called attention to these consequences experienced by patients, including material hardships (e.g., bankruptcy), coping behaviours (e.g., non-adherence to treatment) and psychological response (e.g., worry) [1]. The impact of financial distress on clinical outcomes has also been reported. For instance, Ramsey et al. identified financial distress

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resulting in bankruptcy declaration as a potential risk factor for mortality in cancer patients [2].

In the literature, financial toxicities experienced by patients in high-income countries (HIC) have been highlighted, most notably in the USA (US). For example, over 50% of adult patients in the US with a cancer history were reported to experience any medical financial hardship between 2013 and 2016, and risk factors associated with financial toxicity have been comprehensively synthesized and reported [3].

Financial toxicities experienced by cancer patients in HICs and low- and middle-income countries (LMIC) have also been reported, through both direct costs such as medication and hospitalization expenses and indirect costs such as transportation and food expenses. For example, a recent study found that in LMICs, cancer patients and caregivers spend, on average, 42% of their annual income on out-of-pocket (OOP) expenditures related to cancer care [4]. Absence of universal health coverage (UHC) and financial risk protection across all LMIC is likely contributory to the observed high rates of OOP expenditures [5]. Catastrophic health expenditure (CHE) or financial catastrophe (FC), defined as OOP costs exceeding the household's income at a predetermined threshold level, is an important concern in LMICs [6]. To combat this, the World Health Organization (WHO) aims to achieve UHC by 2030 for all countries to ensure access to quality essential health services without financial hardship [7].

To date, there remains a paucity of literature which reviews the qualitative literature on the cancer patient's experience with financial toxicities in LMIC. Thus, we undertook a scoping review to synthesize the current evidence of cancer-related financial toxicities experienced among patients in LMIC as well as to garner insight into knowledge gaps to focus future research and policy efforts towards improving financial hardships.

## Methods

### Aim and design

Our aim was to synthesize research evidence to answer the review question, "What is known from the literature on the financial toxicities experienced by patients with cancer in LMICs?" The scoping review was conducted using the updated framework proposed by the Joanna Briggs Institute (JBI): (1) identify the research question; (2) identify relevant studies; (3) select studies, (4) chart the data; and (5) collate, summarize and report results [8]. An established protocol [9] was used to ensure the accurate, unbiased and comprehensive compiling, and analysis of study characteristic of the scoping review [8]. The review was conducted and reported following the Preferred Reporting Items for

Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) guidelines [10].

### Eligibility criteria

Studies were considered for inclusion if they were English peer-reviewed published papers that (a) explored cancer patients' experience with financial toxicity due to cancer treatment, (b) were specific to a LMIC and (c) were studies focusing on qualitative data. Low- and middle-income countries were defined according to The World Bank as of 2021 [11]. Qualitative literature was chosen to offer a richer data source to establish the patient experience. We defined qualitative data as studies reporting on patients' experience with financial toxicity (e.g., how they felt about the burden, how they dealt with the costs of the burden) [12]. Studies that included qualitative data and quantitative measures, such as mixed methods studies, were also included. For studies that included both qualitative and quantitative measures, we focused data extraction to the reported qualitative assessments (e.g., content analysis from focus groups). Studies involving both patients and caregivers were included. Studies focusing only on patients' caregivers were excluded (Table 1).

### Study selection

An expert librarian conducted the search for articles published from inception to April 13, 2021, in the electronic databases MEDLINE, EMBASE and the Cochrane Central Register of Controlled Trials (CCRCT) (Supplementary table 1). Following the search, all identified citations were uploaded into Mendeley (Version 1.19.8) and duplicates were removed. Titles and abstracts were screened by two independent reviewers (SU, ES) using the inclusion criteria. The full text of selected citations were assessed by two independent reviewers (SU, ES). Any disagreements between reviewers during the search process were resolved through discussion or through consultation with an additional reviewer (AP). The reference lists of all included articles were screened for additional studies. Results of the search process are presented in a PRISMA-ScR flow diagram (Fig. 1).

### Data extraction and analysis

Data was extracted from selected studies by two independent reviewers (SU, ES) using a data extraction tool developed and revised by the reviewers. The data extracted included details about participants, concept (i.e., the focus of the study), context (i.e., details about the specific setting),

**Table 1** Characteristics of included patients and studies

Characteristic	Number	%
<b>Patient Characteristics</b>		
Total	15,190	100
Range in studies	10–3012	
Age*		
Paediatric (0–17 years)	884	5.8
Adult (18 + years)	10,894	71.7
Not specified	3412	22.5
Sex*		
Female	9144	60.2
Male	5741	37.8
Not specified	305	2
<b>Study characteristic (n = 42)</b>		
<b>Publication year</b>		
Before 2010	1	2.3
2011–2020	37	88.1
2021	4	9.5
<b>Country**</b>		
India	9	21.4
China	7	16.7
Indonesia	3	7.1
Pakistan	3	7.1
Ghana	2	4.8
Iran	2	4.8
Kenya	2	4.8
Malaysia	2	4.8
Nigeria	2	4.8
Tanzania	2	4.8
Bangladesh	1	2.4
Colombia	1	2.4
Egypt	1	2.4
Ethiopia	1	2.4
Haiti	1	2.4
Mexico	1	2.4
Namibia	1	2.4
Thailand	1	2.4
Uganda	1	2.4
Vietnam	1	2.4
<b>Cancer type**</b>		
Breast	24	57.1
Gastrointestinal	15	35.7
Haematologic	13	30.9
Sarcoma	8	19.0
Blastoma	7	16.7
Reproductive	5	11.9
Lung	4	9.5
Head and neck	2	4.8
Oral	2	4.8
Brain	1	2.4
Respiratory	1	2.4
Skin	1	2.4

**Table 1** (continued)

Characteristic	Number	%
Other	8	19.0
Multiple cancer sites	14	33.3
<b>Study method**</b>		
Interviews	36	85.7
Questionnaires	23	54.8
Surveys	4	9.5

\*Characteristics were not reported consistently by all studies

\*\*Characteristics are not mutually exclusive for included studies (e.g., one study looked at three countries: Uganda; Nigeria; Namibia; some studies used both interviews and questionnaires)

methods and main findings relevant to the review question. Any disagreements between reviewers were resolved through discussion, or through consultation with an additional reviewer (AP). Data extracted was summarized and the collated information was reviewed and presented in tabular form (Fig. 2).

## Results

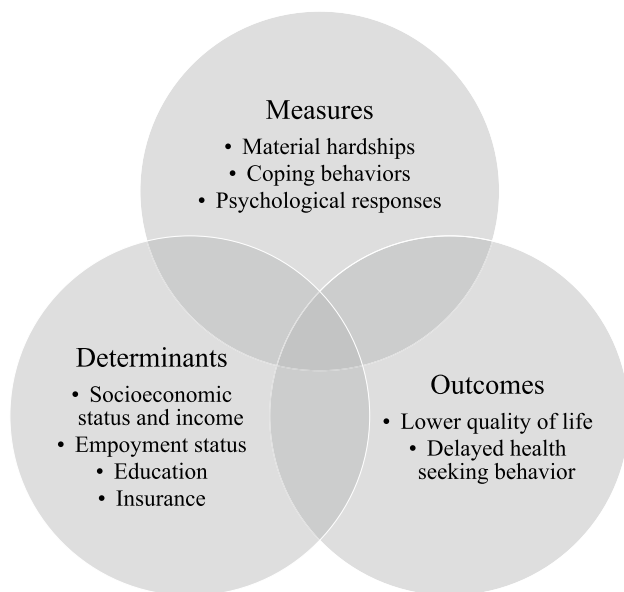
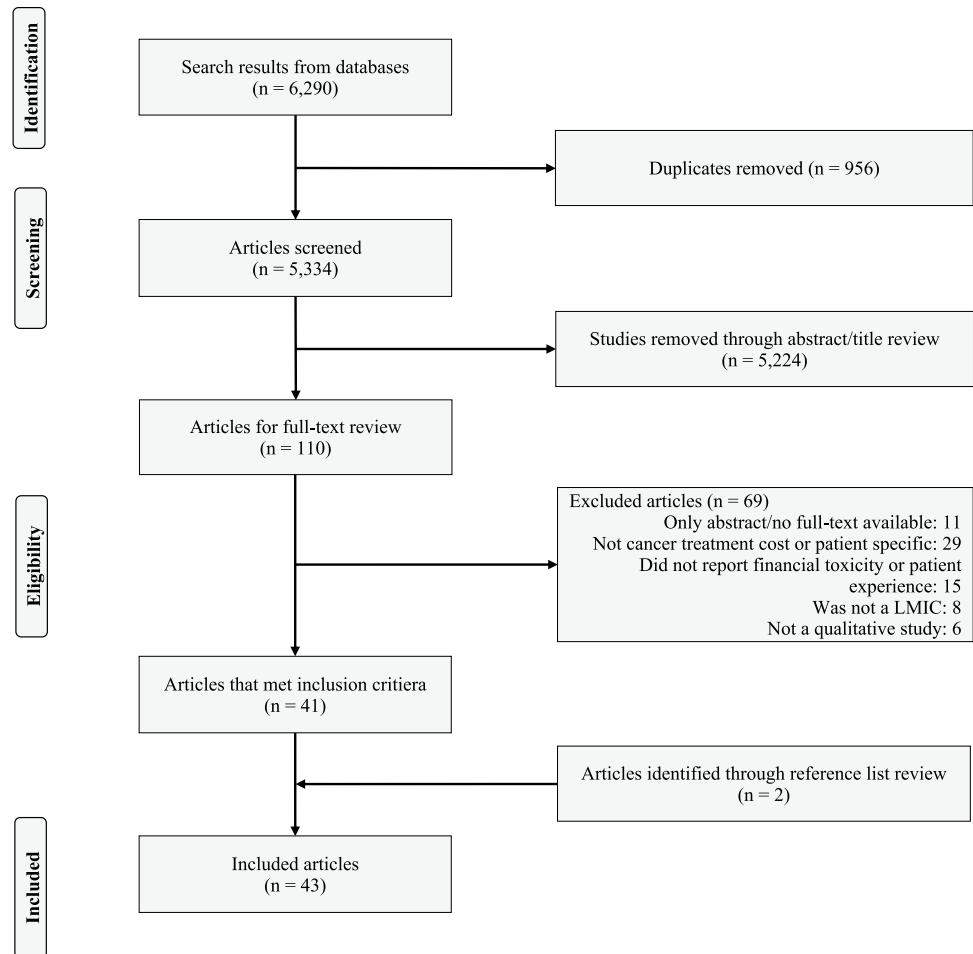
### Search results

The search yielded 6290 citations in total from MEDLINE, EMBASE and CCRCT and 5334 non-duplicates were screened. Following completion of screening, the inter-rater agreement kappa statistic for selection of articles was calculated to be 0.81. One hundred and ten citations were selected for full-text review through which 41 articles were selected for inclusion. Two additional articles were selected for inclusion through reference list review. A total of 43 articles reporting on 42 unique studies were included in this review [13–55]. One study on cervical cancer patients in rural Ghana was presented in two articles, with one article looking at adopted coping strategies and one article looking at treatment uptake barriers [47, 51].

### Study characteristics

Summary characteristics of the included studies are presented in Table 2. The studies were conducted across 20 LMICs, specifically 3 low-income countries (Ethiopia [ $n = 1$ ], Haiti [ $n = 1$ ], Uganda [ $n = 1$ ]), 9 lower-middle-income countries (India [ $n = 9$ ], Pakistan [ $n = 3$ ], Ghana [ $n = 2$ ], Kenya [ $n = 2$ ], Nigeria [ $n = 2$ ], Tanzania [ $n = 2$ ], Bangladesh [ $n = 1$ ], Egypt [ $n = 1$ ], Vietnam [ $n = 1$ ]) and 8 upper-middle-income countries (China [ $n = 7$ ], Indonesia [ $n = 3$ ], Iran [ $n = 2$ ], Malaysia [ $n = 2$ ], Colombia [ $n = 1$ ], Mexico [ $n = 1$ ], Namibia [ $n = 1$ ], Thailand [ $n = 1$ ]), where

**Fig. 1** Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) extension for scoping reviews flow diagram. Abbreviations: *LMIC* low- and middle-income country



**Fig. 2** Venn diagram outlining the measures of, patient characteristics associated with, and outcomes affected by, financial toxicities experienced by cancer patients in LMICs. Abbreviations: *LMICs* low- and middle-income countries

one study looked at three sub-Saharan African countries (Uganda, Nigeria, Namibia). Sixteen of the twenty countries do not currently have UHC (Bangladesh, Colombia, Egypt, Ethiopia, Ghana, Haiti, India, Indonesia, Iran, Kenya, Namibia, Nigeria, Pakistan, Tanzania, Uganda and Vietnam), though steps have been taken towards achieving UHC [56].

Twenty-eight studies included one cancer type and 14 studies included multiple cancer types, where the three most common cancer types among all studies were breast cancer ( $n = 24$ ), gastrointestinal cancers ( $n = 15$ ) and hematologic malignancies ( $n = 13$ ). Thirty-one studies consisted of adult patient populations (patient age  $\geq 18$  years), 9 consisted of paediatric populations (patient age  $< 18$  years) and 2 studies included both populations. Age was reported through various measures in the studies (mean, median, range, majority, age groups). Of the 20 studies that reported range, ages ranged from 0 to 17 for paediatric patients and 18–91 for adult patients. For the 40 studies that reported sex, 61% (9,144/14,885) of the patient population was female. Other patient characteristics such as socioeconomic status (SES) were not reported consistently throughout the studies.

**Table 2** Themes and supporting quotes

Theme	Supporting quote
Patients encountered various material hardships	Quote 1: “Critical illness insurance usually covers for a year and a half to two years, but I have to take five years of medicine. All payment is out of pocket after the expiry of health insurance, and I have to pay half of my retirement salary for the drug”. (Hu et al., 2021)
Patients managed costs with multiple coping behaviours	Quote 2: “Until now I have failed to go on with the two treatments that have been prescribed to me; radiation and chemotherapy. Do you know why? I don’t have money to buy. I took my prescription to my uncle for him to buy me the medications but he returned it to me because he has no money. Therefore, until now I am only using radiation without chemotherapy, because I cannot afford to buy them”. (Masika et al., 2020)
Patients experienced different psychological responses	Quote 3: “It feels like my home had collapsed. I lost my labor and I couldn’t go to work now. My kids are still young. I’ve worried enough about the financial burden, and then the doctor told me that I needed 300,000 yuan (for treatment). The economic pressure is too much”. (Masika et al., 2020)
Financial toxicities are associated with determinants	Quote 4: “Fortunately, the Seguro Popular (insurance company in Mexico) paid almost everything, my operation was free; however, we had to pay for several tests and medicines as these were not available”. (Knaul et al., 2020)
Financial toxicities can affect patient outcomes	Quote 5: “If one does not have capital and one does not have anybody to give financial support, that is what kills a person who has this illness”. (Ogunkorode et al., 2020)

All the selected studies included qualitative data and 23 studies were mixed-method studies. The mixed-method studies included quantitative measures, such as Comprehensive Score for Financial Toxicity-Functional Assessment of Chronic Illness Therapy (COST-FACIT) tools ( $n = 2$ ). Nine studies also explored the specific costs experienced by patients, and 13 explored the association between different variables (e.g., SES) and financial toxicities.

Almost half of the studies were specified to be cross-sectional in design ( $n = 21$ ). Most of the studies ( $n = 36$ ) conducted interviews with patients or caregivers. The six studies that did not conduct interviews completed questionnaires and/or surveys.

## Main themes

### Patients encountered various material hardships

Material hardships encountered by patients due to cancer treatment were reported in 38 studies. Patients across the included studies described their financial burden as “significant” [13, 16, 50] and “unmanageable” [18, 24, 50]. All included studies looked at direct costs of cancer treatment (e.g., medication and laboratory test expenses) and 29 studies also looked at indirect costs (e.g., food and transportation expenses). Compared to studies on adult patients, studies on paediatric patients emphasized more indirect costs, as well as caregiver loss of income and/or job and debt [29, 32, 33, 42, 43, 46, 48]. Across the studies, patients described their main concern of cancer care as being both the direct and indirect costs of treatment [19, 20, 29, 31, 38, 50], particularly the cost of drugs [19, 20, 31].

Out-of-pocket costs were the most common reported material hardship among the studies [17, 18, 22, 24, 26, 28, 32, 34–37, 43, 45, 46, 52, 53, 55] and studies across 8 of 16 countries without UHC reported OOP costs [refer to Table 2, Quote 1]. Although CHE was reported in 5 included studies, the threshold used for defining CHE varied (10% [24], 30% [36], and 40% [26, 46, 52]). The incidence of cancer patients incurring CHE, with proportions based on the cut-off points of 10%, 30%, and 40%, was reported to be 74.4%, 51.4%, and 37.0–67.9%, respectively. Patients also reported incurring debt [21, 32, 33, 35, 42–44, 48] and impoverishment [36].

### Patients managed costs with multiple coping behaviours

Coping behaviours used by patients to manage cancer treatment were described in 38 studies. Patients received financial support and assistance from non-governmental (e.g., family, friends, employers, religious communities) and governmental sources [14, 24, 30, 32, 33, 37, 38, 41, 42, 46–51, 55]. Five studies inclusive of 1162 patients reported that 23% of patients received formal financial assistance (e.g., employer/corporate, charity, government) [14, 24, 38, 41, 49]. Borrowing money [13, 14, 24, 26, 27, 34, 36, 39, 43–45, 49, 53] from sources such as family and religious communities was frequently described. In the study conducted by Knaul et al. on cancer patients in Mexico, patients described begging for money to cover treatment costs [28].

Selling of assets [13, 14, 23, 24, 26, 34, 36, 37, 40, 42, 43, 48] such as properties, valuables, land and cattle was used as a coping behavior by patients, which is also considered a material hardship. Patients also required the use

of their income [14, 26, 49] and savings [14, 15, 24, 26, 34–36, 43, 49], broke their financial stores [41] and took loans [13, 21, 25, 36, 53] to manage costs. Studies described lifestyle changes such as decreasing non-medical expenses and reducing family investment [20, 23, 41].

Many patients reported non-adherence to treatment, specifying delay, discontinuation, and inability to start treatment [13, 16, 19, 23, 31–33, 42, 44, 45, 53, 55] [refer to Table 2, Quote 2]. Patients reported having negotiated for a lesser charge or different treatment [29], and missing appointments and going without prescribed medications [45]. Indeed, studies reported patients could not, or found it difficult to, afford medications [15, 30, 38, 54]. For instance, Gany et al. reported that 80 of 100 breast cancer patients undergoing treatment in Egypt had difficulty affording medications [15]. Further, Owenga and Nyambedha reported that cervical cancer patients who were unable to afford in-patient treatment such as chemotherapy went home or were abandoned at the hospital [38].

### Patients experienced different psychological responses

Psychological responses experienced by patients due to their financial burden of cancer treatment were explored in 12 studies [17–19, 21, 23, 27–29, 40–42, 48]. Patients reported worry and/or stress about their financial burden, economic instability and need to repay loans [17, 18, 27–29] [refer to Table 2, Quote 3]. Patients also reported distress [19, 40], fear [21], concern [23], desperation [28], and anxiety in meeting financial obligations [40]. Paediatric patients described unique psychological responses such as guilt [42] and familial conflicts [48]. Further, Rashid et al. found that 64% of patients undergoing surgery, chemotherapy and/or radiation who were affected financially due to cancer treatment were suffering from depression as compared to 35% financially non-stricken patients [41].

### Association of patient characteristics with higher levels of financial toxicities

Twenty-two studies explored the relationship between patient characteristics and financial toxicities. Patient characteristics such as lower SES [28, 36, 49, 54, 55] or monthly income [18, 23, 50], being a farmer or being unemployed [23, 38] and having a lower level of education [18, 23, 38] were reported to be associated with higher levels of financial toxicity.

Partial or lack of health insurance coverage, coverage for direct costs only, low amount of medical reimbursement and receiving care from private hospitals/care centres were also reported to be associated with higher levels of financial toxicity [17–19, 21, 23, 25–27, 34, 36, 45] [refer to Table 2, Quote 4]. In an analysis of cancer patients undergoing

surgery, chemotherapy, radiotherapy and/or hormone therapy in public and private hospitals in Malaysia, Bhoo-pathy et al. found that lack of health insurance was associated with double the risk of incurring CHE [36]. Further, in a study of 1325 women with breast cancer in Uganda, Nigeria and Namibia, Foerster et al. found a greater proportion of untreated patients than treated patients in the countries without UHC as compared to a country where cancer treatment is covered [55].

### Financial toxicities can affect patient outcomes

The impact of financial toxicities on patient outcomes were reported in 5 studies. Chen et al. found that inpatients receiving chemotherapy, radiotherapy or targeted therapy with perceived severe financial difficulty had lower quality-of-life (QoL) scores than patients with perceived moderate financial difficulty [52]. This study also found subjective indicators of financial toxicity (i.e., perceived financial difficulty) as compared to objective indicators (i.e., healthcare cost and the healthcare-cost-to-income ratio) to have a stronger effect on QoL [52]. Jiang et al. found that for patients receiving outpatient oral targeted therapy, patients with no OOP costs had higher scores of health-related QoL as compared to patients with high OOP costs [22]. The association of financial toxicities with clinical outcomes such as overall survival and response rate were not examined in the included studies.

Financial toxicity and the anticipated burden of high treatment costs were associated with delayed health-seeking behavior [34, 37, 47, 51]. Patients reported financial barriers as the reason to delay their decision to obtain treatment [34] and their delayed presentation [37] [refer to Table 2, Quote 5].

## Discussion

We conducted a scoping review on the qualitative literature characterizing the patient experience with financial toxicities experienced by cancer patients in LMICs. We identified that cancer patients encountered material hardships such as OOP costs and among studies that explored CHE, incidence of cancer patients experiencing CHE ranged from 37.0–74.4%. Patients managed costs through coping behaviours such as selling assets, with upwards of 20% of patients receiving formal financial support. Non-adherence to treatment was also common, reported in more than one-fourth of the studies. Additionally, studies exploring psychological responses reported that patients experience worry and depression because of their cancer treatment. Studies exploring the association of patient characteristics and financial toxicities found factors such as SES and employment status to be associated with higher levels of financial toxicities. Further,

higher levels of financial toxicities were associated with lower QoL and delayed health seeking behavior.

Differences in country healthcare systems, policy and income level are likely to impart differences in financial toxicities, as seen by CHE being more common in LMICs as compared to HICs [6]. Foerster et al. found that lower-middle- and low-income countries, where costs are paid OOP, had a greater proportion of untreated patients than treated patients as compared to an upper-middle-income country where treatment costs are covered [55]. However, factors beyond country income level alone are likely to be contributory to cancer patients' experienced financial toxicity. Additionally, our findings of factors affecting financial toxicities reported by cancer patients in LMICs are comparable to those reported in studies looking at HICs. For instance, low SES has been reported to be associated with higher levels of financial toxicities, as compared to high SES, in both HICs [57] and LMICs [28, 36, 49, 54, 55].

The financial toxicities experienced by patients due to cancer treatment found in our review have multiple implications. Mitigation strategies are needed to reduce the extent of financial toxicities experienced. The main strategies discussed include education of patients, providers and healthcare systems on the costs of cancer treatment and resources available for financial assistance, as well as improvement and formulation of policies focused on making treatment accessible [58, 59].

The WHO strives to improve access to medicines globally through initiatives such as the WHO Essential Medicines List (EML), which acts as a guide detailing effective and safe medicines for healthcare systems. Though cancer drugs have been added to the WHO EML, many therapies remain unavailable and/or unaffordable for many LMICs, with limitations to accessible care being multifactorial [60]. It is important to recognize that the feasibility of mitigation strategies in LMICs varies according to country-specific circumstances, such as sociocultural factors, resource allocation, economic burden, geographic location, stakeholder involvement and roles of health technology assessment. In consideration of strategies that are feasible and impactful, the need for implementation of evidence-based strategies in LMICs is emphasized [58, 59]. The provision of freely provided government sponsored health care would be beneficial for cancer patients and the financial toxicity they face. Though the feasibility of this is limited, organizations have taken promising steps towards the goal of UHC among all countries [7]. The role of financial risk protection through UHC will likely be important in reducing the financial hardship experienced by cancer patients [7].

Knowledge gaps in the literature on treatment-related financial toxicities experienced by cancer patients in LMICs were identified through this review. The studies included only cover 20 LMICs, of which 3 are low-income countries, indicating a large literature gap in LMICs, particularly among

low-income countries. Further, only 9 of our included studies focused on paediatric patients. The experience of paediatric patients and their caregivers differ from that of adult patients and therefore must be further explored to ensure their unique challenges can be addressed effectively. As compared to other financial toxicities, psychological responses were less frequently described in studies. Further, many of the studies are cross-sectional and conducted within and/or at 1-year post diagnosis. Though financial toxicity is reported to be highest shortly after diagnosis, it is a dynamic and long-term consequence of cancer treatment and should be analysed longitudinally over the patient's lifetime [61, 62].

Our scoping review has limitations. As we restricted our inclusion criteria to English peer-reviewed articles, it is possible we missed relevant data from non-English literature or grey literature. As outlined in the JBI guidelines [8], we did not conduct a quality appraisal of studies and thus cannot be certain of the quality of the included studies. Most of the qualitative data included in this review was gathered through interviews or questionnaires and there may be recall, selection and/or sampling bias. Other limitations include the inability to conduct cross country comparison due to differences across studies such as cancer types, stage of diagnosis, cultural differences and differences in healthcare system delivery (including differences in UHC). This also limits the ability to determine if findings of financial toxicities reported are attributable to the specific setting studied or the whole country.

In conclusion, through a scoping review of cancer treatment-related financial toxicities experienced by patients in LMICs, we found that patients experience negative consequences because of their financial burden, such as OOP costs, non-adherence to treatment and worry. Financial toxicities are associated with a lower QoL. In consideration of the multiple factors that affect the feasibility of strategies to combat financial toxicities in LMICs, implementation of evidence-based strategies is needed to reduce the deleterious sequelae of these toxicities among cancer patients.

**Supplementary Information** The online version contains supplementary material available at <https://doi.org/10.1007/s00520-022-06952-4>.

**Acknowledgements** The authors are thankful to Mr. Henry Lam from Sunnybrook Library Services for his expert guidance on search strategy. This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

**Author contribution** S.U., K.K.W.C. and A.P. were involved in conception and design. S.U. and E.S. performed the literature search and data analysis. S.U. drafted the work and all authors critically revised the work.

**Funding** This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

**Data availability** All data generated or analysed during this study are included in this published article (and its supplementary information files).

**Code availability** Not applicable.

## Declarations

**Ethics approval** Not applicable.

**Consent to participate** Not applicable.

**Conflict of interests** The authors declare no competing interests.

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