RESEARCH ARTICLE

Predictors of Secondary Traumatic Stress among Oncology Nurses in Palestine

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Abstract

 Introduction: The work environment of oncology nurses exposes them to patient suffering, making them vulnerable to developing Secondary Traumatic Stress (STS). Most research on STS has been conducted in high-income countries with stable healthcare systems, whereas little is known about its occurrence or risk factors in conflict-affected regions. This study aims to determine the prevalence of STS and identify its predictors among Palestinian oncology nurses who face unstable political conditions, insufficient resources, and limited mental health services. **Methods:** A cross-sectional analytical study was conducted in ten oncology departments across hospitals in the West Bank and East Jerusalem between August and October 2024. A total of 293 participants completed a questionnaire assessing sociodemographic characteristics, STS, burnout, social and organizational support, and coping strategies. Data were analyzed using SPSS 27 with descriptive and inferential statistics, including regression analyses to identify significant predictors. **Results:** The mean STS score was 3.13 ± 0.73, with the intrusion-related symptoms being most prominent (3.18 ± 0.94). STS levels varied significantly with age, working hours, and parental status. Regression analysis identified the number of children as a negative predictor of STS (B = –0.081, p = 0.004), while education level (B = 0.096, p = 0.034) and Personal Accomplishment (B = 0.015, p < 0.001) were positive predictors. Perceived Organizational Support remained a strong negative predictor (B = –0.109, p < 0.001). **Conclusion:** This study provides the first evidence of STS among oncology nurses in a conflict-affected work environment. Strengthening organizational support and tailoring coping strategies to the local context may help reduce STS while promoting nurse well-being. These findings underscore the global relevance of integrating stress management programs into oncology education and workplace policies.

Keywords: Secondary Traumatic Stress- Oncology Nurses- Occupational Health- Palestine

Introduction

Oncology nurses play a critical role in the management of cancer patients, a condition requiring substantial physical, emotional, and psychological engagement [1]. Due to their continuous exposure to patient suffering, pain, and life-threatening conditions, these professionals are at a heightened risk of developing secondary traumatic stress (STS) [2]. STS was first conceptualized by Carla Joinson in her study of emergency room nurses [3]. Subsequently, Charles Figley defined STS as *"The effects that arise from the traumatization of individuals who help people who have experienced trauma and are in close contact with them"* [4]. Figley further posited that STS is a psychological syndrome resulting from indirect exposure to traumatic experiences, with symptoms comparable to post-traumatic stress disorder (PTSD), including emotional exhaustion, intrusive thoughts, and avoidance behaviors [5]. Nurses, in particular, are at a heightened risk due to the nature of their work, which involves

frequent exposure to distressing events, sustaining empathetic engagement with patients and families, and working under high-intensity and demanding conditions [6]. The consequences of STS can significantly impact nurses' personal and professional well-being, manifesting as physical and psychological health problems and contributing to reduced job performance and motivation, burnout, intentions to leave the profession, and actual job turnover [7, 8].

Several studies have investigated the impact of STS on healthcare and mental health professionals. High levels of STS and burnout have been reported among professionals working with vulnerable populations, emphasizing the importance of structured support networks [9-11]. A systematic review noted that the prevalence of STS varies widely across healthcare professions, with rates ranging from 21% to 67%, depending on the population studied and the measurement tools used [11-13]. Factors such as younger age, limited work experience, higher patient caseloads, and inadequate organizational support

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have been identified as significant predictors of STS [14, 15]. Moreover, STS does not occur in isolation. In fact, previous research highlights that burnout, particularly emotional exhaustion and depersonalization, is strongly associated with higher STS levels among healthcare professionals [16].

Conversely, social support and effective coping strategies have been shown to buffer against the negative psychological effects of secondary exposure to trauma [17]. At the organizational level, perceived support has been consistently linked to reduced psychological distress and lower STS, as supportive environments enhance resilience and mitigate work-related stress [6, 18]. The inclusion of these variables in the STS investigation is also informed by the Job Demands–Resources (JD-R) model, which posits that job demands, such as exposure to patient trauma, can result in strain (e.g., STS), whereas resources such as coping skills and social or organizational support help maintain well-being [19-21].

Although many studies have focused on social workers, emergency personnel, and mental health professionals, oncology nurses remain underrepresented despite their frequent exposure to life-threatening illness and recurrent patient loss. Given the demanding nature of oncology care, recognizing and addressing STS is essential for safeguarding nurses' mental health. Studies have emphasized the importance of distinguishing STS from burnout and compassion fatigue to develop targeted interventions that effectively mitigate its impact [22, 23].

The oncology nursing environment in Palestine differs substantially from that of other countries studied to date. The healthcare system in Palestine faces three major challenges: political instability, insufficient resources, and high rates of chronic diseases, including cancer [24]. The psychological impact of cancer treatment is further aggravated by ongoing political unrest and insufficient mental health resources. The current literature lacks sufficient research about STS among Palestinian oncology nurses, creating a significant knowledge gap [25].

The combination of ongoing conflict, restricted resources, and repeated traumatic events places Palestinian oncology nurses at an exceptionally high-risk for developing STS. The lack of strong evidence about STS prevalence and risk factors hinders the development of effective intervention strategies [9]. Therefore, this study is novel in its aim to determine the prevalence of STS among Palestinian oncology nurses and to identify its demographic, professional, and organizational predictors. By addressing this gap, the findings not only inform local strategies to safeguard nurse well-being but also provide insights for oncology nursing practice globally, particularly in other resource-constrained or conflict-affected settings.

Materials and Methods

Study design

This cross-sectional analytical study was conducted between August and October 2024 in Palestinian hospitals providing cancer care.

Study population and sample size

The study used an exhaustive approach, targeting all oncology nurses working in the oncology departments of ten hospitals across the West Bank and East Jerusalem (N=328). These hospitals included seven governmental institutions and three private healthcare facilities, ensuring a diverse representation of oncology care settings. The required sample size was calculated using OpenEpi based on the following parameters: population size = 328, confidence interval = 95%, and medium effect size = 1. The minimum required sample size was 178 [26]. To maximize participation, questionnaires were distributed to all 328 eligible individuals, yielding 293 completed responses.

Measurement tools

The study employed a structured, self-administered questionnaire to assess STS and its predictors among oncology nurses. The demographic section collected participant background information, including age, gender, marital status, and number of children, ensuring representation across diverse personal and professional profiles.

The Secondary Traumatic Stress (STS) Scale was used to measure the prevalence of STS among oncology professionals [27]. This 17-item instrument evaluates three key dimensions: intrusion, avoidance, and arousal, and is widely recognized for its validity and reliability in assessing STS among professionals exposed to trauma. In the present study, the scale demonstrated excellent internal consistency (Cronbach's alpha = .93), with subscale reliability coefficients of Intrusion = .80, Avoidance = .87, and Arousal = .83. The following cut-off points were applied: 1.0-2.33 = low STS symptoms; 2.34-3.67 = moderate STS symptoms, and 3.68-5.0 = high STS symptoms [27].

Potential predictors of STS were examined across a range of socio-demographic, professional, and psychosocial domains. Socio-demographic and work-related variables included age, number of children, education level, years of experience, average working hours, and level of income. In addition, psychosocial and occupational factors were included: Depersonalization (DP), Emotional Exhaustion (EE), Personal Accomplishment (PA), Perceived Organizational Support (POS), and Perceived Social Support (PSS), all selected based on prior evidence of their association with the development and severity of STS in healthcare populations [8, 28].

Burnout was assessed using the Maslach Burnout Inventory (MBI), a 22-item tool comprising three subscales: EE, DP, and PA [29]. Perceived Social Support (PSS) was measured using the Multidimensional Scale of Perceived Social Support, a 12-item instrument rated on a 7-point Likert scale that evaluates support from family, friends, and significant others [30]. This scale is highly reliable and helps determine the role of social support in mitigating STS among healthcare professionals [30].

The POS was used to measure healthcare professionals' perceptions of institutional support for their contributions and well-being [31]. This 10-item scale, also rated on a 7-point Likert scale, assesses the role of organizational support in reducing stress and burnout in high-pressure

environments such as oncology care [31].

The Coping Orientation Problems Experienced (COPE) Scale was used to identify coping strategies among oncology professionals in managing STS [32]. The 28-item scale evaluates various coping mechanisms commonly employed in high-stress healthcare settings [32].

Pilot study and reliability testing

A pilot study was conducted among 30 oncology nurses from two hospitals to assess the reliability of the questionnaire. Cronbach's α for the pilot sample indicated high internal consistency across all instruments: STS = 0.91, MBI = 0.89, PSS = 0.88, and Brief COPE = 0.84. These pilot results confirmed the suitability of the tool for the main study.

Statistical analysis

Data were analyzed using SPSS version 27. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the sociodemographic characteristics and questionnaire responses. Inferential statistical tests were conducted to explore group differences and associations between variables. Independent-samples t-tests, one-way ANOVA, and Tukey's post hoc tests were applied to compare mean STS scores across categorical groups. Pearson's correlation coefficients were computed to evaluate the strength and direction of linear associations between continuous variables.

Multiple linear regression analyses were then conducted to identify the significant predictors of STS. Prior to regression modeling, assumptions of linearity, independence, homoscedasticity, and normality were verified; the Kolmogorov-Smirnov test indicated a normal distribution (p = 0.096). A p-value < 0.05 was considered statistically significant for all analyses.

Ethical considerations

The study was conducted in accordance with the ethical principles outlined in the 1964 Declaration of Helsinki and its later amendments. Ethical approval was obtained from the Institutional Review Board (IRB) of the Research Ethics Committee at Bethlehem University, Bethlehem, Palestine (Registration No: 38/201/2024) and from the Medical Ethics Committee of the Faculty of Medicine of Sousse, University of Sousse, Sousse, Tunisia (Registration No: CEFMSo_0014_2015).

All participants provided written informed consent before enrollment. Participants were assured of anonymity, confidentiality of their responses, and their right to withdraw from the study at any time without penalty or consequences. To ensure confidentiality and anonymity, no personally identifying information was collected, and all data were analyzed in aggregate form.

Results

Characteristics of the participants

The demographic analysis of the 293 participants revealed that the majority were aged 25 to 44 years (81.2%), with a nearly equal distribution of males (45.1%) and females (54.9%). Most participants were married (55.6%). The majority (58.0%) worked in private hospitals, and 53.2% were employed full-time. Frequent exposure to traumatic events was reported by 31.4% of participants, while 37.5% experienced such events occasionally (Table 1). The most common coping strategy was seeking support from family and friends (39.9%), whereas only 12.6% sought professional counseling. Additionally, just 33.4% had received training in stress management. These findings are summarized in Table 2.

Level of STS

The findings revealed a 62.6% of participants had a moderate level of STS, with a mean score of 3.13, SD = 0.73. Among the three subscales of the STS, the Intrusion subscale had the highest mean score (M = 3.18, SD = 0.935), indicating that symptoms such as unwanted thoughts or reminders of clients' trauma were the most frequently reported. This was followed closely by the Arousal subscale (M = 3.14, SD = 0.812), reflecting moderate levels of physiological and psychological tension. The Avoidance subscale recorded the lowest mean score (M = 3.08, SD = 0.722), suggesting a slightly lower—but still moderate—tendency to avoid trauma-related thoughts or interactions. The overall mean score for the total STS was 3.13 (SD = 0.729), which reflects a general moderate experience of secondary traumatic stress symptoms across the sample as seen in Table 3.

Differences in STS scores across demographic features

Table 4 details the variation of STS scores according to demographic parameters. The analysis of differences in STS mean scores revealed significant associations with age, average working hours, and parental status. The Tukey post hoc test indicated that participants aged ≥ 45 years reported the highest STS mean score (M = 3.46, SD = 0.50), while the lowest scores were observed among participants under 25 years (M = 2.88, SD = 0.72; p = 0.001). Additionally, working hours significantly influenced STS scores (p = 0.008). Participants working <40 hours per week exhibited the highest mean score (M = 3.32, SD = 0.990), whereas those working more than 40 hours had the lowest score (M = 2.95, SD = 0.64). Furthermore, participants without children (M = 3.24, SD = 0.73) had higher mean score than those who have (M = 3.06 SD = 0.72; p = 0.040).

Pearson correlation between variables

STS exhibited a weak but significant positive correlation with Personal Accomplishment (PA) (r = 0.177, p = 0.002) and a moderate negative correlation with Perceived Organizational Support (POS) (r = -0.271, p = 0.001), suggesting that higher organizational support was associated with lower levels of secondary traumatic stress. Depersonalization (DP) showed a significant negative correlation with Perceived Social Support (PSS) (r = −0.253, p = 0.001) and with coping (r = −0.119, p = 0.041), indicating that higher social support and more coping are linked to lower depersonalization. Correlations between study variables are presented in Table 5.

Table 1. Socio- Demographic and Professional Characteristics of the Sociodemographic Participants

Participants' characteristics		n	%
Age	< 25 years	15	5.1
	25-34 years	114	38.9
	35-44 years	124	42.3
	≥45 years	40	13.7
Sex	Male	132	45.1
	Female	161	54.9
Marital status	Single	102	34.8
	Married	163	55.6
	Divorced	23	7.8
	Widowed	5	1.7
Having children	No	115	39.2
	Yes	178	60.8
Level of education	Nursing Diploma	50	17.1
	Bachelor's Degree in Nursing	159	54.3
	Master's Degree in Nursing	57	19.5
	Doctorate in Nursing	27	9.2
Experience	< 10 years	212	72.3
	≥ 10 years	81	27.6
Type of hospital	Public Hospital	95	32.4
	Private Hospital	170	58.0
	Specialized Oncology Center	28	9.6
Average working hours	<40 hours	217	74.1
	≥ 40 hours	76	25.9
Traumatic event	Rarely	68	23.2
	Occasionally	110	37.5
	Frequently	92	31.4
	Almost daily	23	7.8
Place of residence	Urban Area	237	80.9
	Suburban Area	39	13.3
	Rural Area	17	5.8
Income	< 4,000 ILS	133	45.4
	4,001- 6,000 ILS	87	29.7
	> 6,000 ILS	73	24.9
Stress managing training	Yes	98	33.4
	No	195	66.6

Linear Regression analysis

The multiple linear regression analysis identified several significant predictors of STS. The number of children emerged as a significant negative predictor (B = -0.081, p = 0.004), indicating that nurses with more children reported lower STS levels. A surprising result was that Education level was positively associated with STS (B = 0.096, p = 0.034), suggesting that participants with higher education levels reported greater STS. The PA was also a significant positive predictor (B = 0.015, p < 0.001), implying that higher PA scores were associated with increased STS. Conversely, POS was a strong negative predictor (B = -0.109, p < 0.001), indicating that greater organizational support was linked to lower STS levels (Table 6).

Table 2. Coping Strategies and Stress Management of the Participants

Coping strategies and stress managing		n	%
Coping strategies	Professional counseling/therapy	37	12.6
	Peer support groups	49	16.7
	Family and friends	117	39.9
	Physical activities/exercise	24	8.2
	Hobbies or personal interests	47	16.0
	Other (Meditation & Spiritual)	19	6.5

Discussion

STS represents a significant concern among professionals working closely with trauma-exposed populations [9]. Understanding the prevalence and severity of STS symptoms is essential for safeguarding the well-being and effectiveness of care providers [33]. In the present study, 62.6% of oncology healthcare personnel experienced moderate levels of STS. This finding aligns with previous research reporting STS prevalence rates ranging from 16% to 37% among oncology staff [33-35]. This higher proportion compared to many international studies may reflect the unique pressures of working in

Table 3. Mean Score for Each Subscale toward the STS

Items	Mean	SD	Level
I felt emotionally numb.	3.27	1.14	Moderate
My heart started pounding when I thought about my work with clients.	2.91	1.23	Moderate
It seemed as if I was reliving the trauma(s) experienced by my client(s).	3.04	1.17	Moderate
I had trouble sleeping.	3.16	1.19	Moderate
I felt discouraged about the future.	3.17	1.15	Moderate
Reminders of my work with clients upset me.	3.25	1.28	Moderate
I had little interest in being around others.	3.00	1.24	Moderate
I felt jumpy.	3.09	1.16	Moderate
I was less active than usual.	2.86	1.08	Moderate
I thought about my work with clients when I didn't intend to.	3.34	1.16	Moderate
I had trouble concentrating.	3.10	1.28	Moderate
I avoided people, places, or things that reminded me of my work with clients.	3.41	1.40	Moderate
I had disturbing dreams about my work with clients.	3.24	1.42	Moderate
I wanted to avoid working with some clients.	3.27	1.32	Moderate
I was easily annoyed.	3.19	1.29	Moderate
I expected something bad to happen.	3.20	1.32	Moderate
I noticed gaps in my memory about client sessions	2.81	1.23	Moderate
Overall STS mean score (out of 17)	3.13	0.73	Moderate
Intrusion subscale (out of 5)	3.18	0.935	Moderate
Avoidance subscale (out of 7)	3.08	0.722	Moderate
Arousal subscale (out of 5)	3.14	0.812	Moderate

Table 4. Differences in STS Scores based on Participants' Demographic Variables

Demographic variables		n	Mean	SD	P-value
Age	< 25 years	15	2.88	0.72	0.001*
	25-34 years	114	3.19	0.68	
	35-44 years	124	2.99	0.77	
	≥ 45 years	40	3.46	0.60	
Sex	Male	132	3.18	0.70	0.297
	Female	161	3.09	0.75	
Marital status	Single	102	3.26	0.67	0.209
	Married	163	3.07	0.78	
	Divorced	23	3.08	0.63	
	Widowed	5	3.14	0.51	
Did you have children	No	115	3.24	0.73	0.040*
	Yes	178	3.06	0.72	
Level of education	Nursing diploma	50	2.94	0.75	0.215
	Bachelor's degree in nursing	159	3.14	0.70	
	Master's degree in nursing	57	3.21	0.80	
	Doctorate in nursing	27	3.23	0.72	
Experience	< 10 years	212	3.31	0.74	0.850
	≥ 10 years	81	3.14	0.70	
Type of hospital	Public hospital	95	3.17	0.75	0.216
	Private hospital	170	3.08	0.72	
	Specialized oncology center	28	3.33	0.66	
Average working hours	< 40 hours	28	3.32	0.990	0.008*
	≥ 40 hours	76	2.95	0.64	
Traumatic event	Rarely	68	3.07	0.70	0.624
	Occasionally	110	3.11	0.71	
	Frequently	92	3.18	0.79	
	Almost daily	23	3.26	0.66	
Place of residence	Urban area	237	3.15	0.71	0.471
	Suburban area	39	3.00	0.88	
	Rural area	17	3.17	0.58	
Income	Less than 4,000 ILS	133	3.13	0.86	0.961
	4,001-6,000 ILS	87	3.11	0.75	
	> 6,000 ILS	73	3.14	0.72	

Independent t test and One-Way ANOVA; SD, Standard Deviation; *Significant values

a conflict-affected and resource-constrained healthcare system.

Among STS symptom dimensions, avoidance behaviors were the most frequently endorsed, with the highest mean score recorded for the item *"I avoided people, places, or things that reminded me of my work with clients"* (mean = 3.41). This finding is consistent with prior studies identifying avoidance as a predominant symptom of STS [36]. Conversely, memory-related symptoms were less prominent, as reflected in the lower mean score for *"I noticed gaps in my memory about client sessions"* (mean = 2.81). This symptom pattern highlights the need for targeted interventions aimed at reducing avoidance behaviors, such as structured peer support programs, resilience training and psychosocial support initiatives

tailored to high-stress oncology care environments [37].

This study revealed several significant associations between STS scores, worker age, and total weekly working hours. Nurses aged 45–54 years exhibited the highest STS scores; whereas participants younger than 25 years reported the lowest STS levels. These findings contrast with earlier studies in Palestine that reported higher stress levels among younger nurses [38]. This discrepancy may be explained by differences in coping strategies and social support networks, which tend to be more developed among older nurses. Interestingly, nurses working < 40 hours hours per week demonstrated the highest STS scores, while those working more than 40 hours per week reported the lowest STS levels. This counterintuitive finding may reflect increased exposure to professional experience,

Table 5. Pearson Correlation between Variables (n = 293)

Variables		Secondary Traumatic Stress	Emotional Exhaustion	Depersonalization	Personal Accomplishment	Perceived Social Support	Perceived Organizational Support
Secondary Traumatic Stress	r	--					
Emotional Exhaustion	r	-0.073	--				
	p-value	0.212					
Depersonalization	r	-0.037	0.510	--			
	p-value	0.525	0.001				
Personal Accomplishment	r	0.177	0.033	-0.069	--		
	p-value	0.002	0.571	0.238			
Perceived Social Support	r	0.005	-0.005	-0.253	0.482	--	
	p-value	0.927	0.928	0.001	0.001		
Perceived Organizational Support	r	-0.271	0.067	-0.048	-0.022	0.124	--
	p-value	0.001	0.253	0.410	0.709	0.034	

r, Pearson correlation coefficient

Table 6. Linear Regression Analysis of STS Predictors

Predictors	B	T	p-value	95% CI for B	
				Lower bound	Upper bound
(Constant)	3.644	9.557	< 0.001*	2.893	4.394
Age	0.043	0.850	0.396	-0.057	0.143
Child number	-0.081	-2.887	0.004*	-0.136	-0.026
Level of education	0.096	2.134	0.034*	0.007	0.184
Experience	0.010	0.350	0.727	-0.048	0.069
Average working hours	-0.087	-1.688	0.092	-0.188	0.014
Frequency of traumatic event	0.045	0.977	0.329	-0.046	0.137
Level of income	0.010	0.254	0.800	-0.065	0.084
EE	-0.002	-0.622	0.534	-0.009	0.005
DP	-0.004	-0.510	0.610	-0.018	0.011
PA	0.015	3.448	< 0.001*	0.006	0.023
PSS	-0.032	-0.729	0.467	-0.117	0.054
POS	-0.109	-3.953	< 0.001*	-0.164	-0.055

Model summary: R^2, 0.163, Adjusted R^2, 0.124, ANOVA p-value < 0.001. *Significant values. CI, Confidence interval; DP, Depersonalization; EE, Emotional Exhaustion; PA, Personal Accomplishment; POS, Perceived Organizational Support; PSS, Perceived Social Support.

peer support, and skill development among those heavier workloads, which may buffer the psychological impact of stress.

A noteworthy and unexpected finding was the positive association between STS and PA. Nurses with higher PA scores may build closer therapeutic relationships with their patients, which, while professionally rewarding, can also increase emotional burden. This highlights the importance of institutional measures to support work-life balance and mitigate emotional exhaustion among high-performing healthcare staff [39].

As anticipated, a strong negative association was observed between STS and POS, which aligns with previous research findings [10, 40]. Our study supports the essential role of organizational support as a protective factor, especially when working in underfunded oncology departments. POS was positively correlated with social support and adaptive coping strategies, reinforcing its role as a protective factor. Enhancing POS through mental health services, structured peer-support programs,

flexible scheduling, and staff recognition initiatives could strengthen resilience among oncology nurses [37].

The positive relationship observed between effective coping strategies and PA underscores the potential of targeted training programs. Introducing adaptive coping skills into oncology nursing curricula could simultaneously reduce STS and foster a stronger professional identity among future oncology nurses.

The regression analysis highlighted the significant predictive power of both organizational and personal factors on STS. Consistent with the recent findings of Salameh et al. [40], POS emerged as the strongest negative predictor of STS, reinforcing its critical role in protecting healthcare workers from psychological strain.

Family-related variables also played a notable role: having a greater number of children was associated with lower STS levels, potentially reflecting the development of stronger coping mechanisms through family responsibilities and social support. Conversely, higher levels of education were positively associated with

STS, suggesting that nurses with advanced training may be more attuned to patients' suffering and therefore more susceptible to secondary trauma.

Finally, the positive association between PA and STS levels, consistent with prior findings, indicates that professional achievement alone does not buffer nurses from emotional distress. Rather, individuals with high PA may form deeper therapeutic relationships with patients, increasing their emotional investment and vulnerability to stress.

Study implications

This study provides valuable evidence on STS among oncology nurses working in conflict-affected environments, contributing to the global understanding of occupational stress in healthcare. Our findings indicate that Palestinian oncology nurses experience moderate levels of STS, with outcomes influenced by educational background, work experience, organizational support, and family size.

To mitigate STS, oncology departments of Palestine and comparable low-resource or conflict-affected settings should adopt cost-effective organizational support interventions. These may include structured peer-support groups, equitable workload distribution systems, flexible scheduling, and improved communication channels between staff and leadership. Recognition programs, psychological first aid services, and access to community-based counseling should also be prioritized, even in resource-constrained settings, to reduce the emotional burden on nurses [33].

Individual-level interventions for staff members in these environments, including running resilience workshops, reflective practice meetings, mindfulness-based stress reduction programs, and post-incident debriefings following critical incidents, could strengthen nurses' coping abilities. The implementation of family-friendly workplace policies, such as flexible scheduling and childcare support, represents additional practical measures to protect nurses' well-being in areas with limited resources [41].

At the policy level, national nursing associations should incorporate STS management and resilience training programs as part of their continuing professional development curriculum. Together, these measures can foster a more supportive work environment and enhance both nurse well-being and patient care quality. The findings of this study underscore the crucial role of organizational support as a protective factor against secondary trauma, offering lessons relevant to oncology nursing worldwide, particularly in resource-limited and high-stress healthcare systems.

Study limitations

The study has several limitations. First, the reliance on a self-reported questionnaire may have introduced response bias, with participants potentially underreporting or overreporting symptoms. Second, the cross-sectional design limits the ability to infer causal relationships between STS and its associated factors. Third, the study was conducted in a single geographical and professional context using a non-probabilistic sampling, which may restrict the generalizability of the findings to other populations or healthcare settings. Finally, the absence of longitudinal data restricts how evolves over time or how cultural factors influence the reporting of psychological distress.

In conclusion, this study identified a high prevalence (62.6%) of moderate secondary traumatic stress (STS) among oncology healthcare workers, with avoidance behaviors being the most prominent symptom. Multivariable analysis revealed that STS severity was positively associated with older age, shorter working hours (40 hours/week), higher educational attainment, and elevated personal accomplishment. In contrast, having more children and higher levels of perceived organizational support were negatively associated with STS.

These findings highlight the critical importance of organizational strategies to enhance workplace support, foster resilience, and improve access to mental health resources. Practical recommendations include implementing policies that ensure access to psychological services, structured professional development programs, mentorship opportunities, peer support networks, and flexible work arrangements to reduce occupational stress and burnout.

At the policy level, national nursing bodies should integrate STS and resilience training into continuing professional development curricula. Future research should explore additional protective factors and develop tailored interventions to mitigate STS and promote the well-being of oncology healthcare professionals, particularly in resource-limited or high-stress healthcare environments.

Author Contribution Statement

AL, MAT, and NM conceived and designed the study. AL coordinated data collection and supervised its implementation. NA conducted the statistical analyses and interpreted the data. AL drafted the initial manuscript, while MAT, NA, and NM provided critical revisions and additional insights into the results, discussion, and conclusions. NM supervised the study. All authors reviewed and approved the final manuscript for submission.

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Ethical Declaration

Institutional Review Board approval was obtained from the Institutional Review Board (IRB) of the Research Ethics Committee at Bethlehem University, Bethlehem, Palestine (Registration No: 38/201/2024) and the Medical and Scientific Research Committees of the Faculty of Medicine of Sousse, University of Sousse, Tunisia (Registration No: CEFMSo_0014_2015).

All participants provided informed consent before their inclusion in the study. They were assured of their anonymity, the confidentiality of their data, and their right to withdraw from the study without any penalty or consequences. To maintain confidentiality and anonymity, no personal identifying information was collected, and the data were analyzed in aggregate form. The authors declare that they have received written informed consent from participants to participate in this study and to publish their data.

Availability of data

The data that support the findings of this study are available from the corresponding author on reasonable request.

Conflict of interest

The authors declared no potential conflicts of interest with respect to the research, authorship, or publication of this article.

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