

REVIEW ARTICLE

Prevalence of oncology nurses' compassion satisfaction and compassion fatigue: Systematic review and meta-analysis

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Abstract

Aim: To systematically review and comprehensively analyse findings of studies reporting oncology nurses' compassion satisfaction (CS), burnout (BO) and secondary traumatic stress (STS), measured by the professional quality of life (ProQOL) scale, and explore CS and CF related factors.

Design: Systematic review and meta-analysis of cross-sectional and interventional studies.

Method: Electronic databases were searched using keywords, and the review followed PRISMA guidelines. The prevalence of CS, BO and STS and their instrumental ratings were pooled using random effects meta-analyses. Meta-regression studies explored the effects of variables.

Results: Fifteen studies (sample size 2,509) were reviewed, and nine were in the meta-analysis. The prevalence of CS, BO, and STS were 22.89%, 62.79% and 66.84%, respectively. No substantial correlation was found for independent variables, possibly due to sample size. There was a weak negative correlation between CS and BO [-0.06(0.90)] and a weak positive correlation between CS and STS [0.20(0.70)].

KEYWORDS

burnout, compassion fatigue, compassion satisfaction, meta-analysis, oncology nursing, secondary traumatic stress, systematic review

1 | INTRODUCTION

Compassion is the inherent moral and spiritual empowerment in nursing. It alleviates people's suffering and pain (Schantz, 2007). Compassionate care is one of the nursing profession's attributes. It appears when nurses interact with their patients and share the pain and suffering reflected in their behaviour and attitude (Burnell, 2009; Henderson & Jones, 2017). Oncology nurses, who treat people with cancer on a daily basis, require emotional endurance in dealing with difficult and hopeless situations. Caring for people with cancer along their journey of treatment from diagnosis to survival or the end of life entails compassion (Katz, 2019). However, the effects of

compassion on oncology nurses are not always positive. Compassion reflects two faces of the one coin as described by Stamm (2010), who developed a professional quality of life (ProQOL) theory that involves compassion satisfaction (CS) and compassion fatigue (CF) experienced by those who act as helpers or care givers. Based on this theory, the ProQOL scale was developed by Stamm (2010), and it contains both positive and negative aspects of compassion. The ProQOL scale gives a numerical rating of ProQOL in CS and CF constructs, and it has been cited in more than one thousand studies, according to Google Scholar, and translated and validated in many languages and populations (Joana Duarte, 2017; Ghorji et al., 2018; Hemsworth et al., 2018; Misouridou et al., 2020).

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CS and CF have been explored widely in a variety of nursing specialties (Craigie et al., 2016; Hinderer et al., 2014; Kawar et al., 2019; Kelly et al., 2015). CS is the positive facet of such care. It is the pleasure that results from providing service to others (Sacco & Copel, 2017; Stamm, 2010). This concept has a statistically significant positive impact on nurses' emotional, social and spiritual wellbeing (Dunn & Rivas, 2014; Radey & Fig ley, 2007; Sacco & Copel, 2017). However, nurses also experience CF, the negative aspect of care that comprises all undesirable feelings from frequent exposure to suffering patients, stressful work environments and self-giving (Peters, 2018;

Stamm, 2010). Amongst oncology nurses, CF has negative influences on their relationships with others, and it leads some to consider leaving the profession (Perry et al., 2011). According to Stamm (2010), CF involves burnout (BO); feelings of hopelessness, lack of motivation, un-supportive work environments and secondary traumatic stress (STS); and fear, insomnia and intrusive images. Oncology nurses suffer from high emotional exertion and low personal accomplishment, indicating signs of BO (Gomez-Urquiza et al., 2016). Oncology nurses experienced STS in terms of insomnia, irritability, and unpleasant thoughts (Melvin, 2015; Quinal et al., 2009). The concept of CF was initially

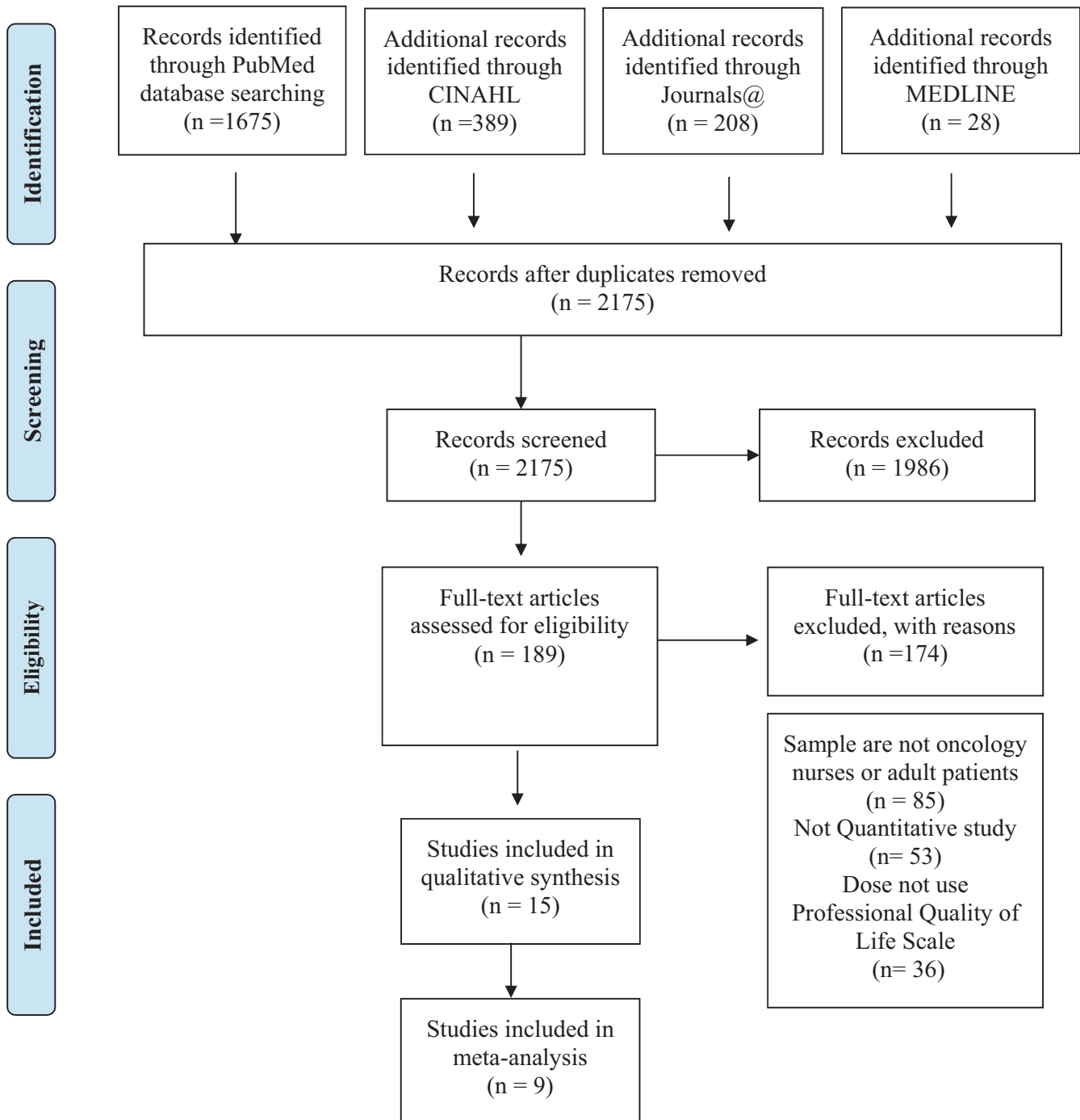


FIGURE 1 Process of studies selection flow chart

TABLE 1 Summary of observational studies included in the review

| Study/ Country | Aim | Sample size / setting / Study design | Statistical tests | compassion satisfaction | Burnout |
|--|---|---|--|--|--|
| 1. (Jarrad & Hammad, 2020) Jordan | Explore levels of burnout and compassion fatigue amongst oncology nurses | 100 / specialized cancer centre/ Descriptive Correlational | $M \pm SD$ 95%CI | 71.8 ± 16 low (68.7–74.9) | 39.5 ± 11 moderate (37.3– 41.7) |
| 2. (Jang et al., 2016) Korea | Identify the relationship of professionalism with professional quality of life | 285/ 8 university hospitals Cross-sectional | $M \pm SD$ 95%CI | 33.84 ± 5.62 moderate (33.1–34.5) | 28.38 ± 5.36 moderate (27.7–28.9) |
| 3. (Wu et al., 2016) USA & Canada | Examine the experience of compassion fatigue and compassion satisfaction oncology nurses | 486 American 63 Canadian/ oncology nurse working in US and CA / Descriptive non-experimental | $M \pm SD$ 95%CI $M \pm SD$ 95%CI | 42.37 ± 5.27 High (41.9–42.8) 42.6 ± 4.7 High (41.3–43.9) | 22.66 ± 5.47 moderate (22.2–23.1) 22.49 ± 4.84 moderate (21.3–21.7) |
| 4. (Yu et al., 2016) China | Describe and explore prevalence of potential predictors of professional quality of life aspects | 650/ 10 3ry hospitals and 5 2ry hospitals / Cross-sectional | $M \pm SD$ 95%CI | 31.81 ± 6.49 moderate (31.3–32.3) | 21.14 ± 4.95 low (20.8–21.5) |
| 5. (Duarte & Pinto-Gouveia, 2017) Portugal | Explore psychological factors | 221/ 5 public hospitals Cross-sectional | $M \pm SD$ 95%CI | 38.0 ± 5.41 moderate (37.3–38.7) | 25.28 ± 5.04 moderate (24.6 – 25.9) |
| 6. (Mooney et al., 2017) USA | Comprehensive analysis of satisfaction and compassion fatigue | 18/ community hospital/ Cross-sectional Comparative | $M \pm SD$ 95%CI | 41.2 ± 4.15 High (39.3–38.7) | 23.3 ± 2.80 moderate (22.0 – 24.5) |
| 7. (Al-Majid et al., 2018) USA | Assess degree of compassion satisfaction and compassion fatigue | 26/218-bed community hospital Cross-sectional Comparative | $M \pm SD$ 95%CI | 52.0 ± 9.6 High (48.3–55.7) | 49.2 ± 9.2 High (45.7–52.7) |
| 8. (Arimon-Pages et al., 2019) Spain | Assess prevalence of compassion satisfaction, compassion fatigue and anxiety | 297 / 8 university hospitals Cross-sectional | F (%) 95%CI | 141(47.5) [41.7–53.3] | 186(62.6) [56.9–68.2] |
| 9. (Wells-English et al., 2019) USA | Explore association between compassion satisfaction, compassion fatigue and intention to turnover | 93 / cancer centre oncology department / Cross-sectional | $M \pm SD$ 95%CI | 40.12 ± 6.20 High [38.9–41.4] | 21.93 ± 5.25 moderate [20.9–23] |
| 10. (Hooper et al., 2010) USA | Explorative | 12/ 461-bed acute healthcare system/ Cross-sectional | F (%) | 1 (8.3) Low 5 (41.7) moderate 6 (50) High | 2 (16.7) Low 7 (58.3) moderate 3 (25) High |
| 11. (Wentzel & Brysiewicz, 2018) | Descriptive | 83/ 3 oncology departments hospice care/ Cross-sectional | $M \pm SD$ 95%CI | 41.48 ± 4.61 High [40.4 – 42.4] | 23.35 ± 4.03 moderate [22.4 – 24.2] |

Note: $M \pm SD$: mean \pm standard deviation, 95%CI: confidence interval, F (%): frequency (percentage), compassion satisfaction, burnout, and secondary traumatic stress scores: high = 42 or more, moderate = ranged between 23 and 41 scores: and low = 22 or less.

| Secondary traumatic stress | Associated variable/ factors | Statistical analysis | Study quality | Risk and Source of bias |
|---|--|---|---------------|---|
| 50.8 ± 16.9 High (47.1.4–54.1) | Socio-demographic Variables | Descriptive Person Correlation | Fair | Moderate/ Convenient Sample |
| 28.33 ± 5.48 moderate (27.3–29) | Socio-demographic variables and Professionalism | T test analysis of variance Multiple regression | Good | Low / time frame |
| 22.56 ± 5.47 moderate (22.1–23) 22.41 ± 5.6 moderate (21–23.5) | Compare Socio-demographic Personal Health and work related characteristics | Chi-square test of independence | Fair | Moderate/ Un equal cohorts |
| 21.39 ± 4.48 Low (21–21.8) | Empathy Social support Personality traits Coping style Social support | T test, analysis of variance, and Multiple regressions | Good | Low / Convenient Sample and Time frame |
| 25.82 ± 4.40 moderate (25.24 – 26.4) | Empathy Self-compassion Psychological inflexibility | regression analysis student's t test | Fair | Moderate / Convenient Sample and Time frame |
| 20.2 ± 4.61 moderate (18.0 – 22.3) | Compare with ICU nurse | Two sample t test regression analysis | Poor | High / Sample size justification eligibility time frame |
| 51.4 ± 10 High (47.6–55.2) | Compare with critical care nurses | Regression models | Fair | Moderate / Sample size and Time frame |
| 152(51.2) [48.5–53.9] | Transfer to another unit and choose nursing profession again | Binary logistic regression Multivariate analysis | Good | Low/ Time frame |
| 23.72 ± 5.09 moderate [22.7–24.8] | Intention to turnover | Bivariate correlation Stepwise Multivariate linear regression | Good | Low/ Convenient Sample and Time frame |
| 3(25) Low 5(41.7) Moderate 4(33.3) High | Compare professional quality of life with emergency, intensive care, nephrology nurses | Frequency and percentages with cut scores | Fair | Moderate / Convenient Sample and Time frame |
| 26.93 ± 5.36 moderate [25.7 – 28.0] | Socio-demographic | Fisher's exact and kruskal-wallis equality of population rank tests | Fair | Moderate/ purposive Sample and Time frame |

TABLE 2 Summary of interventional studies included in the review

| | Study/country | Aim | Sample/ setting | Study design | Intervention |
|----|--|--|--|--|--|
| 1. | (Potter et al. 2013) USA | Evaluation of resilience programme | 13 oncology nurses / national cancer institute | Descriptive pilot study resilience programme immediate/ 3 / 6 months | A 90 min' small groups activities using resilience approach to reduce compassion fatigue |
| 2. | (Jakel et al., 2016) USA | Effect of giver resilience mobile application | 25 oncology nurses /26-bed oncology unit at medical centre | Quasi-experimental Pre- /post-test | Mobile application gives recourse for nurses: Psychoeducation and evaluation of compassion fatigue reminders for self-care. |
| 3. | (Yilmaz et al., 2018) Turkey | Effect of nurse-led intervention programme | 43 oncology nurses/ cancer care clinic | Single group pre- and postintervention | Two sessions consist of lectures, reading, and videos about relevant information related to compassion fatigue and patients' concerns. |
| 4. | (Joana Duarte & Pinto-Gouveia, 2016) Portugal | Explore the effect of mindfulness-based intervention with psychological outcomes | 94 oncology nurses / 2majot oncology hospitals | Non-randomized comparative study | 6 weeks' mindfulness-based intervention focus on stress reduction exercises |

Note: \bar{x} : mean, \bar{x} (SD): Mean (standard deviation).

used by Fligey (1995) to describe STS, with which it was used interchangeably. Therefore, CF is considered another term for STS in many studies (Duarte & Pinto-Gouveia, 2017; Jarrad & Hammad, 2020; Yu et al., 2016). In this review, we use the term STS according to professional quality of life (ProQOL) theory and the term CF to represent BO and STS. Many reviews explored CS, BO and STS in many types of healthcare givers, such as intensive care professionals and nurses (Cavanagh et al., 2020; van Mol et al., 2015; Zhang, Han, et al., 2018). Recent studies of oncology nurses reported low levels of CS and moderate to high levels of BO and STS (Ortega-Campos et al., 2020; Xie et al., 2021). Further exploring about levels of oncology nurses' ProQOL and identifying factors contributing to low CS and high BO and STS would be beneficial. This review aimed to systematically review and comprehensively analyse findings of studies reporting CS, BO and STS levels amongst oncology nurses as measured by the ProQOL scale. Our review questions were as follows: What are the prevalence of oncology nurses' CS, BO and STS as measured by the ProQOL scale? What are oncology nurses' CS, BO, and STS related factors?

2 | METHODS

We conducted this systematic review using Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA) guidelines (Moher, et al., 2009).

2.1 | Eligibility criteria for the studies

To be included in the review, a study had to be: (a) a quantitative study, (c) published in a peer-reviewed journal, (b) in the English language, (d) published in the last 20 years (2000–2020), (e) used a sample of oncology nurses working with adult people with cancer at least 18 years old and (f) used any version of the ProQOL scale to measure CS, BO and STS.

2.2 | Data source and search strategy

OVID and EPSCO were used as data sources, and CINAHL, MEDLINE, PubMed and Journal@ databases were included in the review. Literature was searched by the author and university librarian starting 19 April 2020. The following mesh words were used: OVID: ((oncology nurses or oncology nursing or oncology) AND professional quality of life and (compassion satisfaction or compassion fatigue)).af. and EPSCO: (oncology nurses or oncology nursing or oncology) AND professional quality of life OR (compassion fatigue or burnout or secondary traumatic stress) OR compassion satisfaction. The PubMed database was searched using terms (((oncology nurses) OR (oncology nursing)) OR (professional quality of life)) AND (((compassion fatigue) OR (secondary traumatic stress)) OR (burnout)) OR (compassion satisfaction)).

| Measurement time/group | | Results | | | Effect | Limitation | Study quality | Risk and Source of bias |
|------------------------|---------|--|--|---|---------------|------------------------------------|---------------|---|
| | | Compassion satisfaction \bar{x} or \bar{x} (SD) | Burnout \bar{x} or \bar{x} (SD) | Secondary traumatic stress \bar{x} or \bar{x} (SD) | | | | |
| Pre | | 39.53 | 23.46 | 19.76 | Effect on STS | Small sample size program duration | Fair | Moderate/sample size justification / not representative |
| Immediate | | 39.92 | 22.61 | 17.61 | | | | |
| 3 months | | 38.53 | 23.69 | 17.92 | | | | |
| 6 months | | 40.76 | 22.3 | 16.23 | | | | |
| Pre | case | 42.64 | 20.25 | 32.06 | No effect | Small sample size | Fair | Moderate / sample size justification / no randomization |
| | Control | 41.44 | 21.67 | 25 | | | | |
| Post | case | 41.19 | 21.38 | 21.75 | | | | |
| | Control | 42.78 | 21.67 | 23.78 | | | | |
| Pre | | 32.67 (7.07) | 27.32(3.14) | 24.95(6.38) | Effective | Study bias | Fair | Moderate/ Sample size and response bias |
| Post | | 41.93(5.00) | 12.97(4.06) | 12.00(4.45) | | | | |
| Time 1 | Case | 36.96(6.19) | 26.57 (6.9) | 25.71(3.47) | Effective | Small sample size | Good | Low /sample allocation /no randomization |
| | Control | 39.68(4.73) | 24.74(4.64) | 26.53(3.60) | | | | |
| Time 2 | Case | 37.82 (6.4) | 24.29(5.09) | 23.07(3.53) | | | | |
| | Control | 40.20(5.50) | 23.89(4.82) | 26.0(3.54) | | | | |

2.3 | Data extraction

Data were extracted independently by author and expert. The following types of data were extracted: for observational studies: authors, year, country, aim, sample size, setting, design, statistical tests ($M \pm SD$ or $F\%$) and related measures. They were categorized as high, moderate or low according to Stamm's (2010) scoring manual, statistical analysis, study quality and risk of bias. For interventional studies, the following were extracted: authors, year, country, aim, sample size, design, intervention, measurement by time/group, related results, interpretation, limitation, study quality and risk of bias. There were no disagreements about the data extraction process.

2.4 | Variables assessed

The main variables were CS and CF, as defined operationally by Stamm (2010) in the manual. The ProQOL scale was used as a standard measure to assess the constructs of CS and CF that also reflected two constructs BO and STS or CF (as mentioned in some studies). Based on the theoretical background of the instrument, the operational definition of the studied concepts was comparable throughout the review. In addition, associated factors such as personal, psychological and professional variables were assessed for correlation with the prevalence of the reviewed concepts.

2.5 | Quality assessment

All the studies were evaluated by two raters (Ph.D. holders) to evaluate the quality of studies using National Heart, Lung, and Blood Institutes (NIH) form (available at <https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools>). There were 14 criteria for evaluating cross-sectional studies and 12 criteria for interventional studies. Quality ratings included good (failed to meet two criteria or fewer), fair (failed to meet three to four criteria) and poor (failed to meet five or more criteria). Based on quality assessment, we determined the level of potential risk of bias (i.e. a lower quality indicated a higher risk of bias). We also used Egger's test and produced a funnel plot to evaluate publication bias.

2.6 | Data collection process and statistical analysis

Data were classified as demographic, including participants' technical and health characteristics, and results were taken from the published study papers and arranged in datasheets using Microsoft Excel. Meta-analysis was carried out using a random effect model using Stata software (version 16; Stata Corporation, College Station, Texas, USA) to obtain the pooled estimates of the per cent prevalence of CS, STS, and BO. The total impact size for each pooled analysis was calculated as a weighted average of the inverse variance, corrected for individual effect sizes. The same procedure was used

TABLE 3 Factors associated with compassion satisfaction, burnout, and secondary traumatic stress

| Study | Compassion satisfaction | Burnout | Secondary traumatic stress |
|--------------------------------------|--|--|--|
| 1. (Jarrad & Hammad, 2020) | Number of dependents: $r = -2.30, p < .05$ Sleep hours = $0.212, p < .05$ | Days off: $r = .228, p < .05$ | Appetite: $r = 179, p < .05$ |
| 2. (Jang et al., 2016) | Age $F = 7.198, p < .001$ Marital status: $t = 11.102, p = .001$ Educational level: $F = 22.415, p < .001$ Position: $F = 25.350, p < .001$ Year of Experience: $F = 7.011, p < .001$ Individual organization fit: $F = 79.399, p < .001$ Turnover intention: $t = 17.808, p < .001$ | Age: $F = 5.070, p = .002$ Marital Status: $t = 8.857, p = .003$ Educational level: $F = 11.246, p < .001$ Position: $F = 24.263, p < .001$ Years of Experience: $F = 3.634, p = .013$ Individual organization fit: $F = 47.936, p < .001$ Turnover intention: $t = 19.743, p < .001$ | Educational level: $F = 3.189, p = .043$ Position: $F = 10.920, p = .001$ Individual organization fit: $F = 5.417, p = .021$ |
| 3. (Wu et al., 2016) | Educational level: $X^2 = 6.871, p = .032$ (US) Cohesive teamwork environment: $X^2 = 10.51, p = .005$ Work more hours and experience 3 or more patients' deaths $X^2 = 8.042, p = .045$ | Depression or headache: $X^2 = 13.659, p = .000$ (US) Stressors related personal finance: $X^2 = 27.334, p = .000$ (US), $X^2 = 8.646, p = .003$ (CA) Encounter traumatic death: $X^2 = 7.894, p = .005$ Sacrifices personal and psychological needs: $X^2 = 31.541, p = .000$ (US), $X^2 = 15.047, p = .003$ (CA) Cohesive teamwork environment: $X^2 = 12.928, p = .002$ | Age: $X^2 = 8.094, p = .017$ (US) Educational level: $X^2 = 6.871, p = .032$ Years of experience: $X^2 = 6.117, p = .047$ (US) Depression and headache: $X^2 = 9.969, p = .002$ (US) Stressors related personal finance: $X^2 = 38.198, p = .000$ (US), $X^2 = 13.542, p = .000$ (CA) Encounter traumatic death: $X^2 = 3.887, p = .049$ Sacrifices personal and psychological needs: $X^2 = 45.276, p = .000$ (US), $X^2 = 9.27, p = .002$ (CA) Cohesive teamwork environment $X^2 = 10.546, p = .005$ |
| 4. (Yu et al., 2016) | Empathy: $b = 0.209, p = .000$ Social support: $b = 0.176, p = .000$ Personality traits (5 variables) Coping Style: $b = 0.370, p = .000$ (Active) $b = -0.145, p = .015$ (passive) | Setting: $T = -2.032, p = .043$ Empathy: $b = -0.094, p = .000$ Social support: $b = -0.111, p = .000$ Personality traits (5 variables) Coping Style: $b = -0.126, p = .000$ (Active) $b = 0.287, p = .000$ (passive) | Setting: $T = -3.101, p = .002$ Empathy: $b = 0.209, p = .000$ Social support: $b = 0.209, p = .000$ Personality traits (5 variables) Coping Style: $b = 0.260, p = .000$ (Passive) |
| 5. (J. Duarte & Pinto-Gouveia, 2017) | Age: $r = .19, p < .05$ Year of experience: $r = .1, p < .05$ Perspective taking: $r = 0.31, p < .05$ Empathetic concerns: $r = .38, p < .05$ Personal distress: $r = -0.29, p < .05$ Self-compassion: $r = .35, p < .05$ Psychological inflexibility: $r = .22, p < .05$ | Age: $r = -.14, p < .05$ Years of experience: $r = .19, p < .05$ Perspective taking: $r = .15, p < .01$ Personal distress: $r = .21, p < .05$ Self-compassion: $r = -.51, p < .05$ Psychological inflexibility: $r = .47, p < .05$ | Years of experience: $r = .14, p < .05$ Empathetic concerns: $r = .18, p < .01$ Self-compassion: $r = -0.24, p < .05$ Psychological inflexibility: $r = .36, p < .05$ |
| 6. (Al-Majid et al., 2018) | Transfer to another unit OR (95%CI) = 3.1(1.4-6.6) | Transfer to another unit OR (95%CI) = 3.7(1.9-7.5) | Position: $p = .006$ |
| 7. (Arimon-Pages et al., 2019) | Choose nursing profession again OR (95%CI) = 3.1(1.4-6.6) | Turnover intention: $r = -.732, p < .01$ | Transfer to another unit OR (95%CI) = 3.2 (1.9-5.3) |
| 8. (Wells-English et al., 2019) | Turnover intention: $r = -0.602, p < .01$ | Turnover intention: $r = -.732, p < .01$ | Turnover intention: $r = -0.291, p < .01$ |

Abbreviations: b, beta coefficient (predictor); F, one-way analysis of variance; OR, odd ratio; P, significant level; r, person correlation; t, t test; X^2 , chi-square.

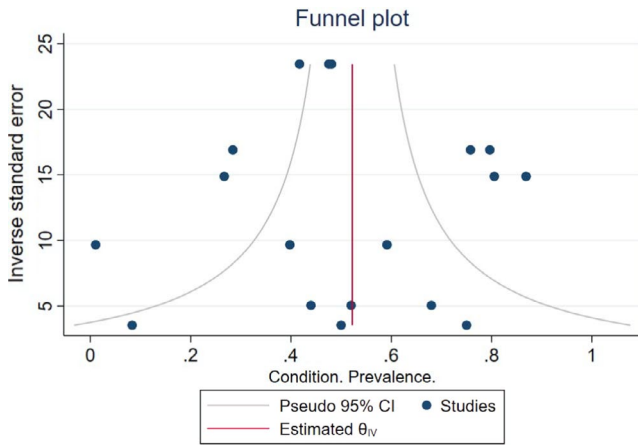


FIGURE 2 A graphical presentation of the publication bias test of the Egger. The plot represents ProQol scores of compassion satisfaction, burnout and secondary traumatic stress studies included in prevalence analysis

to estimate instrumental scores of STS and BO. Meta-regression analysis was conducted using the restricted maximum likelihood approach in Stata software. Several independent variables, including age, gender, marital status, education level, setting, position and years of experience, were evaluated for each dependent variable (prevalence of CS, STS, or BO). The statistical heterogeneity index was used to estimate between-study inconsistency in the outcomes (I^2). All results are presented as weighted effects with 95% confidence intervals.

3 | RESULTS

3.1 | Literature and search results

By comparing both findings and consulting with experts in systematic reviews and meta-analysis, all 2,300 articles were

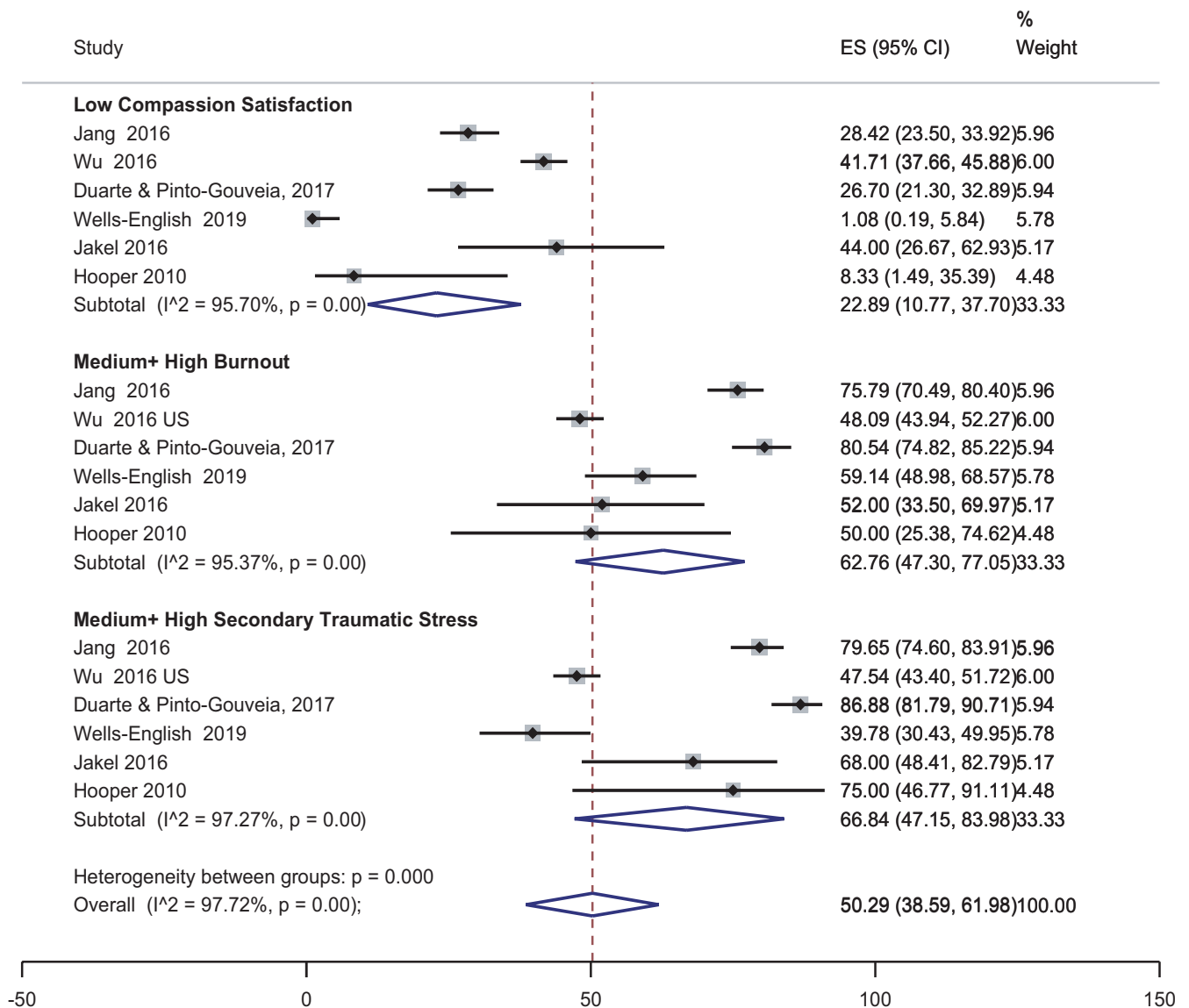
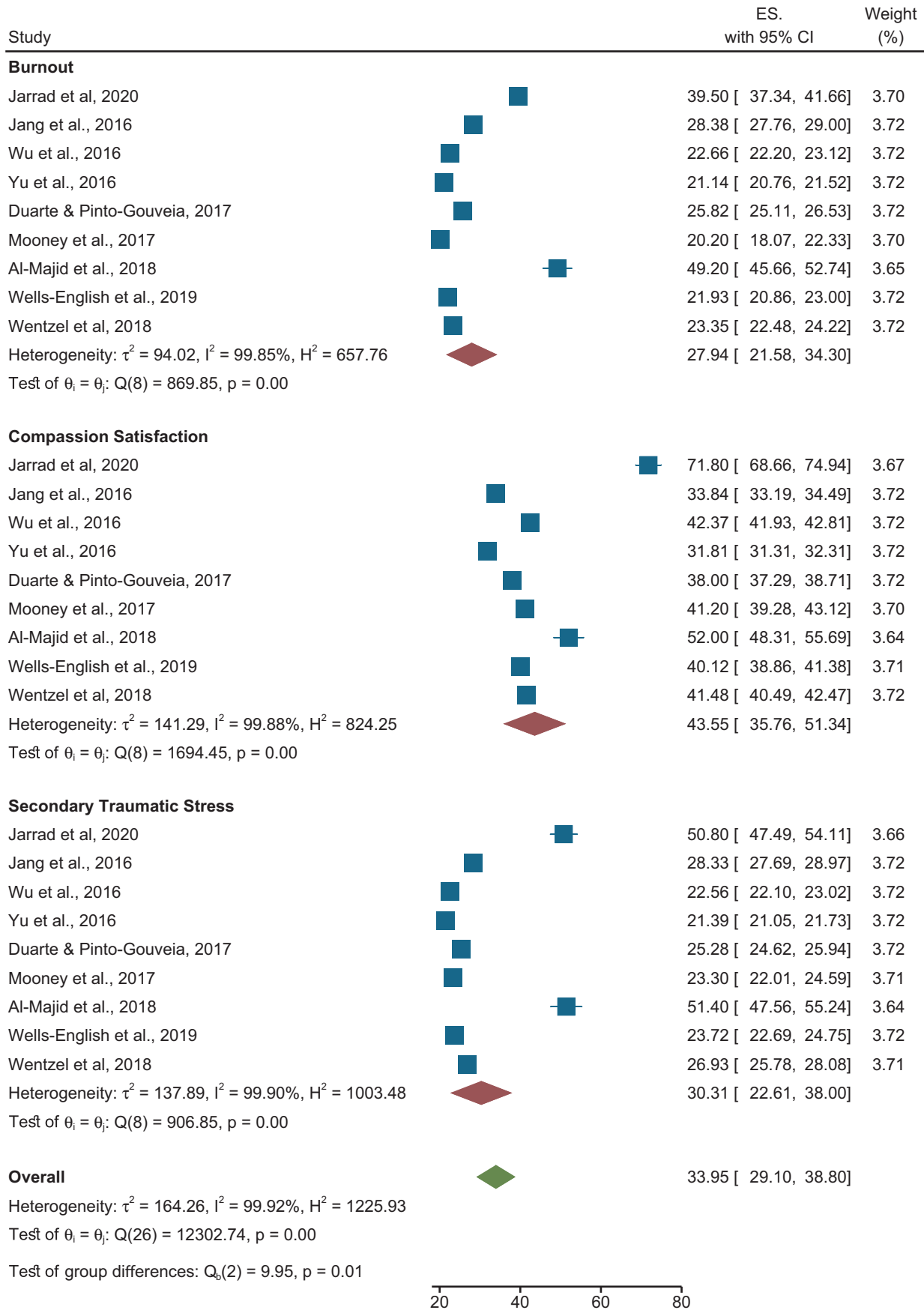


FIGURE 3 A forest plot illustrating the pooled estimates for compassion satisfaction, burnout and secondary traumatic stress



Random-effects REML model

FIGURE 4 A forest graph showing the pooled estimates of the ProQoL scores of compassion satisfaction, burnout and secondary traumatic stress

transferred to EndNote X9 referencing software, 125 duplicates were checked and removed, and then titles and abstracts were screened. The articles were then placed into three files: abstract yes (189), abstract no (1595) and abstract maybe (28). In the second step, all full texts in the abstract yes and abstract maybe files were screened for eligibility. We looked at the sample, variables, instrument, and type of study. As a result, 174 articles did not meet the inclusion criteria due to the type of sample (85), type of study (53), or type of instrument used (36), whilst 15 studies did meet the criteria. Figure 1 is a flowchart of the screening pipeline and selection procedure.

3.2 | Characteristics of the studies

The cumulative sample size was 2,509 oncology nurses, ranging from 12 to 650 participants in six studies from the USA (Al-Majid et al., 2018; Hooper et al., 2010; Jakel et al., 2016; Mooney et al., 2017; Potter et al., 2013; Wells-English et al., 2019). There were two studies from Portugal (Joana Duarte & Pinto-Gouveia, 2016; Duarte & Pinto-Gouveia, 2017) one study each from Korea (Jang et al., 2016), China (Yu et al., 2016), Spain (Arimon-Pages et al., 2019), South Africa (Wentzel & Brysiewicz, 2018), Turkey (Ylmaz et al., 2018) and Jordon (Jarrad & Hammad, 2020). One study was conducted in the USA and Canada (Wu et al., 2016). Eleven studies were cross-sectional and four were interventional; they were conducted in 42 hospitals and four oncology centres. One location gave hospice care. Six studies reported using convenient sampling, and one used purposive sampling (Tables 1 and 2).

3.2.1 | Interventional studies

Four studies gave interventional programmes aimed primarily to reduce CF and improve CS: resilience programme and mobile application, nurse-led interventions, and mindfulness-based interventions (Table 2). Three out of four showed some effect on the studied variables. One study was effective in reducing STS (Potter et al., 2013) and two were effective in improving CS and decreasing BO and STS (Joana Duarte & Pinto-Gouveia, 2016; Yu et al., 2016). However, it was difficult to have clear comparisons because of the variability of data and small sample size.

3.2.2 | Associated factors

Seven studies reported that personal and professional factors had a statistically significant association with CS and BO (Arimon-Pages et al., 2019; Duarte & Pinto-Gouveia, 2017; Jang et al., 2016; Jarrad & Hammad, 2020; Wells-English et al., 2019; Wu et al., 2016; Yu et al., 2016). In addition, one study reported factors associated with STS (Al-Majid et al., 2018) (Table 3).

3.3 | Studies' quality and risk for bias

Based on NIH criteria for evaluating the quality of studies, five out of 15 studies were of good quality, reflecting a low risk of bias (Arimon-Pages et al., 2019; Jang et al., 2016; Wells-English et al., 2019; Yu et al., 2016), and one was an interventional study (Joana Duarte & Pinto-Gouveia, 2016). Nine studies scored fair quality, indicating a moderate level of bias, whilst one study scored poor quality, leading to a high risk of bias (Mooney et al., 2017) (Tables 1 and 2).

3.4 | Publication bias

No statistically significant publication bias was found, based on the results of Egger's test (Funnel plot Figure 2).

3.5 | Results of the analysis

3.5.1 | Prevalence of CS, BO, and STS

For the meta-analysis of the prevalence of low, medium to high BO and STS, six studies were included (Figure 3). The meta-analysis with 95% confidence intervals had the lowest prevalence of CS (22.89%) (10.77–37.7). For medium to high BO and STS, the prevalence rates were 62.76% (47.30–77.5) and 66.84% (47.15–83.98), respectively.

3.5.2 | Prevalence of the ProQOL scores

Nine studies met the eligibility requirements and were included in the meta-analysis. Interventional studies were not included in the analysis because of a lack of the information needed to conduct the analysis. The articles included in the meta-analysis had a cumulative sample size of $n = 2025$ oncology nurses. All articles included in the meta-analysis used the same questionnaire, the professional quality of life, to assess BO and STS. The results of the Egger linear regression test were statistically significant ($p > .05$). This shows there was no publication bias or small study effects in the meta-analysis. The I^2 heterogeneity analysis showed 99.88% for CS, 99.85% for BO, and 99.9% for STS (Figure 4).

3.5.3 | Factors associated with the prevalence of CS, BO, and STS

Meta-regression analysis did not show any substantial correlation with CS, BO or STS prevalence rates for any independent variables studied. This might be due to the low number of observations reported by the studies. Associations appeared in two studies or fewer for each independent variable.

3.5.4 | CS, BO, and STS correlations

A weak negative correlation was found between CS and BO [-0.06(0.90)], and a weak positive correlation was observed between CS and STS [0.20(0.70)].

4 | DISCUSSION

This review aimed to assess the levels of CS, BO, and STS amongst oncology nurses based on the ProQOL scale and to determine the prevalence of each of these variables with associated factors. Fifteen studies were included in this review with a cumulative sample size of 2,509 oncology nurses, and the prevalence rates for CS, BO and STS were obtained from six studies. Nine studies were qualified for meta-analysis with a cumulative sample size of 2025 oncology nurses.

The prevalence of low CS was 22.89% compared with other reviews that reported 19% and 20% prevalence in oncology nurses (Ortega-Campos et al., 2020; Xie et al., 2021) and 48% amongst nurses in general (Zhang, Han, et al., 2018). This was deemed acceptable because of the nature of care given to cancer patients, which requires emotional stamina for stressful events and continued exposure to cancer patients. The current meta-analysis showed a 62.79% prevalence rate of moderate to high BO as experienced by oncology nurses, which is comparable with prevalence rates of 54% and 56% in other reviews (Ortega-Campos et al., 2020; Zhang, Han, et al., 2018). However, the rate for BO was higher than the results reported by (Xie et al., 2021), who reported a 22% prevalence of high BO. The prevalence of STS was 66.84%, which is in line with a finding of 60% by (Ortega-Campos et al., 2020) and higher than other reviews that found prevalence rates of size 22% and 53% (Xie et al., 2021; Zhang, Han, et al., 2018). In the current review, cross-sectional studies exhibited a large percentage of heterogeneity, increasing the difficulty in determining the ProQOL scores of oncology nurses. Two meta-analyses investigating the levels of CS, BO, and STS for oncology nurses and other health professionals reported heterogeneous results similar to the current analysis (Cavanagh et al., 2020; Xie et al., 2021; Zhang, Han, et al., 2018).

CS, BO, and STS could be enhanced or diminished by personal or professional factors (Zhang et al., 2018). All ProQOL concepts were associated statistically significantly with each of the following: age, educational level, position, individual organization, and cohesive teamwork environment (Jang et al., 2016; Wu et al., 2016), years of experience, self-compassion, and psychological inflexibility and turnover intention (Jang et al., 2016; Wells-English et al., 2019), empathy and empathetic concerns (Duarte & Pinto-Gouveia, 2017; Yu et al., 2016), social support and coping style (Yu et al., 2016), and transfer to another unit (Arimon-Pages et al., 2019). Unfortunately, the factors were not reported with adequate data to infer associations with the prevalence of the ProQOL concepts. This was similar to the findings by (Zhang, Han, et al., 2018). (Zhang, Zhang, et al., 2018) conducted a correlative meta-analysis amongst nurses

and found a moderate correlation between BO and CS and a weak negative association between CS and STS. In this review, we found that CS had a weak negative association with BO and a weak positive correlation with STS.

Potter et al. (2013) developed an intervention based on resilience with follow-up in three-time points, which has an impact of STS. Resilience was also recommended by Zhang, Han, et al. (2018) as an effective measure to reduce STS. An intervention developed by (Ylmaz et al., 2018), based on providing adequate information about CF and patients' concerns in sessions, was effective in reducing BO and STS. Mindfulness-based stress-reducing exercises also were effective in reducing the mentioned variables (Joana Duarte & Pinto-Gouveia, 2016). However, interventions to reduce oncology nurses' CF reported a small sample size as a limitation. This means that we cannot give evidence for those interventions.

A recent review highlighted the rise in the prevalence of BO and STS in oncology nurses and called for interventions to reduce it (Ortega-Campos et al., 2020). As in our review, the high prevalence of BO and STS calls attention to the importance of continuous monitoring of oncology nurses' ProQOL and evaluating the impact of internal and external factors. The ProQOL like a continuum with CS at one end and CF at the other, oncology nurses could go back and forth along this continuum based on personal or professional factors. The proQOL scale is a self-reported questionnaire in which people might respond differently according to their psychological condition. Oncology nurses are facing unpleasant situations that need some remediation. CS and CF might change on a daily basis. Nurses celebrating patients' recovery will feel different from those who are exposed to traumatizing events, such as end-stage patients.

4.1 | Limitations

Only studies reporting CS, BO, and STS for oncology nurses were used because those nurses differed from other healthcare practitioners in their practice and their day-to-day activities. Therefore, a mixed sample meta-analysis might not be valid for multiple occupations. Because of this, multiple studies were omitted from the analysis, as they reported results from healthcare professionals besides nurses. Most studies failed to report demographic factors. This makes it challenging to determine associations because of the limited number of observations. Similar to the findings by Zhang, Han, et al. (2018) from a meta-analysis of a sample of nurses, data were not sufficient to perform meta-regression. Finally, the meta-analytics showed a strong statistical heterogeneity, which indicated greater uncertainty in the results of the chosen studies.

5 | CONCLUSION

Compassionate caregiving cost oncology nurses their emotions due to regular exposure to their patients; the feeling of CF was dominant

compared with CS. It may be inferred that oncology nurses are under a great deal of tension, both personally and professionally, leaving them vulnerable to the winds of BO and STS and less CS. An uptick in cases of BO and CF amongst nurses might be mitigated through proper assessment and implementation of prevention plans. As a result of this paper, which has identified a statistically significant issue, urgent action plans must be put in place. The contribution of this work to the body of knowledge includes providing a comprehensive evaluation of CS, BO, and STS levels amongst oncology nurses. It estimates the prevalence and correlation of all aspects of ProQOL with associated factors.

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CONFLICT OF INTEREST

The author declares no conflict of interest in this review.

DATA AVAILABILITY STATEMENT

The data of this review are available from corresponding author upon reasonable request.

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