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Strategies for Stress Management among Paediatric Nurses in Oncology/Haematology Settings: A Systematic Review

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: Paediatric oncology nurses are at risk of workplace stress. Previous systematic reviews have assessed interventions to manage general nurses stress levels, but no systematic review has been conducted on strategies for stress management among paediatric oncology nurses.
Aim: This study aims to Systematically review the methods used for stress management among pediatric oncology nurses.
Methods: A search was conducted in two academic health sciences databases (PubMed and Google scholar) and also Science-direct Journal article List. Methodological features were described using the PRISMA Statement checklists. The Joanna Briggs Institute's (JBI) critical appraisal tools were used for quality evaluation. And Inductive content analysis for synthesizing data.

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Results: Eighteen studies met the inclusion criteria and were analyzed for scientific rigour. The commonest research design was the quasi-experimental design. The contents and methods of the stress management approach varied across studies. It included: On-the-job mindfulness-based interventions, self-care retreat, Pediatric narrative oncology interprofessional training to: promote empathy, build teams, and prevent burnout; Wellness Program to support spiritual well-being. Others included: Peer-supported storytelling and moral distress control which was provided by an ethics consultation team. These stress reduction strategies identified were categorised into: (i) Personnel Support interventions (11 studies) and (ii) team support interventions (7 studies). Issues identified include scarcity of randomized controlled trials and scarcity of investigations to reduce oncology nurses' stress.

Conclusions: The evidence showed a relevant reduction in stress levels from the Personnel Support interventions and team support interventions. Large-scale, well-designed randomized controlled trials on stress interventions among oncology nurses are strongly advised. This finding could also result in more proactive stress management policies in oncology health care settings.

Keywords: Stress; management; paediatric; oncology; nurses; systematic review.

1. INTRODUCTION

Childhood cancer is a global health issue worldwide. Annually about 300,000 children (ages 0-19) are diagnosed with cancer [1]. It can be argued that due to the intensity of emotions involved in the provision of pediatric cancer care, nurses develop coping methods to help them to continue giving humanized care. Coping approaches are intentional, physical, or mental actions aimed at reducing the effect of stressful situations[2]. Nurses disclosed that to support themselves personally, they try to put all emotions aside and focus on their caring role. However, some did bear the burden until they got home to talk to their loved ones about it [3]. Learning to be at the peace with the situation and doing personal reflection were reported as being a good coping tactic [4]. Also, when a child with cancer dies, bereavement support was deemed helpful to both nurses and the family by some nurses, while others differed and termed it as emotionally draining.

Thus, identifying these coping strategies is important to ease the effects of stressors and prevent their worsening among pediatric oncology nurses.

1.1 Background

Pediatric palliative care (PPC) is the provision of care to children with chronic conditions such as cancer, or any acute illnesses that puts children at risk for premature death [5]. The care rendered involves a broad multidisciplinary health professional including nurses and takes place in settings such as oncology/ haematology intensive care units, families' homes and children's hospices. Noteworthy, the needs of children with cancer are different from those of adults, so as are the skills, understanding, and knowledge required by staff who care for them. Consequently, paediatric palliative nurses in these settings are often stressed as a result of attending not only to the children's physical, psychological and social distress but also considering the needs of the child's family when developing and planning the care for the child [6]. Nurse's stress, is related to challenges resulting from the high workload and inadequate staff, coping with emotional needs of the child and their families, managing death and dying patients and a lack of remunerations to staff [7,8].

There are a variety of concepts related to the manifestation of stress including; compassion fatigue, burnout, emotional exhaustion, and workplace stress [9].

Depending on the level of stress, stress can lead to physical and mental distress, such as harmful musculoskeletal injuries, depression and reduced work output of the nurses. Stress could further lead to low job motivation, reduced job satisfaction and poor patient care [7,8]. Job stress also affects organizations, as it leads to a barrier in recruiting and retaining workers, loss of skill employers as a result of labour turnover, burnout, illness and absenteeism. Thus, the function of the health care organizations in controlling costs and increasing productivity while responding to increasing demands from a growing ageing population might be close to impossibility as a result of stress among its workforce [6]. Holistic stress interventions are

comprehensive and include the social, economic [2,10] and spiritual needs of the person[3,11,12].

In the literature search, some of the interventions that are used in reducing workplace stress among paediatric oncology nurses include; co-worker cohesiveness and organizational commitment [7,13]. According to the findings of some studies, both self-motivation and organisational interventions can aid in the reduction of stress among oncology nurses[11,14-16]. Other studies have highlighted that stress management interventions have contributed to improving nurse's health outcomes and also patient's satisfaction [17-19]. Previous reviews have focused on assessing the stress reduction among nurses [20,21] among student nurses[22] among mental health nurses[23] but no study on stress reduction using a systematic review study has specifically been done among the paediatric oncology nurses group. Considering the stress involved in working in the oncology unit which is more compared to working in other units, it is deemed necessary to carry out a systematic review to examine the interventions that are used to reduce the stress experienced by the paediatric oncology nurses in health care facilities.

It is hoped that Policymakers and pediatric oncology nurse managers will find the result of this current review useful in minimizing stress and burnout in the pediatric oncology nursing profession. Furthermore, the results can drive researchers and clinicians in the direction of future research into stress reduction through the development of resilience among paediatric oncology nurses. In this perspective, this study aimed to identify Strategies for stress management among paediatric nurses during their line of duty of caring for children with cancer.

1.2 Review Objectives

1. To identify the types of interventions that are used to reduce stress among the paediatric oncology nurses in health care facilities.

2. METHODS

2.1 Search strategy

2.1.1 Study design

This study is a systematic review of published papers from empirical RCT, Quasi-experimental studies, Surveys studies. The review is done in line with the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) Statement [24]. To avoid duplication of already existing reviews on this subject, the authors did a scoping search for any related paper on the topic under consideration. To our knowledge, at the time of the search, we found no recent systematic review paper on this subject under consideration.

A search was conducted in two academic health sciences databases (PubMed and Google scholar) and a Science-direct Journal article List. The Boolean operators "AND" and "OR" were used to combine the search terms which, in some cases, were truncated to generate the maximal number of results. To ensure a comprehensive literature search, variations in keywords were considered in the search strategy. The keywords included; "oncology nursing, child health, paediatrics, oncology, cancer, and coping". Table 1 lists the keywords used by all the authors following the same independent search strategies done in PubMed.

In addition, reference lists of the selected studies were hand-searched to obtain additional relevant articles. Studies published in the English language from 2007 to 2021 were considered. The search was limited to the years 2007– to date, where two phenomena, namely, the rising haematology/oncology patient population and the stress among oncology nursing has become more evident [25].

The literature search and study selection began in June 2021 and was completed in July 2021.

2.2 Inclusion Criteria

A study must have met the following categories to be included in the review:

1. Types of participants: Paediatric oncology Nurses who care for patients with cancers.
2. Types of interventions: Stress reduction interventions among Paediatric oncology Nurses.
3. Outcome measures: Outcome of stress control, after using each intervention.
4. Types of studies: Empirical RCT, Quasi-experimental studies, Surveys studies. Only studies in the English language were added. Argument non-scientific based literature, editorials, commentaries, dissertations, letters and opinion pieces

were searched. All studies from 2007 till July 2021 were included.

5. Study Settings: Oncology/haematology settings.

2.3 Exclusion criteria

Studies that intended aim was not an intervention for stress management among pediatric oncology nurses**.**

2.4 Data Extraction

The Titles and abstracts of all papers were first independently assessed by the two reviewers, to exclude irrelevant material based on selection criteria. After which the full text was retrieved. Then, Reference lists of included papers were further analyzed and scanned for additional studies by all reviewers. During the search process, discrepancies occurring concerning included articles were resolved through discussions between the authors. Generic characteristics of each study were extracted into a researcher-developed excel table. For each study, generic aspects (authors, date of the study, country, study design, sample size, aim, and methodology) and topic-specific content (intervention type, instruments, and main findings) were recorded. We used PRISMA checklists to guide the methodological features of the study.

2.5 Assessment of Quality

The methodological quality of the included articles was evaluated using three adapted quality appraisal tools from the Joanna Briggs Institute (JBI):

a. Checklist for quasi-experimental studies
b. Checklist for Analytical Cross-sectional studies and
c. Checklist for RCTs (JBI, 2017).

Three reviewers collaboratively reviewed the studies using the JBI quality appraisal tools.

2.6 Synthesis

This study used content analysis in categorising the various types of stress management methods used by pediatric oncology nurses. Content Analysis methods allow for the synthesis of either qualitative or quantitative data [26]. Here, findings describing various stress management among the pediatric oncology nurses were assembled in a document. A descriptive analysis was used as a method to aid in the analysis and discussion of each paper and the details of each study were further described. This allows for a comprehensive conceptualization and a more methodologically inclusive synthesis of evidence [27].

Table 1. Study search results in pubmed

Database	Search Teams	Number of Articles that first Appeared
Results from Advanced search in PubMed	(((((oncology [Title]) OR (cancer [Title])) AND (nurse [Title])) AND (stress [Title]))	7
	((stress management [Title]) AND (oncology nurses [Title]))	3
	(((stress [Title]) AND (oncology nurses [Title]))) AND (coping)	13

3. REVIEW RESULTS

3.1 Search Outcome

The selection process is described using the PRISMA flow diagram in Fig. 1 (Moher et al. 2009). The records obtained in the database searched were (n = 1002), the additional records were obtained through other sources (n = 1). Using endnote software, 221 articles were discarded as duplicates. Records after duplicates removed (n =782), records screened (n =782), records excluded (n =732) [discarded for being irrelevant to the current study]. Full-text articles assessed for eligibility (n =50), and full-text articles excluded with reasons (n =32). Studies included in the final synthesis (n =18).

3.2 Study Characteristics

An excel spreadsheet was used to outline the summaries of the included articles. The features highlighted include; the authors, published year and country, study design, the title of the study, participants, sample size, type of interventions and outcomes as presented in Table 2. Most

studies involved the use of diverse approaches to stress reduction to help reduce the stress of pediatric oncology nurses. Among the 18 studies included in the review; Twelve studies were conducted in the United States: Moody et al., 2013, [28], Sands, 2008 [29], Zadeh et al. 2012[30], Brandon et al. 2014 [31], Meadors & Lamson, 2008 [32], Altounj et al, 2013 [18], Macpherson, 2008 [33], Gauthier et al.2015 [34], Kometiani, 2017 [35], Rogers et al 2008 [4], Murphy et al (2021) [16] and Philip et al(2020)[11]. Whiles two studies were conducted in Canada: Edmond et al., 2012 [36] and Chang et al 2007 [17], respectively. A study was each conducted by Yılmaz et al, 2018 in Turkey [37], Slater, Edwards, & Badat in Australia 2018 [38], Eagle, 2012 in the UK [39] and Hyunju et al(2020) in Korea [15], respectively.

3.3 Study Designs

All the studies were quantitative. Out of it, one used a Randomised controlled trial (n=1), whiles, Ten (n=10) of the studies used a quasi-experimental study, specifically using the pretest and post-test approach. The rest of the study (n=7) used a Cross-sectional observational survey research design.

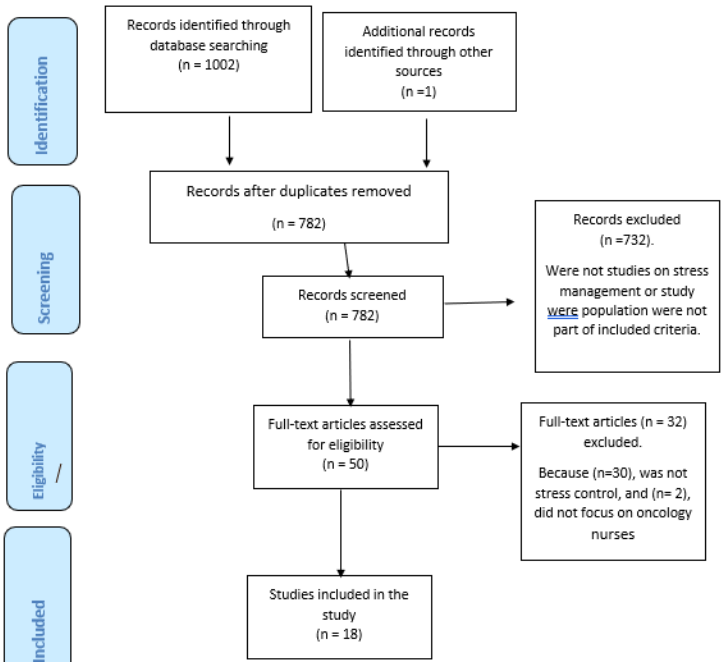

Fig. 1. PRISMA 2009 flow diagram

Table 2. Summary of studies included in the review

Author, Year, country	Title	Sample Size study population	Methodology	Types of stress management methods	Outcomes of stress management methods
1. Moody et al., 2013. United States [28]	Helping the helpers: mindfulness training for burnout in pediatric oncology--a pilot	48 paediatric oncology staff (nurses, social workers, physicians, nurse practitioners	Randomised controlled trials (RCT)	Mindfulness-based course (MBC)	MBC did not result in any significant improvement in scores on burnout, perceived stress. Analysis of diaries kept by subjects revealed reduced stress, improved inner peace,

Author, Year, country	Title	Sample Size study population	Methodology	Types of stress management methods	Outcomes of stress management methods
	program	, psychologists, and child-life specialists)			compassion and joy, better focus and self-awareness and fewer somatic symptoms in the intervention arm.
2.Sands, 2008. USA[29]	Pediatric narrative oncology: interprofessional training to promote empathy, build teams, and prevent burnout.	19 members (doctors, nurses, social workers, and child life therapists)	Quasi-experimental study	Narrative training	The training was a means to address some of the most difficult aspects of pediatric oncology care facing clinicians.
3. Zadeh et al. 2012. USA[30]	Taking Care of Care Providers: A Wellness Program for Pediatric Nurses	126 paediatric oncology nurses	Survey	Wellness program	Staff found the wellness series very helpful to themselves and to their ability to positively change their job performance.
4.Edmond et al., 2012 Canada [36]	Alleviating Emotional Exhaustion in Oncology Nurses: an Evaluation of Wellspring's "Care for the Professional Caregiver Program"	182 healthcare workers oncology nurses (pediatric, surgical, and general oncology staff) and one group of nurse managers	Quasi-experimental study	Care for the Professional Caregiver Program (CPCP).	The CPCP was effective in ameliorating emotional exhaustion, an intrinsic aspect of burnout.
5.Brandon et al. USA, 2014[31]	Impact of a Pediatric Quality of Life Program on Providers' Moral Distress	413 pediatric providers (nurses, physicians, social workers, therapists, dieticians,	Survey	Pediatric QOL Program	After the implementation of the Pediatric QoL Program, nurses and other providers encountered morally distressing situations less often. Providers also answered that

Author, Year, country	Title	Sample Size study population	Methodology	Types of stress management methods	Outcomes of stress management methods
		chaplains, administrators)			they had greater comfort with and competence in providing care focused on patients' quality of life after completing the program.
6.Meadors & Lamson, 2008) USA[32]	Compassion Fatigue and Secondary Traumatization: Provider Self Care on Intensive Care Units for Children	185 providers employed within a Children's Hospital	Survey	educational seminars on compassion fatigue	The researchers found that this educational seminar was successful in raising awareness on compassion fatigue and reducing clinical stress.
7.Altounj et al, 2013, USA[18]	A Self-Care Retreat for Pediatric haematology-oncology Nurses	64 Pediatric haematology-oncology nurses Children's Hospital Los Angeles	Quasi-experimental study	self-care retreats	Overall feedback was extremely positive, with the majority of the participants finding great value in this experience. The retreat was not only an enjoyable event but also a valuable intervention for helping pediatric haematology oncology nurses cope with the difficulties of their jobs and avoid burnout.
8.Macpherson, 2008, USA[33]	Peer-Supported Storytelling for Grieving Pediatric Oncology Nurses	6 registered nurses from a tertiary care pediatric hospital inpatient oncology unit who self-identified as experiencing grief.	Quasi-experimental study	peer-supported storytelling for grieving pediatric oncology nurses	Participants reported (1) receiving and providing support during sessions; (2) that sessions had an impact on their grief; (3) that sessions had an impact on their meaning-making, and the explicit session focus on making sense of and identifying benefits in their experiences was

Author, Year, country	Title	Sample Size study population	Methodology	Types of stress management methods	Outcomes of stress management methods
					particularly helpful. There was a significant positive correlation between participant reports of some special patient deaths during career and impact of sessions on grief
9.Yılmaz et al, 2018, Turkey [37]	Effect of a nurse-led interventio n programm e on the profession al quality of life and post-traumatic growth in oncology nurses	The sample group of (oncology and haematolog y chemothera py centre, paediatric oncology-) (n = 43).	Quasi-experimental study	To evaluate the effects of a nurse-led intervention programme on compassion fatigue, compassion satisfaction, and burnout	The evaluation carried out before and 5 weeks after the intervention showed that compassion fatigue and burnout decreased, while compassion satisfaction and all subscales scores of post-traumatic growth inventory increased.
10.Slater, Edwards, &. Badat, Australia 2018[38]	Evaluation of a staff well-being program in pediatric oncology, haematolo gy, and palliative care services group	177 pediatric oncology, haematolog y, and palliative care medical and nursing staff Queensland Children's Hospital	Survey	The program included education, on-site counsellors, mindfulness sessions, debriefing, well-being resources, and improved engagement, support, and communication.	Participants in mindfulness sessions agreed that it was a valuable tool to improve clinical practice, 94% said it had an immediate positive impact on their well-being, and 70% agreed that they were applying mindfulness principles outside the sessions. Staff retention and turnover improved. Staff reported a positive effect on awareness of self-care, addressing risks to resilience, seeking support from trusted colleagues, coping with critical incidents, and the ability to interact positively with patients and families
11.Chan g et al	Effect of the	A total of 58 Pediatric	Survey	A new leadership role,	The results show that the intensity of work-

Author, Year, country	Title	Sample Size study population	Methodology	Types of stress management methods	Outcomes of stress management methods
2007, canada[17]	Clinical Support Nurse Role on Work-related Stress for Nurses on an Inpatient Pediatric Oncology Unit	Oncology Nurses participated in this study		the Clinical support nurse (CSN).	related stress experienced by nurses in this study is significantly less (P < .001) on shifts staffed with a CSN compared with shifts without a CSN.
12.Eagle, 2012 UK[39]	The effect of facilitated peer support sessions on burnout and grief management among health care providers in pediatric intensive care units: a pilot study.	50 interdisciplinary professionals were invited to participate(Physicians, nurses, social workers, paediatric nurses, and respiratory therapists)	Quasi-experimental study	facilitated support sessions as a method of reducing grief perceptions and burnout among providers	The results of pretest/post-test CBI and HGRC instruments did not indicate statistically significant changes. Notably, the instruments indicated low levels of grief and burnout among participants pre-/post-implementation.
13.Gauthier et al. (2015) USA[34]	On-the-job mindfulness-based interventions for paediatric ICU nurses: a pilot	Paediatric ICU nurses (n = 38) from an urban paediatric hospital in the US.	Quasi-experimental study	The feasibility of 5-minute mindfulness meditation for PICU nurses before each work-shift to investigate the change in nursing stress, burnout, self-compassion, mindfulness, and job satisfaction was explored	A repeated measures ANOVA revealed significant decreases in stress from baseline to post-intervention and maintained 1 month following the intervention
14.Kometiani, 2017, USA[35]	Creating a vital healing communit	11 Nurses	Quasi-experimental study	The purpose of this pilot study was to survey participants in	Participants were generally more satisfied at the end of the third session than

Author, Year, country	Title	Sample Size study population	Methodology	Types of stress management methods	Outcomes of stress management methods
	y: A pilot study of an art therapy employee support group at a pediatric hospital			an art therapy pediatric hospital staff support group to assess their sense of wellbeing in the workplace. The primary goal was to explore the value of using the ProQOL measure to evaluate outcomes of art therapy engagement for staff.	when they started the group thus relaying their contentment with work and enabling them to provide better care. Several responses received showed that participating in the group had an increased positive attitude.
15.Rogers et al (2008)USA [4]	Educational interventions in end-of-life care: part I: an educational intervention responding to the moral distress of NICU nurses provided by an ethics consultation team	82 registered nurses working in a level III neonatal intensive care unit (NICU) were included.	Quasi-experimental study	A single group undergoing educational sessions in the 6 areas of pain management, symptom management, ethical/legal issues, communication/ culture, spiritual/anxiety, and prevention of compassion fatigue.	There were statistically significant higher levels of comfort and knowledge in care for dying infants in the areas of ethical/legal issues and symptom management after the educational programs.
16.Murphy, Jane M., et al. (2021).USA	Pediatric Hematology/Oncology Nurse Spirituality, Stress, Coping, Spiritual Well-being, and Intent to Leave: A Mixed-	130 Pediatric Hematology/ Oncology Nurses (APHON)	A concurrent triangulation mixed-method Observational research design	Social Coping behaviours used: having a sense of humour, supportive friends and family members, and leisure activities such as hobbies, physical activities,	Coping and Spiritual well-being (SWB) were weakly, positively correlated (r = .248, p = .005) indicating greater coping was associated with greater SWB.

Author, Year, country	Title	Sample Size study population	Methodology	Types of stress management methods	Outcomes of stress management methods
	method Study			relaxation techniques, as well as achieving balance through time away from work. Participants also described spiritual-based coping strategies such as being prayerful, religious practices, the use of gratitude, reflection, focusing on the present, mindfulness, patience, positivity, and being humbled by nature or changing seasons.	
17. Hyunju (2020)Korea.	Palliative Cancer Care Stress and Coping Among Clinical Nurses Who Experience End-of-Life Care	180 clinical nurses caring for cancer patients in a hospital in Korea.	A cross-sectional descriptive study	Measures used to cope with nursing stress were: "sleeping", "asking close confidants for help" (family, friends, colleagues, supervisors, and supporters; "engaging in leisure activities" (travelling, mountain climbing, fishing, listening to music, watching movies, reading books, watching TV, etc; average, and "not trying to cause personal stress".	The results of a correlation analysis between stress and coping methods revealed that higher cancer care stress was related to higher emotion-focused coping.
18.	Storytellin	Participants	Two-group	Intervention	The differential

Author, Year, country	Title	Sample Size study population	Methodology	Types of stress management methods	Outcomes of stress management methods
Phillips (2020) the USA	g Through Music: A Multidimensional Expressive Arts Intervention to Improve Emotional Well-Being of Oncology Nurses	(N = 43) their average oncology experience was 8.5 years.	(intervention and control), quasi-experimental study of a 6-week intervention	combined storytelling, reflective writing, songwriting, and stress management skills	pattern of scores across time revealed that the intervention group typically had greater improvements over time than the control group, although not all differences were statistically significant. The significant changes over time for both groups suggest that even control group participants had an improvement in many outcomes.

3.4 Results of Study Appraised

The overall methodological quality of the studies was good. The JBI critical appraisal checklist was used. Supplementary information I, II & III attached to this paper indicate how studies were appraised based on the selected JBI appraisal tool. A point was assigned to a study if details that answer the appraisal question were performed in the study. No point was awarded to the study if there was no clear, non-applicability or no description in the study's methods that allows the authors to answer the item in the appraisal tool.

3.5 Stress Management Methods

This study used content analysis in categorizing interventions into two levels [40]. Which are Personnel support interventions (11studies) and team support interventions (7 studies). A descriptive narrative was used as a method to aid in the discussion of each paper that was included. Meta-analysis of findings was not performed due to the heterogenicity of study designs.

3.5.1 The personnel support interventions

These include mindfulness training for burnout in pediatric oncology [28]. Impact of a pediatric quality of life program on providers' moral distress [31]; On-the-job mindfulness-based interventions [34]; Evaluation of a staff well-being program in a pediatric oncology, haematology, and palliative care services group [38]; A self-care retreat for pediatric haematology oncology nurses [18]; Alleviating emotional exhaustion in oncology nurses: An evaluation of wellspring's care for the professional caregiver program [36],

Compassion fatigue and secondary traumatization: provider self-care on intensive

care units for children [32], Nurse-led intervention programme on the professional quality of life and post-traumatic growth in oncology nurses [37], Pediatric narrative oncology: interprofessional training to promote empathy, build teams, and prevent burnout [29]; Taking Care of Care Providers: A Wellness Program for Pediatric Nurses [30], and supportive spiritual well-being [16].

3.5.2 Team support interventions

These include the Effect of the clinical support nurse role on work-related stress for nurses on an inpatient pediatric oncology unit [17]; Peer-supported storytelling for grieving pediatric oncology nurses [33]; facilitated peer support sessions on burnout and grief management [39]; A pilot study of an art therapy employee support group at a pediatric hospital [35]; and educational intervention responding to the moral distress provided by an ethics consultation team [4]. Other interventions according to Hyunju (2020) included group Measures used to cope with nursing stress which included: sleeping,

asking close confidants for help and engaging in leisure activities [15]. And a study by Phillips (2020), on Interventions that combined storytelling, reflective writing, songwriting, and stress management skills[11].

3.6 Results of Personnel Support Interventions

3.6.1 Findings on studies on mindfulness

There were two (2) studies on interventions on mindfulness. The study on mindfulness training for burnout in pediatric oncology by Moody et al. (2013), shows that of the 156 health care workers recruited who received an intervention, nearly 100% of the subjects exhibited signs of burnout at baseline and MBC did not result in any significant improvement in scores on burnout, perceived stress or depression scales [28].

A study on mindfulness-based intervention for pediatric nurses by Gauthier et al (2015), shows the feasibility of 5-minute mindfulness meditation for PICU nurses before each work shift to investigate the change in nursing stress, burnout, self-compassion, mindfulness, and job satisfaction. And one of the Limitations of the study was the lack of a control group [34].

3.6.2 Findings on studies on self-care interventions

Three (3) studies were on self-care interventions. The main aim for the self-care retreats by Altounji et al (2013) was to heal nurses from their reported past trauma and stress by implementing 3 off-site self-care retreats. The authors concluded that the overall feedback was extremely positive, with the majority of the participants finding great value in this experience [18].

According to Edmonds (2012), nurses demonstrated a significant decrease in emotional exhaustion and an improvement in their stress level, at the 1-month follow-up testing (p=0.003 and 0.001, respectively) and 7-month follow-up testing (p=0.002 and 0.001) [36].

In the self-care intervention by Meadors (2008), in evaluating the effectiveness of providing educational care seminars on compassion fatigue to health care providers working on critical care units with children, some of the results showed that the participant felt a general reduction in compassion fatigue, they felt they could handle multiple traumas at work. Pretest M= 3.09 SD =1.10, post-test M =3.64 SD 0.87 t =7.42 p =.001. The author concluded that the educational seminar was successful in raising awareness on compassion fatigue and reducing clinical stress [32].

3.6.3 Findings on studies on quality of life (QOL interventions)

There were two (2) studies on QOL interventions. Yilmaz (2018) study evaluated the effects of a nurse-led intervention programme on the professional quality of life and post-traumatic growth of oncology nurses. The study was designed for a single group with pre-test and post-test comparisons. The nurse-led intervention programme was carried out in two face-to-face sessions and two counselling follow-up sessions. The evaluation was carried out before and 5 weeks after the intervention. Nurses' Compassion Fatigue levels were low after the nurse-led intervention (t = 21.14); the Burnout score was low (t = 24.26), and the Compassion Satisfaction score was high (t = −17.48). The author concluded that the nurse-led intervention programme was effective in improving the professional quality of life and post-traumatic growth of oncology nurses [37].

In QoL intervention by Brandon (2014), the intensity of distress related to “work quality of life” decreased after program implementation (pre = mean 4.32; SD 1.63; post = mean 4.19; SD 1.83). The frequency at which providers encountered these situations decreased significantly after program implementation (p = .01). The frequency of providers who were considering leaving the institution within 6 months decreased following program implementation (p = .04). The author also concluded that after the implementation of the Pediatric QoL Program, nurses and other providers encountered less morally distressing situations[31].

3.6.4 Findings on wellness/well-being intervention study

There were two (2) studies on wellness interventions. A study by Zadeh (2012), describes a 10-session wellness program for Pediatric Nurses that was offered on 2 occasions to both inpatient and outpatient nursing staff. The nursing staff chose the content areas, and each session used a combined approach of hands-on and didactic learning. The majority of the staff

found the sessions to be effective in providing new information that they felt would enhance their work skills. More than 75% reported that the sessions would change completely the way they performed their job [30].

Slater (2018) study was about the evaluation of a staff well-being program after 1 year following education workshops on a wellness intervention in a pediatric oncology, haematology, and palliative care services group. All participants in the sessions agreed that it was a valuable tool to improve clinical practice, 94% said it had an immediate positive impact on their well-being, and 70% agreed that they were applying mindfulness principles outside the sessions. The author concluded that education showed a positive impact on staff well-being [38].

3.6.5 Findings on a narrative intervention study

A narrative intervention study by Sands (2008) also was to test the feasibility and effectiveness of providing narrative training to a mixed group of doctors, nurses, social workers, and child life therapists on pediatric oncology. All staff members were invited to attend a weekly narrative training seminar for 6 weeks. During these seminars, participants wrote about their attachment to patients, their emotional responses to patients' participants then read aloud their narratives to one another during a facilitated discussion. Baseline and post-intervention assessments used the Interpersonal Reactivity Index (IRI) and the Stressor Scale for Pediatric Oncology Nurses (SSPON). Nineteen staff members who consented and participated in the training completed all baseline and postintervention measures. The IRI subset of Perspective-Taking improved at a statistically significant level (P = 0.029), and the Empathic Concern subset trended toward significant improvement (P= 0.056) [29].

3.6.6 Spiritual well-being Intervention

A nurse's spirituality offers a mechanism for coping with accumulated losses and grief encountered in clinical practice and turn supports spiritual well-being [16].

3.7 Results of Team Support Interventions

The study by Chang (2007) explored the effect of the CSN role on the nurses' work-related stress using the Stressor Scale for Pediatric Oncology Nurses. A total of 58 nurses participated in this study for a response rate of 86%. There was a decrease in the intensity of work-related stress by approximately 10%, and this difference was highly significant (P < .001) by a paired t-test. The author concluded that the nurses in this study reported that they experienced significantly lower levels of work-related stress when a CSN was available compared with when no CSN was available [17].

In a study by Macpherson (2008), on peer-support storytelling for grieving pediatric oncology nurses using a mixed-methods single-group descriptive repeated measures design. Participants were 6 registered nurses. All participants reported that they felt "very supported" during storytelling [33].

Eagle (2012), explored facilitated support sessions as a method of reducing grief perceptions and burnout among providers. Twenty-eight participants completed pretest documents. Copenhagen Burnout Inventory (CBI) and Hogan Grief Reaction Checklist (HGRC) were administered before and after two interactives. The mean HGRC score comparisons did not demonstrate statistical significance. CBI pre-and post-test total and domain sub-scores were not statistically significant. Notably, the instruments indicated low levels of grief and burnout among participants pre-/post implementation [39].

Kometiani (2017), in an art therapy intervention at a pediatric hospital, used the ProQOL measure to evaluate outcomes of art therapy engagement for staff. The data was analyzed using SPSSv17.0 statistical software. All statistical testing was two-sided assuming alpha = 0.05 type I error rate. Likert measurements for the ProQOL have been summarized for the study population using means, standard deviations, frequencies and percentages. Correlations were observed for trends in response rates across potential subgroups. The research assistant concluded that over time the compassion satisfaction scale relayed that high compassion satisfaction of the participants was maintained. Lower satisfaction improved as the group progressed [35].

Roger (2008), used a quantitative pretest, intervention, post-test design with a single group undergoing educational sessions in the 6 areas of pain management, symptom management, ethical/legal issues, communication/ culture,

spiritual/anxiety, and prevention of compassion fatigue. After running a paired sample t-test, the result showed that the neonatal end-of-life care sessions had a significant effect on the NICU nurses' comfort level in caring for dying infants ($t(81) = 4.2$, $P < .001$, and effect size $d = 0.333$). This study indicates that NICU nurses' comfort level in caring for dying infants was significantly increased or improved after receiving all the modules' sessions of the educational program [35].

The measures used to cope with nursing stress, the top 5 highest-scoring items were "sleeping" (average, 4.2 points), "asking close confidants for help", "engaging in leisure activities" (travelling, mountain climbing, fishing, listening to music, watching movies, reading books, watching TV, etc; average, 3.71 points), and "not trying to cause personal stress" (average, 3.61 points)[15].

Meanwhile, Philip et al, in a 6-week intervention combined storytelling, reflective writing, songwriting, and stress management skills. The study showed that participants in both groups had significant improvements over time on all outcome measures (depression, insomnia, loneliness, burnout, secondary traumatic stress, compassion satisfaction, self-awareness, and self-compassion). There was also a statistically significant time-by-group interaction that showed decreased loneliness and insomnia and greater self-compassion and self-awareness in the intervention group[11].

4. DISCUSSIONS

As the nursing workforce ages and turnover rates at work continue to increase due to workplace stress, it has become more and more important to identify interventions to reduce stress among the pediatric oncology nurse to improve the care they give to the paediatrics with chronic or acute palliative health needs [7]. This review was to identify strategies for stress management among paediatric nurses in oncology/haematology settings. After a systematic review of the literature, 18 studies were identified. Among these studies: Twelve (12) studies were carried out in the United States, and two (2) studies were carried out in Canada. One (1) study was conducted in Turkey, one (1) in Australia, one (1) in the United Kingdom, and one (1) in Korea. The identifications of these counties in the analysis of the papers retrieved could be as a result of these countries being among the countries which have lots of oncology cases. Thus, the nurses' in these settings experience stress as a result of managing the oncology cases and they had to use stress interventions to manage the daily stresses that they experience.

Confronting Stress and promoting wellness within the oncology nursing workforce should be the shared responsibility of oncology nurses' and their organizations [14]. This study showed the dearth of studies on stress reduction interventions among pediatric palliative nurses and explored the methodological challenges that each study had, evaluation of the effectiveness of interventions with this participant cohort could not be undertaken.

There were about Eighteen (18) dearths of studies with evidence of stress interventions. These findings were compared with other related studies, some of which are as follows:

The result of Edmonds (2012) intervention program on mindfulness is in line with a study on mindfulness-based stress reduction intervention for nurses and nurse aides by Mackenzie (2006), which showed that Mindfulness-based stress reduction programs were effective in reducing stress and improving health in a variety of clinical populations[14]. Mackenzie (2006) study involved the development and evaluation of a brief 4-week mindfulness intervention for one such group-nurses and nurse aides. In comparison with 14 wait-list control participants, 16 participants in the mindfulness intervention experienced significant improvements in burnout symptoms, relaxation, and life satisfaction [41].

The current study findings of Sands, Stanley and Charon (2008), on the use of Narrative training to reduce stress, is in line with a study by Hensel-Dittmann (2011). Hensel-Dittmann worked on the Treatment of traumatized victims of war and torture using a randomized controlled comparison of narrative exposure therapy and stress inoculation training. Hensel-Dittmann's result indicated that exposure treatments like narrative exposure therapy (NET) lead to a significant stress inoculation training (SIT) symptom reduction even in severely traumatized refugees and asylum seekers [42].

The use of the Wellness program of Zadeh et al. (2012) is in line with the findings on research done on the effect of a holistic program, the Collaborative Care Model (CCM) Program, and the development of a self-care plan on health-

promoting behaviours in hospital nurses by McElligott (2010).

In McElligott's study, the experimental group included registered nurses (RNs) from units in one institution introduced to the Collaborative Care Model (CCM) and the development of a self-care plan in an 8-hour program. McElligott concluded that the CCM plus the development of a self-care plan significantly increased overall health-promoting behaviours, and spirituality, interpersonal relations, and nutrition scores in these RNs [43].

The current findings of Edmond et al. (2012) on the use of Care for the Professional Caregiver Program (CPCP), is in line with Banerjee et al., (2017), on a study on implementation and evaluation of a communication skills training program for oncology nurses[44]. In Banerjee et al., (2017), three hundred forty-two inpatient oncology nurses participated in a 1-day communication skills training program and completed course evaluations, self-reports, and pre-and post-standardized patient assessments. Participants rated the training favourably, and they reported significant gains in self-efficacy in their ability to communicate with patients in various contexts. Participants also demonstrated significant improvement in several empathic skills, as well as in clarifying skills [44]. A common component of most of the interventions was the incorporation of systems of motivational support for participants: from the research team and/or the peer group (18-19, 23). Feedback on progress in the attainment of intervention goals was made by most of the studies [18, 32, 34, 36].

Some studies in this current review study have demonstrated that both personnel and team support interventions can help in reducing stress among oncology nurses[11, 15, 16]. In addition, for this current review conducted, the sample size was on the whole small with no power analysis presented. In most of this current review reports, it was ambiguous whether statistical non-significance was due to type I or II error or a real phenomenon. Actual differences in stress levels were not exhibited in some reports. The majority of the studies used theories of stress to guide their works that offered a framework that could be used to categorize components and goals of intervention and that categorization and description of interventions. However, conceptual clarity in future research could help further clarify which aspects of the stress main scale that the intervention is designed to reduce, hence little can be inferred from the findings of some of the studies. However, despite this, the studies indicate that workplace stress reduction (Personal and team) interventions can be feasible and beneficial in general for the paediatric oncology nurses, patients and the whole health care institutions.

5. CONCLUSIONS

Within the limitations of the study and the few high-quality publications available, Pediatric oncology nurses appear to be stressed. As a consequence of the findings from the papers used, stress interventions used by the participants were categorised into: personnel support interventions: [Mindfulness training intervention, Wellness Program, A self-care and wellspring's care, post-traumatic care, case narratives, supportive spiritual well-being and training to enhance empathy and reduce burnout]. Team support interventions included; Art therapy through support groups, educational intervention by an ethics consultation team. Sleeping, seeking aid from close friends, and participating in group leisure activities such as combined storytelling, reflective writing, and songwriting. Noteworthy, stress among oncology nurses is seen to be reduced as a result of personnel support interventions and Team support interventions. These interventions could improve the oncology nurses' well-being and job satisfaction by lowering the social and economic costs of stress. Thus, the finding from this review should lead to a more proactive stress management policy in oncology healthcare facilities.

5.1 Implications for Practice and Future Research

The sample size of most of the studies was small, so it does not permit one to generalize the efficacy of a specific stress reduction approach over the other. However, there was more evidence for the effectiveness of personnel support than team support interventions. Overall intervention reviewed here appeared at least harmless to the participants. Further research is definitely needed, specifically RCTs and with adequate rigour. This review strongly suggests the need for experimental research on stress management programmes that overcome the limitations pointed out in the critical appraisals and methodological weakness.

5.2 Strengths and Limitations

Search strategies were made purposively broad, and it is unlikely that many English language publications were missed. This systematic review contributes to current knowledge on the concepts of stress among paediatric oncology nurses by identifying stress reduction programs through the identified interventions. Findings can inform further research in this area and across various nursing contexts. Due to the heterogeneity of most of the studies, it is recommended that there is a need for more RCT research in this field.

5.3 Recommendations

Policy initiatives should fund and prioritize advocacy for the awareness of individual performance and firm resources used to manage stress in the paediatric oncology nurses workforce. Also, the Nursing managers and health facility administrators, in particular, should promote and encourage the individual characteristics and organizational resources used to manage stress in the working environments. More Interventional studies that can give durable and feasible strategies to lessen the stress faced by workplace paediatric oncology nurses should be conducted.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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