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## FROM THE EDITOR



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### Advancing the Boundaries of Modern Healthcare: Intersections of Biology, Technology, Ethics, and Human Experience

It is with great pride that we present this issue of the journal, which brings together four significant contributions representing some of the most compelling and evolving domains in contemporary health sciences. While varied in focus—ranging from metabolic and vascular biology to artificial intelligence in nursing, the ethics of cosmetic ophthalmology, and the psychosocial implications of breast cancer surgery—their shared relevance lies in their emphasis on the complexity of the human condition. These manuscripts illustrate not only the rapid transformation of medical science and practice, but also the profound interconnectedness between physiology, technology, culture, and personal identity.

The modern era of healthcare requires a multidimensional understanding of disease processes, clinical care, and human behavior. The papers published in this issue reflect this need by challenging outdated paradigms, introducing emerging technologies, and shedding light on underexplored aspects of patient experience, particularly across Middle Eastern and global contexts.

In the systematic review “The Effect of Breast Cancer Surgery on Marital Quality in Saudi Arabia”, Khayat sheds light on a profoundly important topic that remains underrepresented in Middle Eastern literature: the impact of breast cancer surgery on marital relationships. Breast cancer carries not only physical and emotional consequences but also deep social and cultural significance, particularly in societies where discussions of intimacy and marital dynamics are often constrained.

Through a synthesis of available empirical studies, the review finds that breast cancer surgery may influence marital quality, body image, self-esteem, sexual functioning, and emotional closeness. Although the existing evidence does not conclusively establish that breast cancer surgery directly undermines marital stability, the review emphasizes clear gaps in regional research—highlighting the need for culturally sensitive, longitudinal, and qualitative studies that address the lived experiences of women and their spouses.

This contribution is especially valuable as it calls attention to the psychosocial dimensions of cancer survivorship in Saudi Arabia. It encourages clinicians to adopt holistic care strategies that include supportive counseling, couple-based interventions, and culturally attuned patient education.

In “Artificial Intelligence in Nursing: A Comprehensive Review”, Abyad & Abyad provide an expansive examination of the roles, opportunities, and ethical considerations surrounding the integration of artificial intelligence (AI) in nursing practice, administration, and education. Nursing, comprising the largest proportion of the global healthcare workforce, is uniquely positioned to both benefit from and shape the implementation of AI-driven technologies.

The manuscript explores the diverse applications of AI, including early warning systems for patient deterioration, machine learning models that support clinical decision-making, robotics for safe patient lifting and medication delivery, and natural language processing tools that analyze nursing documentation for safety and quality indicators. These technologies collectively signal a transformation in how nurses assess patients, allocate time, document care, and interact with interdisciplinary teams.

What distinguishes this review is its balanced approach. The authors acknowledge the immense opportunities presented by AI while emphasizing crucial ethical concerns such as algorithmic bias, patient privacy, data governance, and the risk of depersonalizing care. The manuscript calls for a robust AI literacy among nurses and the establishment of ethical governance frameworks to ensure that innovation aligns with human-centered, culturally sensitive, and equitable care.

This article is a timely reminder that AI must not replace the essential human components of nursing, but rather augment them. The future of nursing—particularly in the Middle East, where digital transformation agendas are rapidly expanding—will rely on nurses who are skilled not only clinically, but also technologically, ethically, and analytically.

In the manuscript “The Term of Excess Weight Should Be Replaced with Excess Fat Tissue in the Human Body”, Helvaci et al. present a persuasive argument for reconceptualizing one of the most widely used yet apparently insufficient constructs

in medicine: “excess weight.” Through detailed examination of cardiometabolic patterns, inflammatory processes, and endocrine interactions, the authors propose that excess adipose tissue, rather than excess mass, is the true pathological driver behind systemic atherosclerosis, diabetes, heart failure, chronic kidney disease, and vascular complications.

Drawing comparisons between patients with sickle cell disease—who possess markedly lower BMI yet have extremely low rates of type 2 diabetes—the manuscript advances the theory that adiposity-induced vascular inflammation may be the single most fundamental origin of metabolic disease. This hypothesis aligns with emerging global research that recognizes adipose tissue as an active endocrine organ involved in cytokine release, hormonal disruption, and systemic metabolic instability.

For clinical practice, the implications are substantive. Replacing the simplistic term “overweight” with “excess fat tissue” reframes the clinical conversation by shifting focus from body mass to the inflammatory and metabolic properties of adipose tissue. Such a shift encourages more precise assessment tools, more personalized risk management, and more targeted interventions for chronic inflammatory diseases. Helvaci et al. invite clinicians, researchers, and public health leaders to revisit entrenched terminologies and update them to reflect contemporary understanding of chronic disease biology.

The manuscript “Eye Tattooing, a Facial Extra Pack, and Enhanced Beauty” by Elghblawi explores an area of growing cultural and clinical attention: the use of cosmetic ocular procedures—including scleral tattooing, keratopigmentation (KTP), and laser-induced iris depigmentation—as elective beauty enhancements. Historically used solely for reconstructive or therapeutic purposes, these interventions are increasingly being sought for aesthetic motivations, particularly among younger adults influenced by social media and global beauty trends.

The manuscript presents a comprehensive review of the evolution of these procedures, the associated aesthetic motivations, and, critically, the potential risks. Reported complications include corneal perforation, toxic pigment reactions, severe inflammation, glaucoma, uveitis, and vision-threatening infections. Even more concerning is the fact that many elective procedures are performed outside accredited medical settings, often by practitioners lacking ophthalmologic training.

Elghblawi argues convincingly that regulatory oversight has not kept pace with the rapidly expanding demand for cosmetic ocular interventions. The review highlights the need for stronger clinical governance, public health regulation, and ethical frameworks to ensure patient safety and informed consent. This manuscript serves as a warning that aesthetic innovation must not outpace the standards of safe medical practice.

## **Synthesis: Toward a Holistic, Ethical, and Forward-Looking Healthcare Paradigm**

Although the four manuscripts differ in focus, they share unifying threads that speak to broader transformations in healthcare:

### **1. A shift toward understanding disease as multidimensional**

From adipose-induced inflammation to psychosocial consequences of surgery, disease must be understood in biological, psychological, and social terms.

### **2. Technology as a defining force in modern healthcare**

AI in nursing and aesthetic ocular procedures both highlight the accelerating convergence of medicine and technology—requiring new forms of governance, competence, and ethical reflection.

### **3. The centrality of ethics**

Each manuscript touches on ethical tensions: the language clinicians use, the deployment of AI, the commercialization of beauty procedures, and the cultural framing of marital relationships following illness.

### **4. Cultural context as a determinant of health experience**

Whether examining Saudi marital norms or the popularity of cosmetic eye changes, these papers underscore the importance of cultural sensitivity in healthcare research and practice.

### **5. The need for interprofessional and interdisciplinary collaboration**

Effective solutions in modern healthcare will require clinicians, nurses, researchers, technologists, psychologists, ethicists, and policymakers to work together.

This issue reflects the continuing evolution of healthcare as both a scientific and human endeavor. The manuscripts included herein deepen our understanding of disease mechanisms, highlight the transformative potential of new technologies, illuminate critical ethical considerations, and foreground the lived experiences of patients within cultural and social contexts.

As healthcare systems confront new challenges—from chronic disease epidemics to rapidly advancing digital tools—it is essential that research continue to bridge disciplines and remain firmly anchored in human-centered care. The contributions in this issue move us closer toward a vision of healthcare that is scientifically rigorous, technologically advanced, ethically grounded, and profoundly attuned to the complexities of human life.

# PREVALENCE OF BURNOUT AND ITS ASSOCIATED RISK AND PROTECTIVE FACTORS AMONG NURSING STUDENTS IN SAUDI ARABIA: A SYSTEMATIC REVIEW AND META-ANALYSIS

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## Abstract

### Background

Burnout is increasingly recognized as a significant occupational health concern among nursing students worldwide. Despite growing evidence of its adverse academic and psychological consequences, Saudi-specific prevalence estimates remain inconsistent, and no previous synthesis has quantitatively pooled findings from this population.

### Aim

This systematic review and meta-analysis aimed to estimate the pooled prevalence of burnout and its three core dimensions, emotional exhaustion, depersonalization, and reduced personal accomplishment among undergraduate nursing students in Saudi Arabia, and to synthesize associated risk and protective factors.

### Methods

A comprehensive systematic search was conducted across five electronic databases, PubMed, MEDLINE, CINAHL Complete, Scopus, and Web of Science, from February to April 2026. Observational studies employing validated burnout measurement instruments and conducted among undergraduate nursing students in Saudi Arabia were eligible for inclusion. Methodological quality was independently appraised using the Joanna Briggs Institute (JBI) prevalence checklist. A random-effects meta-analysis with a variance-stabilizing transformation was used to estimate the pooled prevalence, and heterogeneity was quantified using the  $I^2$  statistic. This review was prospectively registered with PROSPERO (CRD420261320297).

### Results

Six studies (N = 1,851 participants) met the inclusion criteria; four reported overall burnout (N = 1,298). The pooled prevalence of overall burnout was 43% (95% CI: 20%–67%). Reduced personal accomplishment was the most prevalent dimension (59%), followed by depersonalization (52%) and emotional exhaustion (41%). Heterogeneity was extremely high across all outcomes ( $I^2 > 95\%$ ). Narrative synthesis, guided by the Job Demands–Resources (JD-R) framework, identified academic workload, clinical placement stress and maladaptive coping strategies as significant risk factors. In contrast, resilience, adaptive coping and self-efficacy emerged as protective factors.

### Conclusion

Burnout is prevalent and multidimensional among nursing students in Saudi Arabia, with nearly half affected. These findings underscore the need for theory-informed, multi-level interventions that address both academic demands and personal resources. The limited number of eligible studies restricts subgroup analysis and publication bias assessment, highlighting the urgent need for methodologically rigorous primary research in this region.

### Keywords

burnout; nursing students; academic stress; Saudi Arabia; meta-analysis; systematic review; Job Demands–Resources; prevalence

## Introduction

Burnout is a work-related psychological syndrome characterized by emotional exhaustion, depersonalization (or cynicism), and reduced personal accomplishment (1,2). Although originally conceptualized within occupational settings, burnout has increasingly been recognized in academic populations, particularly among students enrolled in health-related disciplines (3). The conceptualization of student burnout parallels occupational burnout, reflecting chronic exposure to academic stressors, emotional demands, and sustained performance pressures.

Nursing students have been consistently reported to experience elevated levels of stress and burnout throughout their education (4). Nursing education combines intensive theoretical coursework with clinical placements that expose students to emotionally and physically demanding situations (5,6). Clinical exposure to patient suffering, performance evaluations, heavy academic workload, and role-related pressures are among the most commonly identified stressors in this population (5,6). In addition, nursing education entails progressive professional formation and the development of clinical responsibility, which may further amplify perceived stress during training (7).

International evidence indicates that burnout among nursing students is a growing global concern. A recent systematic review and meta-analysis estimated that approximately one-quarter of nursing students worldwide experience burnout, with emotional exhaustion being the most prevalent dimension (4). Burnout in this population has been associated with diminished academic engagement, increased psychological distress, reduced well-being, and heightened risk of program attrition (3). These consequences extend beyond individual student outcomes and may ultimately threaten workforce sustainability and quality of patient care.

In Saudi Arabia, nursing education is characterized by rigorous curricula, extensive clinical training hours, and increasing expectations aligned with the national healthcare transformation goals outlined in Saudi Vision 2030. Emerging local evidence suggests substantial levels of burnout among Saudi nursing students, particularly in emotional exhaustion and depersonalization (8,9). Recent studies have reported high burnout levels among undergraduate nursing students, especially during clinical training (9,10), and sociocultural and educational structures may further influence how stress and burnout are experienced and disclosed in this context. Despite this growing body of primary research, findings remain fragmented, with substantial variation in measurement tools, reported prevalence rates, and identified risk factors across studies (9,10).

To date, no study has quantitatively synthesized burnout prevalence or systematically examined associated risk and protective factors among Saudi nursing students. International meta-analyses provide global estimates (4),

but these findings are not directly generalizable to Saudi Arabia, given context-specific educational structures, sociocultural expectations, and evolving workforce demands. Without pooled national data, policymakers and educational leaders lack robust evidence to guide curriculum reform, student support strategies, and workforce planning. This systematic review and meta-analysis addresses this gap by generating pooled national prevalence estimates and synthesizing the academic, psychological, and contextual determinants of burnout among Saudi nursing students.

## Objectives

The review focused on undergraduate nursing students in Saudi Arabia (population), burnout (outcome), and its three core dimensions, as measured by validated instruments, in academic and clinical training settings (context). The primary objective was to estimate the pooled prevalence of overall burnout among nursing students in Saudi Arabia. Specifically, the review aimed to: (1) estimate the pooled prevalence of overall burnout; (2) estimate the pooled prevalence of each core burnout dimension - emotional exhaustion, depersonalization (or cynicism), and reduced personal accomplishment; and (3) identify and synthesize academic, psychological, demographic, and contextual risk and protective factors associated with burnout in this population. Where sufficient data were available, subgroup analyses were planned to explore potential sources of heterogeneity, including measurement instruments, geographic region and academic year.

## Methods

### Theoretical framework

This review is informed by the Job Demands–Resources (JD-R) model (11,12,13), a widely applied theoretical framework for understanding the development of burnout in occupational and performance-based contexts. The JD-R model proposes that burnout emerges when chronic environmental demands exceed an individual's available psychological, social, and organizational resources. Within nursing education, students are exposed to multiple concurrent academic and clinical demands, including intensive coursework, high-stakes examinations, extended clinical hours, exposure to patient suffering, and sustained performance pressures (5,6) that may activate the health-impairment pathway described in the model, progressively leading to emotional exhaustion, depersonalization, and reduced personal accomplishment. Conversely, personal and institutional resources, including resilience, adaptive coping strategies, self-efficacy, social support, and positive learning environments, may buffer against burnout risk (4,6). The JD-R framework provides a theoretically grounded structure for interpreting both the pooled prevalence estimates and the identified risk and protective factors synthesized in this review, situating burnout within the dynamic interplay between educational demands and available resources.

### Study design and review registration

This systematic review and meta-analysis were conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) statement (14). The review was prospectively registered with the International Prospective Register of Systematic Reviews (PROSPERO; registration number: CRD420261320297) before data collection. The methodological approach to quantitative synthesis followed established guidance for meta-analytic modelling, heterogeneity assessment, and bias evaluation in nursing research (15,16).

### The following research questions guided the review:

1. What is the pooled prevalence of burnout among nursing students in Saudi Arabia?
2. What is the pooled prevalence of each burnout dimension, emotional exhaustion, depersonalization, and reduced personal accomplishment?
3. What academic, psychological, and contextual risk and protective factors are associated with burnout in this population?

These questions were structured using the Population–Exposure–Outcome (PEO) framework, which is recommended for prevalence and exposure-focused systematic reviews (17).

### Eligibility criteria

Eligibility criteria were defined a priori to ensure clarity, reproducibility, and methodological consistency, in accordance with PRISMA 2020 recommendations (14).

### Population

Studies were eligible if they included undergraduate nursing students enrolled in accredited Saudi Arabian universities. Studies that recruited mixed health-discipline samples were retained only if nursing-specific data could be extracted independently as a separate component.

### Outcomes

Studies were required to report at least one of the following: the prevalence of overall burnout; sufficient data to calculate prevalence (i.e., the number of participants exceeding established cut-off thresholds); or the prevalence of individual burnout dimensions (emotional exhaustion, depersonalization, or reduced personal accomplishment). Burnout was required to be measured using a validated instrument, such as the Maslach Burnout Inventory (MBI) or its validated student adaptation (MBI-SS) (2).

### Study design

Eligible designs included quantitative observational studies, specifically cross-sectional and cohort designs, which are methodologically appropriate for prevalence estimation and for examining associated factors (15).

### Language and publication status

Only peer-reviewed articles published in English were eligible for inclusion. No restrictions on publication date were applied. Grey literature, including theses, dissertations, and conference abstracts, was excluded to ensure methodological consistency and to restrict inclusion to rigorously peer-reviewed evidence (14).

### Information sources and search strategy

A comprehensive and systematic electronic search was conducted across five databases: PubMed, MEDLINE, CINAHL Complete (accessed via the Saudi Digital Library), Scopus, and Web of Science. The search was conducted from February to April 2026. Search strategies were constructed using controlled vocabulary (MeSH terms) and free-text keywords related to three core concepts: burnout, nursing students, and Saudi Arabia. Boolean operators (AND, OR) were used to combine search terms, and strategies were tailored to each database's indexing system and controlled vocabulary. The complete PubMed search strategy is presented in Appendix A. In addition, the reference lists of all included studies were manually screened to identify any eligible studies not captured through the electronic searches.

### Study selection process

All records retrieved from database searches were imported into reference management software (EndNote) and duplicate records were removed before screening. Two reviewers (NA and BA) independently screened all titles and abstracts against the predefined eligibility criteria. Full-text articles for all potentially eligible records were subsequently retrieved and independently assessed by the same two reviewers. Discrepancies at either the title/abstract or full-text screening stage were resolved through discussion and consensus between the two reviewers; no formal inter-rater reliability statistic was calculated. When consensus could not be reached, a third reviewer (MA) served as adjudicator and made the final determination. This structured multi-reviewer selection process reduces the risk of selection bias and strengthens the overall methodological rigor of the review (14). The complete study selection process is illustrated in a PRISMA 2020 flow diagram.

### Data collection process

A standardized, pilot-tested data extraction form was developed a priori in accordance with best practices for systematic reviews and quantitative synthesis (15,16). Two reviewers (NA and BA) independently extracted data from each included study, and all extracted items were subsequently cross-checked for accuracy and completeness. Discrepancies were resolved through discussion and consensus, when agreement could not be reached. MA reviewed the contested items and made the final determination. This multi-reviewer extraction process strengthens reliability and minimizes the risk of data extraction errors (14).

### Data items

All data items were predefined before extraction in accordance with PRISMA 2020 recommendations (14). Extracted variables included: study characteristics (first author, publication year, geographic region within Saudi Arabia); methodological features (study design, total sample size); participant characteristics (gender distribution, academic year or level); burnout measurement instrument and cut-off classification criteria; prevalence estimates for overall burnout and each subscale; identified risk and protective factors; and the statistical methods employed. The complete data

### Risk of bias assessment

The methodological quality of each included study was independently assessed by two reviewers (NA and MA) using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Studies Reporting Prevalence Data (18). This tool evaluates key quality domains, including sampling adequacy, measurement validity, and the appropriateness of statistical analysis for prevalence research. When disagreements arose, BA adjudicated and made the final determination. Studies were categorized as low (7–9 criteria met), moderate (4–6 criteria met), or high ( $\leq 3$  criteria met) risk of bias. A summary of the risk of bias assessments for all included studies is presented in the Results section (Table 2).

### Data synthesis and meta-analysis

A narrative synthesis was first conducted to summarize the characteristics of included studies and to describe reported risk and protective factors across studies. Where at least three studies reported comparable prevalence outcomes for the same burnout construct, quantitative pooling was undertaken.

Given the anticipated clinical and methodological heterogeneity across institutions, geographic regions within Saudi Arabia, and burnout measurement instruments, pooled prevalence estimates were calculated using a random-effects model. Between-study variance ( $\tau^2$ ) was estimated using the restricted maximum-likelihood (REML) method, which yields more stable variance estimates than the traditional DerSimonian–Laird approach, particularly when the number of included studies is small.

Because prevalence data are bounded proportions that may exhibit unstable variance near 0 or 1, a Freeman–Tukey double arcsine transformation was applied before pooling. Studies were weighted by inverse variance, and pooled estimates were subsequently back-transformed to the original proportion scale for clinical interpretation. Separate meta-analyses were conducted for overall burnout, emotional exhaustion, depersonalization, and reduced personal accomplishment. All pooled estimates are reported with 95% confidence intervals (CIs). All statistical analyses were conducted in R (version 4.5.2) using the meta and metafor packages.

### Assessment of heterogeneity

Statistical heterogeneity across studies was assessed using Cochran's Q statistic, the between-study variance estimate ( $\tau^2$ ), and the  $I^2$  statistic, which reflects the proportion of total variability in effect estimates attributable to between-study heterogeneity rather than sampling error.  $I^2$  values exceeding 75% were interpreted as indicating substantial heterogeneity. Confidence intervals for  $\tau^2$  and  $\tau$  were derived using the Q-profile method.

### Subgroup and sensitivity analyses.

Pre-specified subgroup analyses were planned for implementation where sufficient data were available to explore potential sources of heterogeneity. Subgroups were defined according to: burnout measurement instrument (MBI vs. MBI-SS); geographic region within Saudi Arabia; and cut-off classification criteria (standard published thresholds, study-specific criteria, or percentile-based classifications). Between-subgroup differences were tested using mixed-effects models. Meta-regression analyses were additionally performed to examine whether publication year was independently associated with burnout prevalence. Sensitivity analyses were conducted using leave-one-out procedures, in which each study was sequentially removed to evaluate its influence on the pooled prevalence estimate and heterogeneity statistics.

### Publication bias

Formal assessment of publication bias using funnel plot asymmetry or Egger's regression test was not conducted in this review. As fewer than 10 studies were included in each meta-analysis, these methods lack adequate statistical power and reliability for meaningful interpretation, and their application is not recommended under these conditions (14).

### Certainty of evidence

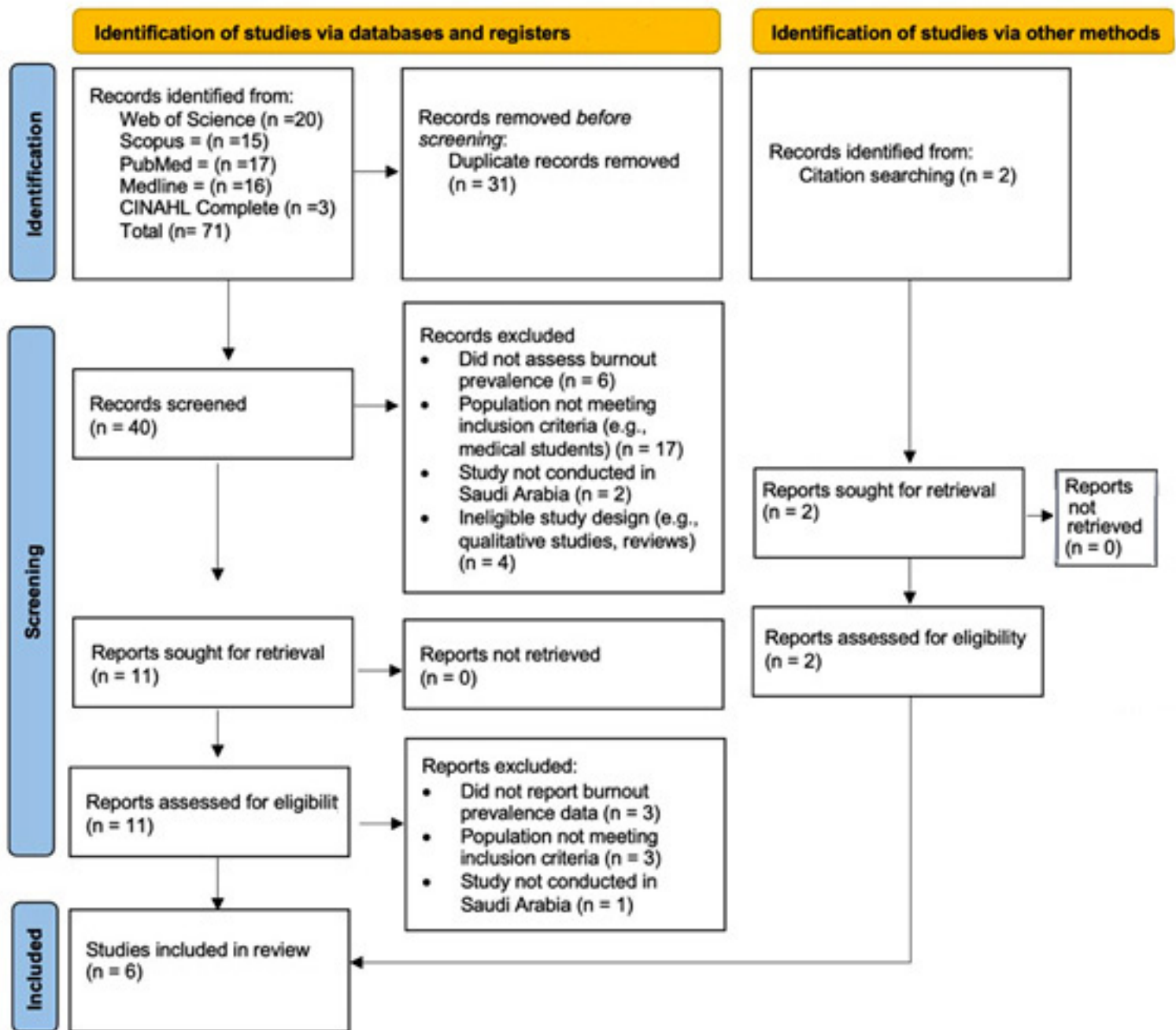
Formal grading of evidence certainty using the GRADE framework was not applied, as the review focused on prevalence estimation from observational cross-sectional studies for which GRADE criteria are not routinely indicated. Methodological quality was instead systematically appraised using the JBI Critical Appraisal Checklist for Prevalence Studies (18), and all findings were interpreted in the context of the risk-of-bias profile of the included evidence base.

## Results

### Study selection

The database search identified 71 records across five electronic databases (Web of Science,  $n = 20$ ; Scopus,  $n = 15$ ; PubMed,  $n = 17$ ; MEDLINE,  $n = 16$ ; CINAHL Complete,  $n = 3$ ). After removing 31 duplicate records, 40 records remained and were screened by title and abstract. Of these, 29 were excluded at the screening stage: six did not assess burnout prevalence, 17 involved populations that did not meet inclusion criteria, two were not conducted in Saudi Arabia, and four used ineligible study designs. Eleven full-text articles were retrieved and independently assessed for eligibility; seven were subsequently excluded (three did not report burnout prevalence data, three included ineligible populations, and one was not conducted in Saudi Arabia), leaving four eligible studies from the database search. An additional two records identified through citation searching were assessed for eligibility, and both met the inclusion criteria. In total, six studies were included in the systematic review and meta-analysis (Figure 1 -).

Figure 1. PRISMA 2020 Flow Diagram Showing the Study Selection Process



Source: Page MJ, et al. *BMJ* 2021;372: n71. doi: 10.1136/bmj.n71.

## Study characteristics

Six cross-sectional studies conducted in Saudi Arabia met the eligibility criteria, comprising a total of 1,851 nursing students. Sample sizes ranged from 205 to 564 participants. Studies were conducted in Riyadh (k = 3), Dammam (k = 1), Madinah (k = 1), and across multiple Saudi nursing programs (k = 1). Burnout was assessed using either the Maslach Burnout Inventory (MBI; k = 3) or the Maslach Burnout Inventory–Student Survey (MBI-SS; k = 3). Considerable variability in cut-off classification criteria was observed: standard recommended thresholds (k = 4), study-specific cut-offs (k = 1), and percentile-based classification (k = 1). Study characteristics are presented in Table 1.

Table 1. Characteristics of included studies

Study	Region	N	Instrument & cut-off	Overall (%)	EE (%)	DP (%)	PA (%)	Risk factors	Protective factors
Alemam et al., 2023 <sup>8</sup>	Riyadh	205	MBI-SS; EE $\geq$ 12.5, CY $\geq$ 7.5, rPE $\geq$ 10.5	62.0	69.8	72.7	66.8	Lower GPA	Exercise; sleep duration
Altharman et al., 2023 <sup>9</sup>	Multiple	564	MBI; EE >30, DP >12, PA <33	65.0	42.0	54.0	77.0	Higher GPA	Psychological resilience
Alghamdi, 2024 <sup>18</sup>	Dammam	243	MBI-SS; EE $\geq$ 16, CY $\geq$ 11, PA $\leq$ 23	18.1	30.0	16.0	39.5	NR	Psychological resilience
Andargeery et al., 2025 <sup>29</sup>	Riyadh	286	MBI-SS; study-specific cut-offs	28.0	30.1	32.2	25.5	Lower GPA; low English proficiency; lack of interest; low peer support	Self-efficacy; positive learning experience
Andargeery et al., 2024 <sup>20</sup>	Riyadh	237	MBI; standard scoring	NR	43.5	77.6	74.3	Academic stress; psychological distress	NR
Moafa et al., 2025 <sup>10</sup>	Madinah	316	MBI; percentile ( $\geq$ 75th EE/DP; $\leq$ 25th PA)	NR	30.0	59.0	66.0	Maladaptive coping	Adaptive coping

### Risk of bias assessment

Five of the six included studies were rated as low risk of bias (JBI scores 8–9/9), and one study was rated as moderate risk of bias (Andargeery et al., 2024;20 score: 8/9, with one item rated unclear). No studies were rated as high risk of bias, indicating an overall acceptable methodological quality of the included evidence base. Full item-level ratings are presented in Table 2.

**Table 2. JBI critical appraisal results for included studies**

Study	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Total	Risk of bias
Alemam et al., 2023 <sup>8</sup>	Y	Y	Y	Y	Y	Y	Y	Y	Y	9	Low
Altharman et al., 2023 <sup>9</sup>	Y	N	Y	Y	Y	Y	Y	Y	Y	8	Low
Alghamdi, 2024 <sup>13</sup>	Y	N	Y	Y	Y	Y	Y	Y	Y	8	Low
Andargeery et al., 2025 <sup>13</sup>	Y	Y	Y	Y	Y	Y	Y	Y	Y	9	Low
Andargeery et al., 2024 <sup>20</sup>	Y	Y	Y	Y	Y	Y	Y	Y	U	8	Moderate
Moafa et al., 2025 <sup>10</sup>	Y	Y	Y	Y	Y	Y	Y	Y	Y	9	Low

### Pooled prevalence estimates

A summary of all pooled prevalence estimates, heterogeneity statistics, and between-study variance parameters is presented in Table 3.

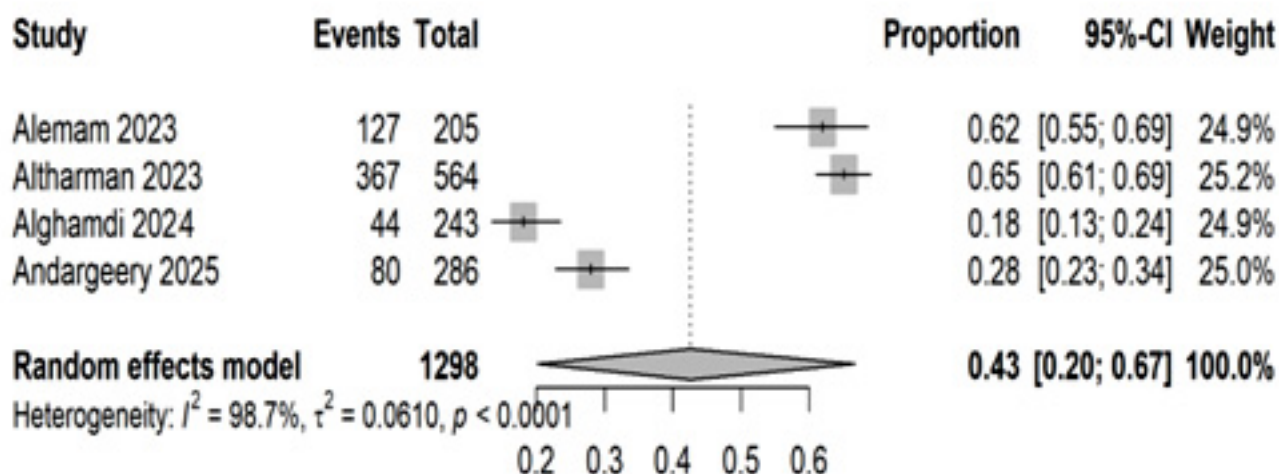
**Table 3. Summary of pooled prevalence estimates from random-effects meta-analysis**

Outcome	k	N	Pooled prevalence	95% CI	Q (df)	p	I <sup>2</sup>	τ <sup>2</sup>	τ
Overall burnout	4	1,298	43%	20–67%	234.70 (3)	<.0001	98.7%	0.0610	0.247
Emotional exhaustion	6	1,851	41%	29–53%	113.29 (5)	<.0001	95.6%	0.0237	0.154
Depersonalization	6	1,851	52%	32–71%	308.51 (5)	<.0001	98.4%	0.0622	0.249
Reduced personal accomplishment	6	1,851	59%	41–75%	293.54 (5)	<.0001	98.3%	0.0459	0.214

**Pooled prevalence of overall burnout**

Four studies comprising 1,298 nursing students reported overall burnout, defined as the concurrent presence of high emotional exhaustion, high depersonalization, and low personal accomplishment. The pooled prevalence of overall burnout was 43% (95% CI: 20%–67%). Statistical heterogeneity was extremely high:  $Q(3) = 234.70$ ,  $p < .0001$ ,  $I^2 = 98.7\%$ ,  $\tau^2 = 0.0610$ ,  $\tau = 0.247$ . The wide confidence interval and large  $\tau$  value confirm that true burnout prevalence varied substantially across settings, and the pooled estimate should be interpreted as a central tendency across heterogeneous study contexts rather than a precise point estimate. The pooled prevalence of overall burnout is presented in Figure 2.

**Figure 2. Forest plot of the pooled prevalence of overall burnout among nursing students in Saudi Arabia**

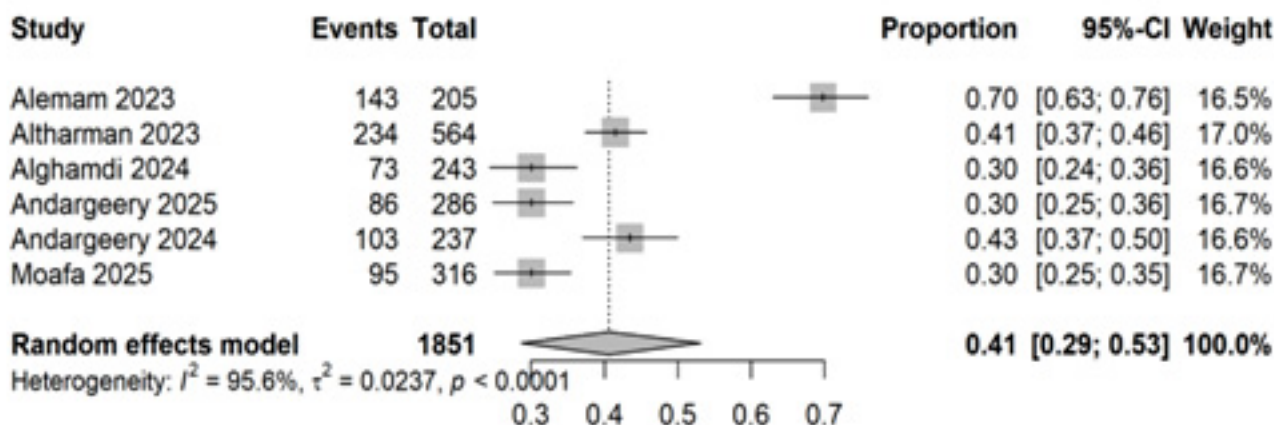


**Pooled prevalence of burnout dimensions**

**Emotional exhaustion**

All six studies (N = 1,851) contributed to the meta-analysis of emotional exhaustion (EE). The pooled prevalence of high EE was 41% (95% CI: 29%–53%),  $Q(5) = 113.29$ ,  $p < .0001$ ,  $I^2 = 95.6\%$ ,  $\tau^2 = 0.0237$ ,  $\tau = 0.154$ . Approximately two in five nursing students met criteria for high emotional exhaustion (Figure 3).

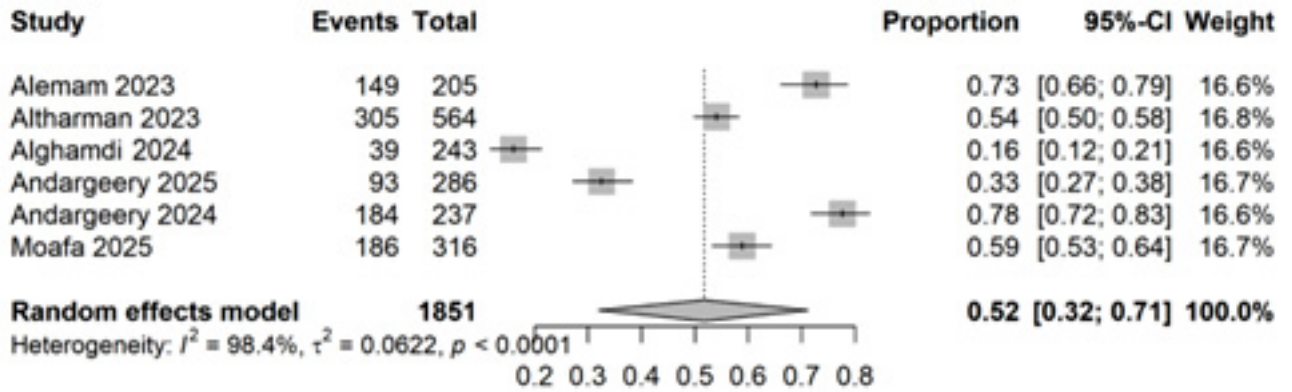
**Figure 3. Forest plot of pooled prevalence of high emotional exhaustion among nursing students in Saudi Arabia**



**Depersonalization**

All six studies (N = 1,851) were included in the meta-analysis of depersonalization (DP). The pooled prevalence of high DP was 52% (95% CI: 32%–71%),  $Q(5) = 308.51$ ,  $p < .0001$ ,  $I^2 = 98.4\%$ ,  $\tau^2 = 0.0622$ ,  $\tau = 0.249$ . Approximately one in two nursing students reported high depersonalization, though estimates varied markedly across settings (Figure 4).

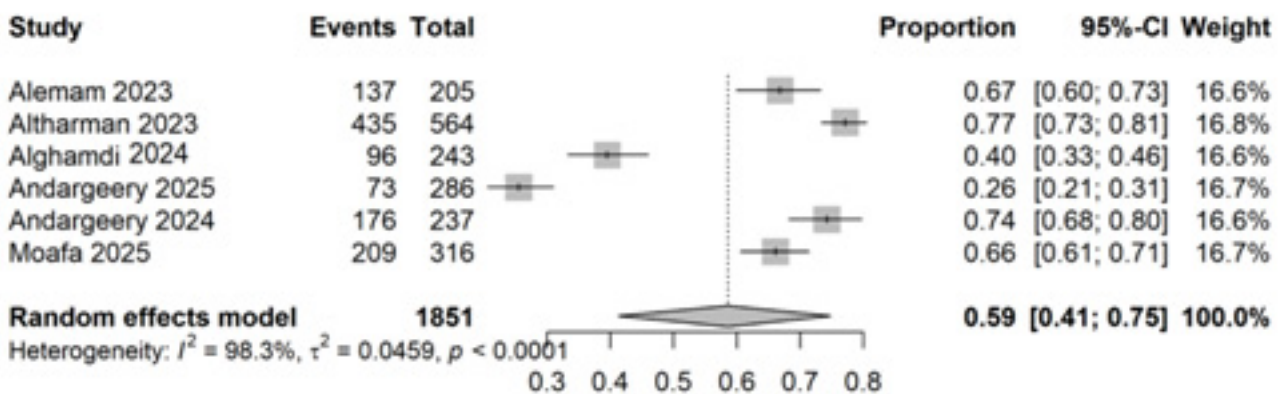
**Figure 4. Forest plot of pooled prevalence of high depersonalization among nursing students in Saudi Arabia**



**Reduced personal accomplishment**

All six studies (N = 1,851) were included in the meta-analysis of reduced personal accomplishment (PA). The pooled prevalence was 59% (95% CI: 41%–75%),  $Q(5) = 293.54$ ,  $p < .0001$ ,  $I^2 = 98.3\%$ ,  $\tau^2 = 0.0459$ ,  $\tau = 0.214$ . Among the three burnout dimensions, reduced personal accomplishment demonstrated the highest pooled prevalence, suggesting that feelings of diminished professional efficacy represent the most prevalent burnout-related challenge among Saudi nursing students (Figure 5).

**Figure 5. Forest plot of pooled prevalence of reduced personal accomplishment among nursing students in Saudi Arabia**



### Subgroup analyses

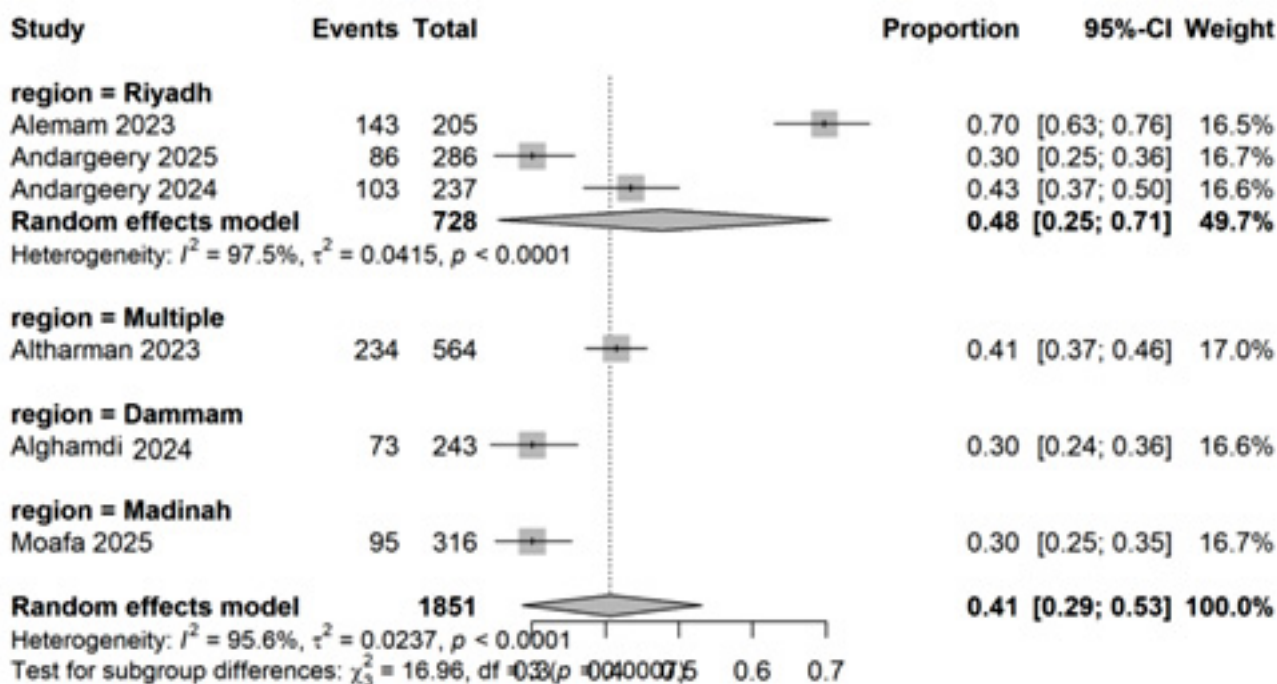
Pre-specified subgroup analyses were conducted to explore potential sources of the consistently extreme heterogeneity observed across all outcomes. Moderators examined were: measurement instrument (MBI vs. MBI-SS), geographic region within Saudi Arabia, and cut-off classification criteria.

#### Emotional exhaustion: moderator analyses

*By instrument.* The pooled prevalence of high EE was 43.1% for MBI-SS studies and 38.2% for MBI studies. The test for subgroup differences was not statistically significant ( $Q(1) = 0.12, p = .73$ ), indicating that instrument type did not significantly moderate EE prevalence.

*By region.* Regional subgroup differences were statistically significant ( $\chi^2 = 16.96, df = 3, p < .0001$ ). Pooled EE prevalence estimates were: Riyadh ( $k = 3$ ): 48% (95% CI: 25%–71%),  $I^2 = 97.5\%$ ,  $\tau^2 = 0.0415$ ; Multiple programs ( $k = 1$ ): 41%; Dammam ( $k = 1$ ): 30%; Madinah ( $k = 1$ ): 30%. Although EE prevalence was highest in Riyadh-based samples, caution is warranted, as three of the four regional subgroups were represented by a single study, limiting the stability of the estimates (Figure 6).

**Figure 6. Forest plot of pooled prevalence of high emotional exhaustion by geographic region in Saudi Arabia**



*By cut-off criteria.* The test for subgroup differences was not statistically significant ( $Q(2) = 3.57, p = .168$ ), indicating that cut-off methodology did not significantly explain between-study heterogeneity in EE.

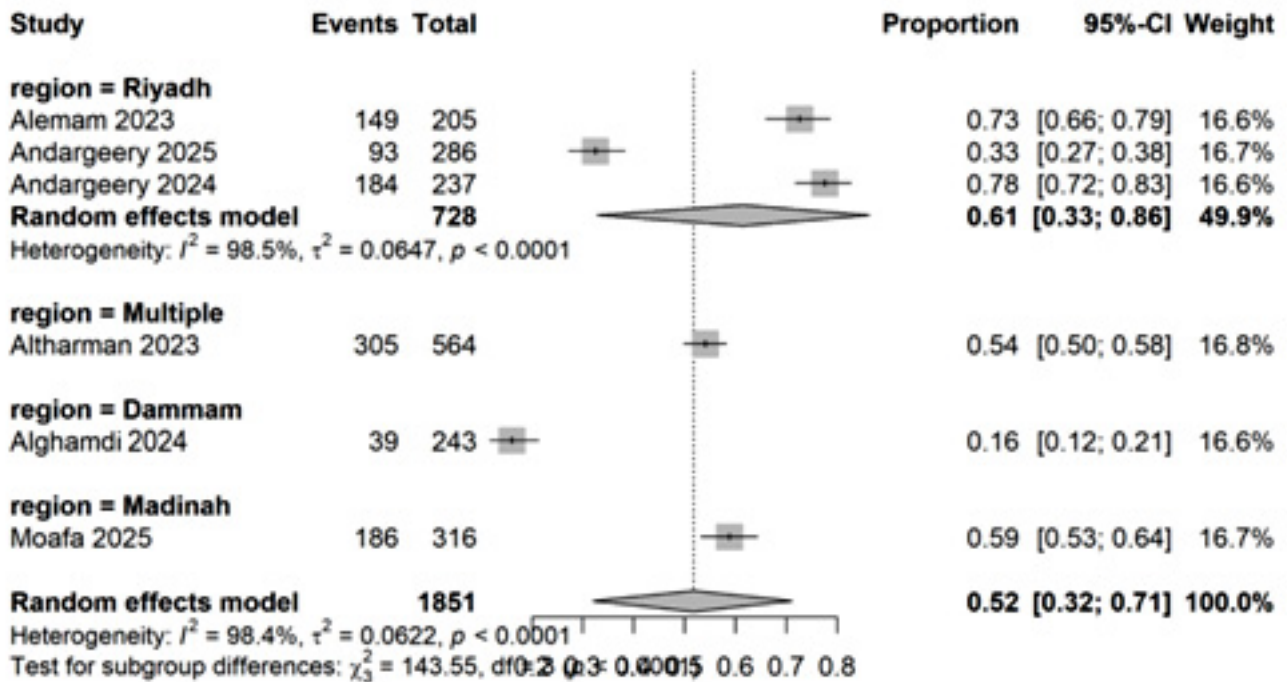
*Meta-regression by publication year.* Publication year was not a statistically significant predictor of EE prevalence ( $\beta = -0.0852, p = .206; R^2 = 10.97\%$ ), indicating no clear temporal trend.

**Depersonalization: moderator analyses**

*By instrument.* Studies using the MBI reported a higher pooled DP prevalence (63.8%) compared with MBI-SS studies (39.5%). The test for subgroup differences was not statistically significant ( $Q(1) = 1.58, p = .208$ ).

*By region.* Regional subgroup differences were statistically significant ( $\chi^2 = 143.55, df = 3, p < .0001$ ). Pooled DP prevalence estimates were: Riyadh (k = 3): 61% (95% CI: 33%–86%),  $I^2 = 98.5\%$ ,  $\tau^2 = 0.0647$ ; Multiple programs (k = 1): 54%; Dammam (k = 1): 16%; Madinah (k = 1): 59%. As with EE, three regional subgroups were represented by a single study each (Figure 7).

**Figure 7. Forest plot of pooled prevalence of high Depersonalization by geographic region in Saudi Arabia.**



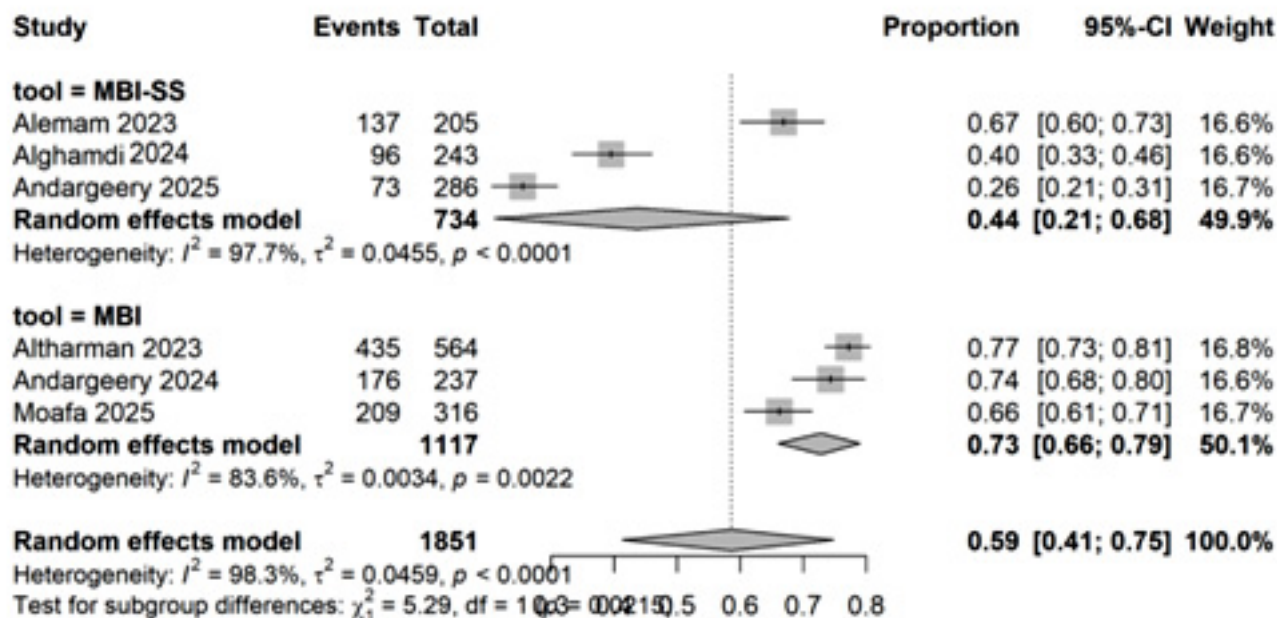
*By cut-off criteria.* The test for subgroup differences by cut-off classification was not statistically significant ( $p > .05$ ), indicating that cut-off methodology did not significantly moderate DP prevalence.

*Meta-regression by publication year.* Publication year was not a statistically significant predictor of DP prevalence ( $\beta = 0.0051, p = .968; R^2 = 0\%$ ), indicating no temporal trend.

**Reduced personal accomplishment: moderator analyses.**

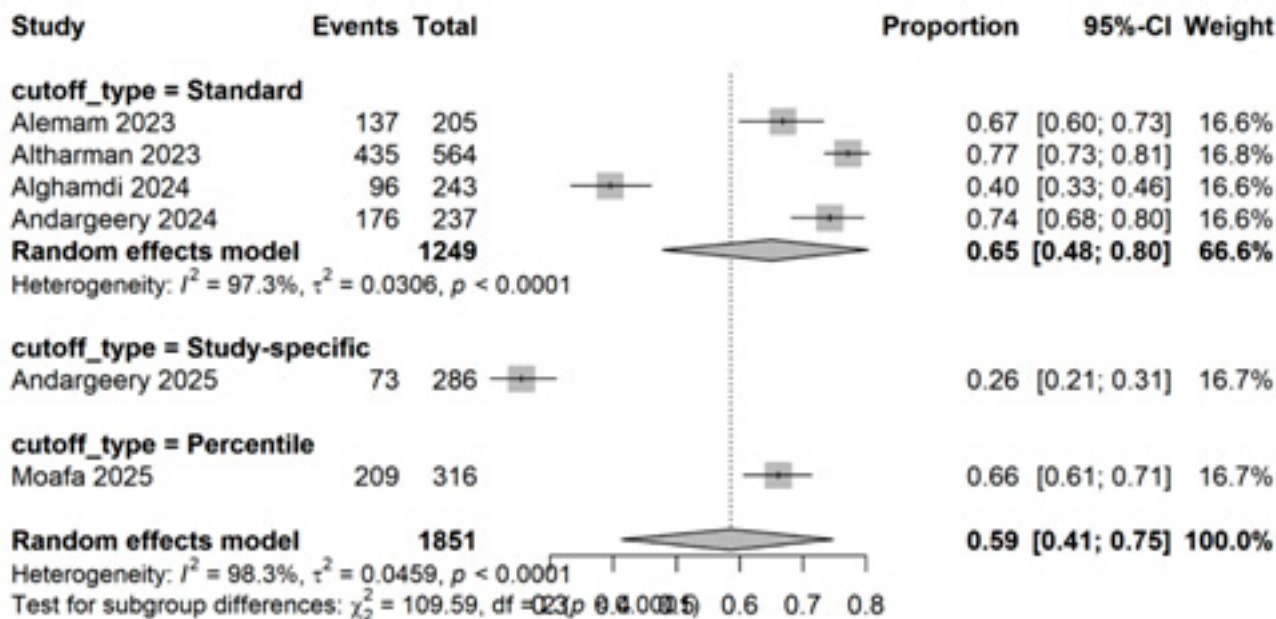
*By instrument.* Instrument type significantly moderated PA prevalence ( $\chi^2 = 5.29$ ,  $df = 1$ ,  $p = .0215$ ). MBI studies yielded a substantially higher pooled prevalence (73%; 95% CI: 66%–79%,  $I^2 = 83.6%$ ,  $\tau^2 = 0.0034$ ) than MBI-SS studies (44%; 95% CI: 21%–68%,  $I^2 = 97.7%$ ,  $\tau^2 = 0.0455$ ), indicating that instrument selection materially influences estimates of reduced personal accomplishment (Figure 8).

**Figure 8. Forest Plot of Reduced Personal Accomplishment by Measurement Instrument**



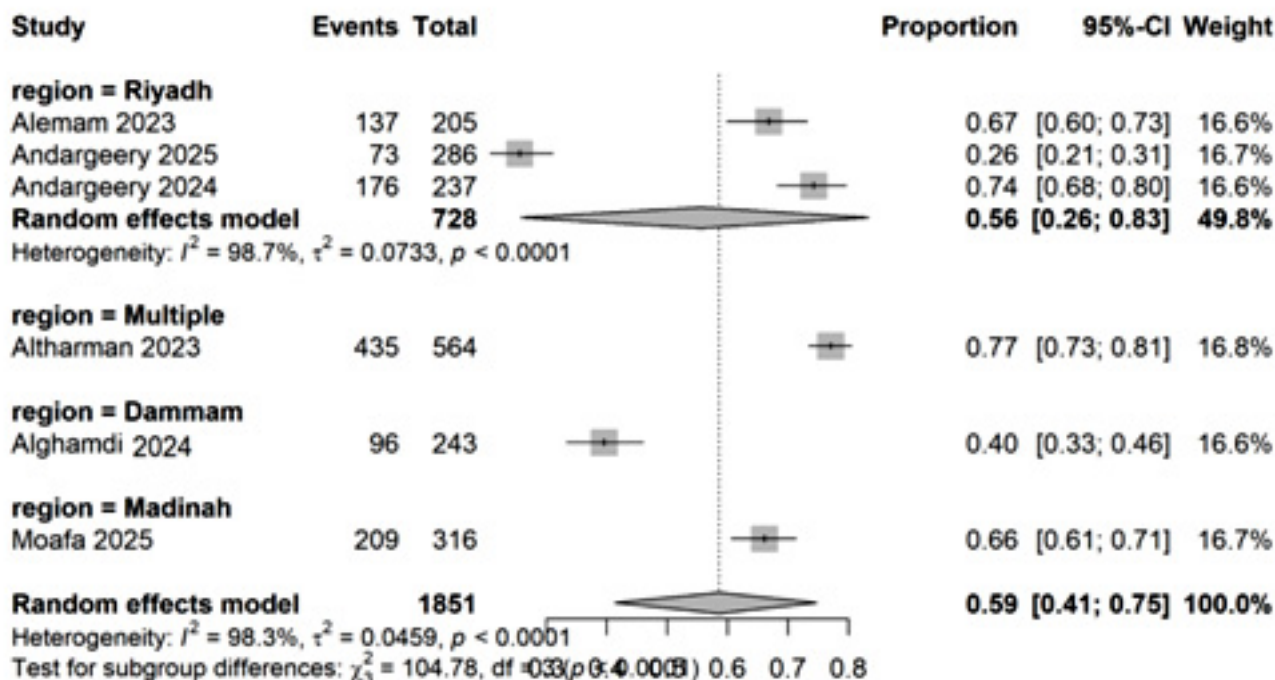
*By cut-off criteria.* Cut-off classification significantly moderated PA prevalence ( $\chi^2 = 109.59$ ,  $df = 2$ ,  $p < .0001$ ). Standard thresholds yielded a pooled prevalence of 65% (95% CI: 48%–80%,  $I^2 = 97.3%$ ,  $\tau^2 = 0.0306$ ); study-specific criteria: 26%; percentile-based thresholds: 66%. The markedly lower prevalence with study-specific cut-offs highlights the substantial impact of classification methodology on reported burnout rates (Figure 9).

**Figure 9. Forest Plot of Reduced Personal Accomplishment by Cut-Off Classification**



By region. Regional differences were statistically significant ( $\chi^2 = 104.78$ ,  $df = 3$ ,  $p < .0001$ ). Pooled PA estimates were: Riyadh ( $k = 3$ ): 56% (95% CI: 26%–83%,  $I^2 = 98.7\%$ ,  $\tau^2 = 0.0733$ ); Multiple programs ( $k = 1$ ): 77%; Dammam ( $k = 1$ ): 40%; Madinah ( $k = 1$ ): 66%. Interpretation is limited by single-study representation in three regional subgroups (Figure 10).

Figure 10. Forest Plot of Reduced Personal Accomplishment by Geographic Region



Meta-regression by publication year. Publication year was not a statistically significant predictor of PA prevalence ( $\beta = -0.0742$ ,  $p = .474$ ;  $R^2 = 0\%$ ), indicating no temporal trend.

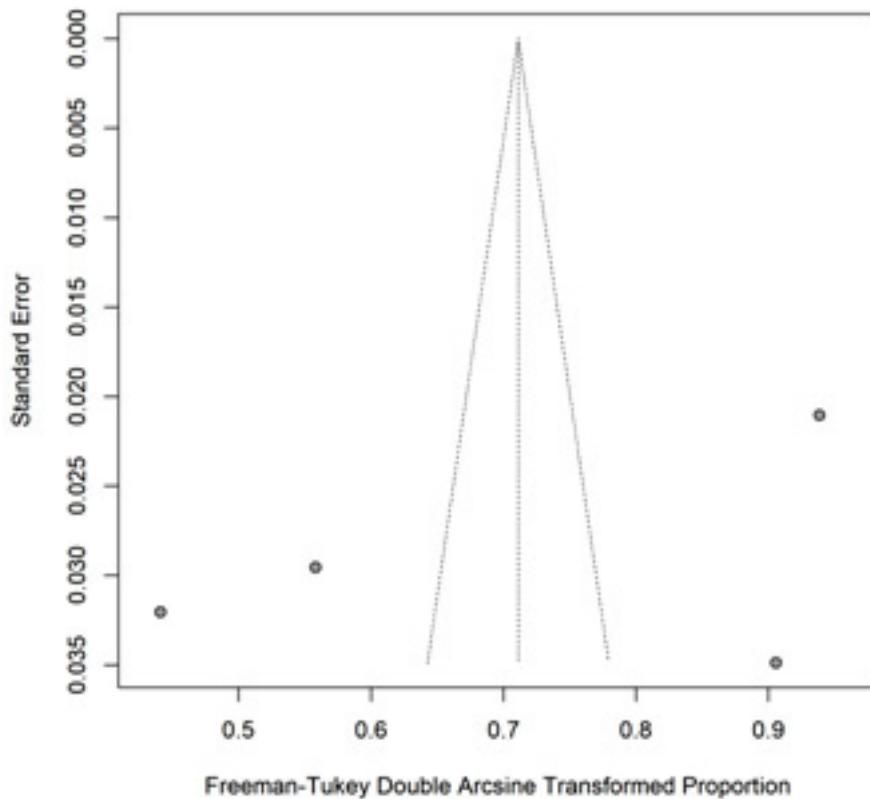
**Sensitivity analyses**

Leave-one-out sensitivity analyses were conducted for all four outcomes. For overall burnout, sequential study removal produced only modest changes in pooled prevalence, with heterogeneity remaining extremely high across all iterations ( $I^2$  range: 98.0%–99.1%). For emotional exhaustion, estimates remained stable with  $I^2$  persistently above 95% across all models. For depersonalization, pooled estimates ranged from 46% to 60%, compared with the original estimate of 52%, and  $I^2$  consistently exceeded 97.2%. For reduced personal accomplishment, pooled estimates ranged from 55% to 65%, compared with the original estimate of 59%, and  $I^2$  remained above 96.4% across all iterations. Across all outcomes, leave-one-out analyses confirm that the observed variability reflects genuine between-study differences rather than the influence of any single study, supporting the robustness of the meta-analytic results.

### Publication bias

Formal statistical testing for publication bias using funnel plot asymmetry or Egger's regression test was not conducted, as the number of studies per outcome ( $k = 4$  for overall burnout;  $k = 6$  for burnout dimensions) fell below the recommended threshold of 10 studies for reliable application of these tests (14). Funnel plots were visually inspected for overall burnout. However, some asymmetry was apparent; interpretation is severely limited by the small number of studies and extremely high between-study heterogeneity, which can independently distort funnel plot symmetry irrespective of true publication bias. Conclusions regarding potential publication bias should therefore be interpreted with considerable caution (Figure 11).

**Figure 11. Funnel plot of overall burnout prevalence among nursing students in Saudi Arabia.**



### Risk and protective factors associated with burnout

Because predictors were operationalized and reported inconsistently across studies, with variation in instruments, cut-off criteria, and effect size metrics, quantitative pooling of risk and protective factor data was not feasible. Findings are summarized narratively within the Job Demands–Resources (JD-R) framework (11,12,13).

#### Job demands and risk factors

**Academic performance.** GPA showed mixed associations with burnout across studies. Alemam et al. (8) reported that lower GPA was associated with higher EE ( $p = .005$ ), higher cynicism ( $p < .001$ ), and reduced professional efficacy ( $p < .001$ ). Similarly, Andargeery et al. (14) found that lower GPA was associated with higher academic burnout ( $t(284) = 2.011$ ,  $p = .045$ ). In contrast, Altharman et al. (9) reported that higher GPA was associated with higher burnout ( $p = .037$ ), while Alghamdi (18) found no significant association. These inconsistent findings suggest that unmeasured contextual factors may moderate the relationship between academic performance and burnout.

**Academic and psychological strain.** Andargeery et al. (20) reported that academic stress and burnout dimensions significantly predicted psychological distress ( $p < .05$ ), with EE and DP demonstrating significant positive associations with distress ( $p < .01$ ), consistent with the health-impairment pathway of the JD-R model.

*Motivational and social demands.* Andargeery et al. (19) found that lack of interest in nursing was associated with higher burnout ( $t(284) = -3.855, p < .001$ ), lack of peer support with increased burnout ( $t(284) = -2.626, p = .009$ ), and lower English proficiency with higher burnout levels ( $F(2, 283) = 4.328, p = .014$ ).

*Maladaptive coping.* Moafa et al. (10) reported that avoidance, denial, behavioural disengagement, and self-blame were each significantly associated with higher EE and DP ( $p < .05$ ), functioning as demand-amplifying factors within the JD-R framework.

### **Job resources and protective factors**

*Psychological resilience.* Resilience was the most consistently identified protective factor. Altharman et al. (9) reported that higher resilience was associated with lower DP ( $r = -.12, p = .04$ ) and higher PA ( $r = .43, p < .001$ ). Alghamdi (18) found resilience was negatively correlated with overall burnout ( $r = -.147, p = .022$ ), EE ( $r = -.348, p < .001$ ), and cynicism ( $r = -.528, p < .001$ ), and positively correlated with PA ( $r = .596, p < .001$ ).

*Health-promoting behaviours.* Alemam et al. (8) found that higher exercise frequency was associated with lower EE ( $p = .002$ ), lower cynicism ( $p = .006$ ), and lower reduced professional efficacy ( $p = .031$ ). Longer sleep duration was additionally associated with lower EE ( $p = .045$ ).

*Self-efficacy and learning environment.* Andargeery et al. (19) reported that higher self-efficacy was negatively correlated with academic burnout ( $p < .05$ ), and that a positive learning experience was associated with significantly lower burnout levels ( $p < .05$ ).

*Adaptive coping strategies.* Moafa et al. (10) found that problem-focused coping, social support seeking, positive reframing, and planning were each associated with higher PA and lower overall burnout levels ( $p < .05$ ).

## Discussion

### Principal findings

This systematic review and meta-analysis synthesized national evidence on burnout among undergraduate nursing students in Saudi Arabia. Across six cross-sectional studies (N = 1,851), the pooled prevalence of overall burnout was 43% (95% CI: 20%–67%). Dimension-specific analyses demonstrated that 41% of students reported high emotional exhaustion, 52% reported high depersonalization, and 59% reported reduced personal accomplishment, the latter representing the most prevalent burnout dimension across the included evidence base.

This dimensional ordering differs from many international syntheses, in which emotional exhaustion typically emerges as the dominant dimension (4). The prominence of reduced personal accomplishment in the Saudi context may reflect a sustained perception of inadequacy in meeting academic and clinical expectations, a pattern consistent with the health-impairment pathway of the Job Demands–Resources (JD-R) model, (11,12,13) in which chronically unmet demands progressively erode individuals' sense of professional efficacy. However, given the extremely high heterogeneity across all outcomes ( $I^2 > 95\%$ ), dimensional differences should be interpreted with considerable caution, as variability across institutions and measurement approaches limits the ability to draw definitive conclusions.

Consistent with the JD-R framework, included studies identified academic stress, lower GPA, lack of peer support, and maladaptive coping as factors associated with higher burnout. In contrast, resilience, self-efficacy, adaptive coping, exercise, and supportive learning environments were associated with lower levels of burnout. Emotional exhaustion likely reflects cumulative exposure to workload and clinical stressors, while depersonalization may represent a psychological distancing response to sustained, unrelieved strain.

### Interpretation in the context of existing literature

Meta-analytic evidence suggests that approximately one-quarter of nursing students experience burnout (4). The pooled overall prevalence identified in this review, 43%, appears substantially higher, suggesting that Saudi nursing students may face a disproportionate burden. Direct comparison must nonetheless be approached cautiously, as differences in operational definitions, measurement instruments, and cut-off criteria meaningfully influence prevalence estimates across studies.

Subgroup analyses confirmed that methodological factors materially moderate observed prevalence. The measurement instrument significantly moderated the prevalence of reduced personal accomplishment, with MBI studies yielding substantially higher estimates (73%) than MBI-SS studies (44%), and cut-off classification criteria further influenced this dimension ( $\chi^2 = 109.59$ ,  $p$

$< .0001$ ). These findings underscore the methodological sensitivity of burnout measurement and the importance of standardized criteria in prevalence research. Regional subgroup analyses revealed statistically significant differences across burnout dimensions; however, three of the four regional subgroups were represented by a single study, limiting the robustness of geographic comparisons. Meta-regression analyses did not identify a statistically significant association between publication year and any burnout outcome. However, the small number of studies likely constrained statistical power to detect temporal trends.

Collectively, these findings indicate that burnout among Saudi nursing students is both substantial and highly variable. Institutional context, measurement methodology, and classification thresholds each appear to contribute to the wide dispersion of prevalence estimates, and pooled values should be interpreted as aggregated indicators rather than precise national rates.

### Associated risk and protective factors

Narrative synthesis revealed consistent demand–resource patterns across studies. Academic stressors, including examination pressure, clinical training demands, lack of peer support, lower GPA, and maladaptive coping, were associated with higher burnout levels, consistent with international evidence characterizing nursing education as a high-demand environment (5,6). Notably, the association between GPA and burnout was inconsistent across studies: lower GPA was associated with higher burnout in two studies, (8,20) whereas one study reported the reverse, (9) and another found no significant association (19). This inconsistency suggests that the relationship between academic performance and burnout may be context-dependent and moderated by unmeasured institutional or individual factors.

Resilience emerged as the most consistently identified protective factor (9,18) and was associated with lower burnout across multiple dimensions. Self-efficacy, adaptive coping strategies, positive learning environments, exercise frequency, and adequate sleep were additionally identified as protective resources (8,10,19). Within the JD-R framework, these variables function as personal and contextual resources that may buffer the impact of sustained academic and clinical demands. However, most evidence was derived from cross-sectional bivariate or regression analyses that lacked comprehensive adjustment for confounders, precluding causal inference regarding any identified associations.

### Implications for nursing education and policy

The prevalence estimates observed in this review suggest that psychological well-being warrants strategic attention within Saudi nursing programs. Interventions targeting both demand reduction and resource enhancement appear warranted. Structured mentorship, timely performance feedback, resilience training, and systematic monitoring of workload distribution represent feasible institutional

strategies. Given the prominence of reduced personal accomplishment, educational approaches that reinforce competence development and mastery experiences may be particularly relevant. Early identification of students experiencing elevated burnout could facilitate preventive support before progression to more severe psychological distress.

From a workforce perspective, burnout during training may influence long-term professional engagement and retention within the Saudi healthcare system. Within the context of Saudi Vision 2030 healthcare transformation goals, addressing burnout at the educational level is therefore not only a student well-being imperative but also a workforce sustainability priority.

### Strengths and Limitations

This review represents the first quantitative synthesis of burnout prevalence among undergraduate nursing students in Saudi Arabia, providing nationally specific evidence that broader international meta-analyses cannot capture. Methodological rigor was strengthened through a comprehensive systematic search across five databases, independent multi-reviewer screening and data extraction, and standardized JBI risk-of-bias assessment. The application of a random-effects model with Freeman–Tukey double arcsine transformation and REML estimation enhanced the statistical stability of pooled estimates in the presence of substantial between-study variability. Subgroup analyses, leave-one-out sensitivity analyses, and meta-regression further improved the robustness and transparency of findings.

Several limitations must nonetheless be acknowledged. All included studies employed cross-sectional designs, precluding causal inference. Non-probability sampling was common, which may limit the representativeness of findings at a national level. Variation in burnout instruments (MBI vs. MBI-SS) and cut-off classification criteria contributed substantially to the heterogeneity observed, limiting the precision of pooled estimates. Reliance on self-reported measures may introduce social desirability or recall bias, and most primary studies did not adjust for potential confounders. At the review level, restriction to English-language peer-reviewed literature may introduce both language and publication bias. The small number of eligible studies ( $k = 4–6$  per outcome) constrained moderator analyses and precluded formal testing for small-study effects. The magnitude of heterogeneity across all outcomes ( $I^2 > 95\%$ ) means that pooled estimates should be interpreted as broad aggregated indicators rather than definitive national prevalence rates.

### Future research

Future studies should prioritize longitudinal designs to clarify burnout trajectories across academic progression and to examine the temporal relationship between demands, resources, and burnout outcomes. Standardization of measurement tools and classification thresholds across Saudi institutions is essential to improve the comparability and interpretability of future evidence. Multi-institutional studies using probability sampling would substantially enhance national representativeness. Intervention-focused research is urgently needed to evaluate the effectiveness of theory-informed, multi-level strategies, including resilience-building programs, workload optimization, and peer support initiatives, within Saudi nursing education.

### Conclusion

This systematic review and meta-analysis provides the first pooled national estimates of burnout among undergraduate nursing students in Saudi Arabia. The findings demonstrate that burnout is prevalent and multidimensional within this population, with 43% meeting criteria for overall burnout. Reduced personal accomplishment was the most prevalent dimension (59%), followed by depersonalization (52%) and emotional exhaustion (41%).

Interpretation of these estimates must be approached with caution, given the extremely high between-study heterogeneity and substantial variability in measurement instruments and cut-off classifications; pooled values should therefore be regarded as aggregated indicators rather than precise national rates. Guided by the JD-R framework, the observed pattern suggests a sustained imbalance in which academic and clinical demands chronically exceed available personal and institutional resources. Although causal inference is precluded by the cross-sectional design of included studies, the evidence collectively highlights the need for structured, theory-informed institutional strategies that both mitigate excessive demands and strengthen protective resources. Addressing burnout at the educational level is critical not only for student well-being but also for the long-term sustainability of the nursing workforce within the Saudi healthcare system.

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## Appendices

### Appendix A. PubMed Search Strategy

The following search strategy was used in PubMed (February–April 2026). Strategies were adapted for each of the remaining four databases (MEDLINE, CINAHL Complete, Scopus, and Web of Science) using equivalent controlled vocabulary and free-text terms appropriate to each database's indexing system.

#### PubMed Search String:

((“burnout”[Title/Abstract] OR “academic burnout”[Title/Abstract])

AND (Nurs\*[Title/Abstract])

AND (student\*[Title/Abstract])

AND (“Saudi\*”[Title/Abstract] OR “KSA”[Title/Abstract]))

**Search period:** February to April 2026

**Language filter:** English only

**Publication type:** Peer-reviewed articles only; no date restrictions applied

**Records retrieved from PubMed:** n = 17

## Appendix B. Data Extraction Framework

The following standardized data extraction framework was developed a priori and piloted in one study before full extraction. Two reviewers (NA and BA) independently extracted data from all included studies using this template. Discrepancies were resolved through discussion, with MA adjudicating when consensus could not be reached.

Variable category	Items extracted
<b>Study identification</b>	First author, publication year, geographic region within Saudi Arabia, journal name
<b>Study design</b>	Study design type, setting (university/college name), data collection period, sampling method
<b>Participants</b>	Total sample size (N), gender distribution (% female/male), academic year or level, response rate (if reported), mean age (if reported)
<b>Burnout instrument</b>	Instrument name (MBI or MBI-SS), version, subscale scoring method, cut-off criteria for overall burnout and each dimension (EE, DP/CY, PA), and Cronbach's alpha if reported
<b>Outcome data — prevalence</b>	Prevalence of overall burnout (%); prevalence of high EE (%); prevalence of high DP/cynicism (%); prevalence of low PA (%); number of participants above cut-off for each dimension
<b>Risk factors</b>	Identified academic, psychological, demographic, and contextual risk factors; statistical test used; effect size (r, OR, $\beta$ ); p-value
<b>Protective factors</b>	Identified personal and institutional protective factors; statistical test used; effect size; p-value
<b>Statistical methods</b>	Analytical methods used by study authors (e.g., descriptive statistics, Pearson/Spearman correlation, regression, ANOVA, t-test)
<b>Risk of bias</b>	JBI Critical Appraisal Checklist scores (Q1–Q9); overall risk of bias rating (low/moderate/high)
<b>Additional notes</b>	Any limitations noted by authors, assumptions made during extraction, and data requiring author clarification

Note. EE = emotional exhaustion; DP = depersonalization; PA = personal accomplishment; MBI = Maslach Burnout Inventory; MBI-SS = MBI Student Survey; JBI = Joanna Briggs Institute; NR = not reported.

**Appendix C. Narrative Synthesis of Risk and Protective Factors Mapped to the JD-R Framework**

The following table presents a comprehensive synthesis of all statistically reported risk and protective factors across included studies, organized within the Job Demands–Resources (JD-R) framework. Demands are factors associated with higher burnout levels; resources are factors associated with lower burnout or higher personal accomplishment.

Study	Factor	JD-R category	Burnout outcome	Statistical association
Alemam et al., 2023	Lower GPA	Demand	EE	$p = .005$
	—	Demand	Cynicism (CY)	$p < .001$
	—	Demand	Reduced PE	$p < .001$
	Higher exercise frequency	Resource	EE	$p = .002$
	—	Resource	CY; Reduced PE	$p = .006$ ; $p = .031$
	Longer sleep duration	Resource	EE	$p = .045$
Altharman et al., 2023	Higher GPA	Demand	Overall burnout	$p = .037$
	Psychological resilience	Resource	DP	$r = -.12$ , $p = .04$
	—	Resource	PA	$r = .43$ , $p < .001$
Alghamdi, 2024	Psychological resilience	Resource	Overall burnout	$r = -.147$ , $p = .022$
	—	Resource	EE	$r = -.348$ , $p < .001$
	—	Resource	CY	$r = -.528$ , $p < .001$
	—	Resource	PA	$r = .596$ , $p < .001$
Andargeery et al., 2025	Lower GPA	Demand	Academic burnout	$t(284) = 2.011$ , $p = .045$
	Lower English proficiency	Demand	Burnout	$F(2, 283) = 4.328$ , $p = .014$
	Lack of interest in nursing	Demand	Burnout	$t(284) = -3.855$ , $p < .001$
	Lack of peer support	Demand	Burnout	$t(284) = -2.626$ , $p = .009$
	Higher self-efficacy	Resource	Academic burnout	$p < .05$
	Better learning experience	Resource	Burnout	$p < .05$
Andargeery et al., 2024	Academic stress	Demand	Psychological distress	$p < .05$
	EE & DP	Demand	Psychological distress	$p < .01$
Moafa et al., 2025	Maladaptive coping (avoidance, denial, disengagement, self-blame)	Demand	EE & DP	$p < .05$
	Adaptive coping (problem-focused, social support, positive reframing, planning)	Resource	PA & overall burnout	$p < .05$

# GERIATRIC AND GERONTOLOGICAL NURSING: HISTORICAL EVOLUTION, CONTEMPORARY PRACTICE, CURRENT DEVELOPMENTS, AND FUTURE DIRECTIONS IN HEALTHY AGING CARE

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## Abstract

Population aging has emerged as one of the most important demographic transformations of the twenty-first century, fundamentally altering healthcare delivery, workforce requirements, and long-term care systems worldwide. As life expectancy increases and fertility rates decline, healthcare professionals are increasingly required to address the complex and multidimensional needs of older adults. Geriatric and gerontological nursing have consequently evolved into specialized disciplines that integrate biological, psychological, social, cultural, and environmental dimensions of aging. This review examines the historical development of geriatric and gerontological nursing, theoretical foundations of aging, epidemiological trends, and contemporary challenges associated with population aging. The review further explores how evolving concepts such as healthy aging, functional ability, person-centered care, and age-friendly health systems have transformed nursing practice. Evidence indicates that gerontological nursing is transitioning from a disease-oriented paradigm toward a holistic framework

emphasizing resilience, autonomy, quality of life, and maintenance of function. Understanding the historical evolution and conceptual foundations of the specialty is essential for addressing future healthcare demands associated with rapidly aging populations.

**Keywords:** geriatric nursing, gerontological nursing, healthy aging, population aging, frailty, older adults, healthy ageing, nursing science

## Introduction

### 1 Global Population Aging

Population aging is increasingly recognized as one of the most profound demographic phenomena in modern history (United Nations, 2023; World Health Organization [WHO], 2024). Improvements in public health, vaccination programs, sanitation, nutrition, education, and medical technology have substantially increased life expectancy across most regions of the world over the past century (Beard et al., 2016; Rowe & Kahn, 2015; Harper, 2021). Simultaneously, declining fertility rates have reshaped population structures, producing a growing proportion of older adults within both developed and developing nations (Bloom & Luca, 2016; Beard & Bloom, 2022).

The World Health Organization (2024) estimates that the global population aged 60 years and older will increase from approximately one billion individuals in 2020 to more than 2.1 billion by 2050. Furthermore, the population aged 80 years and older is projected to triple during the same period, representing the fastest-growing demographic group worldwide (United Nations, 2023). These demographic transitions are occurring at unprecedented rates in many low- and middle-income countries, where healthcare systems frequently lack adequate infrastructure to meet emerging geriatric care demands (WHO, 2023; Prince et al., 2021).

Population aging has significant implications for healthcare delivery because advancing age is associated with increased prevalence of chronic diseases, multimorbidity, frailty, disability, cognitive impairment, and long-term care requirements (Cesari et al., 2022; Hoogendijk et al., 2019; Sezgin et al., 2022; Dent et al., 2019). Consequently, healthcare systems worldwide require professionals with specialized expertise in aging processes and older adult care (Fulmer et al., 2021; Boltz et al., 2021).

### 2 Emergence of Geriatric and Gerontological Nursing

The increasing complexity of healthcare needs among older adults has contributed to the development of geriatric and gerontological nursing as specialized fields of professional practice (Touhy & Jett, 2022). Although the terms are often used interchangeably, important distinctions exist.

Geriatric nursing traditionally focuses on clinical management of disease, disability, and age-related health conditions affecting older adults (Capezuti et al., 2023). In contrast, gerontological nursing adopts a broader perspective that incorporates biological, psychological, social, cultural, ethical, and environmental dimensions of aging (Resnick et al., 2022; Touhy & Jett, 2022).

Gerontological nursing has evolved beyond disease management toward promotion of healthy aging, maintenance of functional independence, prevention of avoidable decline, enhancement of quality of life, and support of successful adaptation to aging-related changes (WHO, 2020; Cacchione, 2022). Contemporary practice increasingly emphasizes person-centered care, shared decision-making, interdisciplinary collaboration, and evidence-based interventions designed to maximize functional ability and well-being (Fulmer et al., 2021; Neville et al., 2026).

### 3 Purpose and Scope of the Review

The purpose of this review is to critically examine the historical evolution, theoretical foundations, and epidemiological context of geriatric and gerontological nursing. Particular attention is devoted to understanding how demographic transitions, scientific advances, and evolving healthcare priorities have shaped contemporary nursing practice.

This review synthesizes seminal historical contributions alongside contemporary evidence published primarily between 2020 and 2026. Through examination of historical milestones, theoretical frameworks, and demographic trends, the review provides a foundation for understanding the current and future role of gerontological nursing in addressing global aging challenges.

## Historical Development of Geriatric and Gerontological Nursing

### 1 Early Approaches to Care of Older Adults

Historically, care of older adults occurred primarily within family networks, religious communities, and charitable institutions (Cole, 1992; Achenbaum, 2015). Prior to the emergence of modern healthcare systems, aging was commonly viewed as an inevitable process of decline rather than a distinct area of scientific inquiry (Thane, 2000). Consequently, older adults experiencing disability or dependency frequently resided in almshouses, poorhouses, or religious institutions that provided custodial rather than therapeutic care (Conrad & Schneider, 1992).

Throughout much of the eighteenth and nineteenth centuries, older individuals received limited attention within healthcare systems because infectious diseases, maternal mortality, and childhood mortality dominated public health priorities (Achenbaum, 2015). The absence of effective medical interventions further reinforced beliefs that aging-related decline was largely unavoidable (Cole, 1992).

These early attitudes significantly influenced societal perceptions of aging and contributed to ageist assumptions that persisted well into the twentieth century (Levy, 2021).

## 2 Florence Nightingale and the Foundations of Elder Care

Although Florence Nightingale did not explicitly establish geriatric nursing, her contributions profoundly influenced subsequent approaches to older adult care (Nightingale, 1860/1969; Dossey, 2010). Nightingale emphasized environmental factors including ventilation, cleanliness, nutrition, light exposure, and individualized observation of patients. These principles remain central to contemporary gerontological nursing practice (Dossey, 2010).

Nightingale's holistic philosophy recognized that health outcomes were influenced not only by disease processes but also by environmental and social conditions (Selanders, 2010). Modern age-friendly healthcare models similarly acknowledge the importance of environmental design, functional support, and person-centered care in promoting healthy aging (Fulmer et al., 2021).

Furthermore, Nightingale's emphasis on detailed patient assessment anticipated contemporary concepts of comprehensive geriatric assessment, which remain fundamental components of gerontological nursing practice (Capezuti et al., 2023).

## 3 Marjory Warren and the Birth of Modern Geriatrics

The emergence of modern geriatrics is widely attributed to the pioneering work of British physician Marjory Warren during the 1930s and 1940s (Warren, 1943; Matthews, 1984). At a time when many hospitalized older adults were regarded as incurable and were frequently confined to chronic wards, Warren systematically evaluated elderly patients and demonstrated that many conditions previously attributed to aging could be improved through rehabilitation and individualized care (Evans, 1997; Coni, 2000).

Warren's work challenged prevailing assumptions regarding aging, disability, and dependency (Morley, 2021). Through comprehensive assessment and interdisciplinary management, she demonstrated that older adults could achieve substantial improvements in function, independence, and quality of life (Arai et al., 2021).

The principles established by Warren, including functional assessment, rehabilitation, individualized care planning, and interdisciplinary collaboration, remain foundational to contemporary geriatric and gerontological nursing practice (Boltz et al., 2021; Capezuti et al., 2023).

**Table 1. Historical Milestones in Geriatric and Gerontological Nursing**

Period	Development	Impact
Pre-1850	Family and charitable elder care	Informal support systems
1850–1900	Nightingale reforms	Foundations of modern nursing
1930–1940	Marjory Warren's work	Birth of geriatrics
1950–1970	Emergence of gerontology	Scientific study of aging
1970–1990	Specialty nursing programs	Professionalization
1990–2010	Evidence-based practice movement	Research-driven care
2010–Present	Healthy aging paradigm	Functional ability focus
2021–2030	UN Decade of Healthy Ageing	Global transformation agenda

## 4 Emergence of Gerontology as a Scientific Discipline

The post-war period witnessed increasing recognition that aging represented a multidimensional phenomenon requiring interdisciplinary investigation (Birren & Schaie, 2011; Bengtson & Settersten, 2016). Gerontology emerged as a scientific field integrating biological, psychological, sociological, and environmental perspectives on aging (Ferrucci et al., 2021).

Research institutions, academic programs, and professional organizations dedicated to aging rapidly expanded throughout North America and Europe (Achenbaum, 2015). The establishment of the Gerontological Society of America and similar organizations promoted scientific inquiry and interdisciplinary collaboration (Birren & Schaie, 2011).

Nursing scholars increasingly contributed to this evolving body of knowledge by examining functional decline, adaptation to aging, caregiving, health promotion, and quality of life among older adults (Touhy & Jett, 2022).

## 5 Development of Gerontological Nursing as a Specialty

The latter half of the twentieth century marked substantial growth in gerontological nursing education, certification, research, and professional recognition (Meiner, 2023). Increased longevity and growing prevalence of chronic disease highlighted the need for specialized nursing competencies focused on older populations (American Nurses Association, 2023).

Educational programs began incorporating gerontology content into undergraduate and graduate curricula, while professional organizations developed competency frameworks for gerontological nursing practice (Resnick et al., 2022). Specialty certification programs further strengthened professional identity and promoted evidence-based care standards (Capezuti et al., 2023).

Contemporary gerontological nursing now encompasses clinical practice, education, leadership, research, policy development, and advocacy (Neville et al., 2026).

## Conceptual and Theoretical Foundations

### 1 Understanding Aging as a Multidimensional Process

Contemporary gerontology recognizes aging as a multidimensional process involving biological, psychological, social, and environmental changes occurring throughout the lifespan (Bengtson & Settersten, 2016; Ferrucci et al., 2021). Chronological age alone inadequately reflects health status because substantial heterogeneity exists among older adults (WHO, 2020).

Individuals of identical chronological age may exhibit markedly different levels of physical function, cognitive performance, resilience, and social engagement (Rowe & Kahn, 2015; Beard et al., 2016). Consequently, modern gerontological nursing increasingly emphasizes functional ability rather than chronological age as the primary indicator of healthy aging (WHO, 2020; Cacchione, 2022).

### 2 Biological Theories of Aging

Numerous biological theories have been proposed to explain aging processes (López-Otín et al., 2023; Kirkland, 2022). Contemporary geroscience identifies several interconnected mechanisms, including genomic instability, telomere attrition, epigenetic alterations, mitochondrial dysfunction, cellular senescence, and chronic inflammation (Campisi, 2021; Ferrucci et al., 2021).

These biological changes contribute to increased vulnerability to chronic disease, frailty, disability, and cognitive decline (Partridge, 2021; Kirkland, 2022).

**Table 2. Biological Hallmarks of Aging**

Hallmark	Clinical Relevance
Genomic instability	Disease susceptibility
Telomere attrition	Cellular aging
Epigenetic alterations	Functional decline
Mitochondrial dysfunction	Reduced physiological reserve
Cellular senescence	Chronic inflammation
Stem cell exhaustion	Impaired repair mechanisms
Altered intercellular communication	Multisystem dysfunction

### 3 Psychological and Social Theories of Aging

Psychological theories emphasize adaptation, resilience, coping, and maintenance of well-being throughout later life (Baltes & Baltes, 1990; Tornstam, 2005). Successful aging theory suggests that older adults can maintain high levels of functioning through adaptation and engagement despite biological changes (Rowe & Kahn, 2015).

Gerotranscendence theory proposes that aging may involve positive psychological development characterized by increased wisdom, self-reflection, and life satisfaction (Tornstam, 2005). Similarly, socioemotional selectivity theory suggests that older adults prioritize emotionally meaningful relationships and experiences as perceived time horizons shorten (Carstensen et al., 2011).

These theoretical perspectives provide important foundations for person-centered gerontological nursing interventions.

### Epidemiology of Population Aging

Population aging is occurring in virtually every region of the world and is increasingly regarded as one of the defining public health challenges of the twenty-first century (United Nations, 2023; WHO, 2024). Improvements in survival rates have contributed to substantial increases in life expectancy, while fertility declines have altered age structures across populations (Harper, 2021; Beard & Bloom, 2022).

The demographic transition has resulted in increasing prevalence of multimorbidity, frailty, dementia, disability, and long-term care needs (Hoogendijk et al., 2019; Cesari et al., 2022; Sezgin et al., 2022). Multimorbidity affects a majority of adults over age 65 in many countries and significantly increases healthcare utilization and expenditure (Tinetti et al., 2021).

Frailty has emerged as a major global concern, affecting approximately 10–15% of community-dwelling older adults and substantially higher proportions of institutionalized populations (Dent et al., 2019; Sezgin et al., 2022). Similarly, dementia prevalence continues to increase worldwide, with projections indicating that the number of affected individuals may exceed 150 million by 2050 (Livingston et al., 2020; Prince et al., 2021).

**Table 3. Major Global Aging Indicators**

Indicator	Current Trend
Life expectancy	Increasing
Population ≥60 years	Rapid growth
Population ≥80 years	Fastest-growing age group
Dementia prevalence	Increasing
Multimorbidity	Highly prevalent
Frailty	Increasing with age
Long-term care demand	Expanding globally
Healthcare expenditure	Increasing

The epidemiological realities of aging populations underscore the growing importance of geriatric and gerontological nursing. As healthcare systems confront increasing complexity associated with aging, specialized nursing expertise will remain essential for promoting healthy aging, preserving functional ability, and improving quality of life among older adults.

## Scope and Roles of Geriatric and Gerontological Nursing

### 1 Evolution of Professional Roles

The scope of geriatric and gerontological nursing has expanded considerably over the past several decades in response to demographic aging, increasing multimorbidity, healthcare system complexity, and evolving models of chronic disease management (Boltz et al., 2021; Capezuti et al., 2023; Meiner, 2023). Historically, nursing care of older adults focused primarily on assistance with activities of daily living and management of chronic illnesses. Contemporary gerontological nursing, however, encompasses a much broader range of responsibilities that include health promotion, disease prevention, rehabilitation, palliative care, care coordination, caregiver support, policy advocacy, leadership, and research (Touhy & Jett, 2022; Resnick et al., 2022).

Modern gerontological nurses function across acute care hospitals, primary care settings, long-term care facilities, rehabilitation centers, assisted living communities, hospice programs, and community-based services (Fulmer et al., 2021; Neville et al., 2026). Their responsibilities increasingly involve management of complex health conditions that require sophisticated clinical judgment and interdisciplinary collaboration (Tinetti et al., 2021).

The growing prevalence of multimorbidity has further transformed nursing practice. Rather than focusing on single diseases, gerontological nurses frequently manage interconnected clusters of conditions such as cardiovascular disease, diabetes mellitus, osteoarthritis, chronic kidney disease, cognitive impairment, and depression (Marengoni et al., 2020; Tinetti et al., 2021). This complexity necessitates a holistic approach that prioritizes function, quality of life, and patient preferences rather than disease-specific outcomes alone (WHO, 2020; Cacchione, 2022).

### 2 Clinical Care Roles

Clinical practice remains the cornerstone of gerontological nursing. Nurses are responsible for comprehensive assessment, care planning, implementation of interventions, monitoring of outcomes, and coordination of services across the continuum of care (Capezuti et al., 2023).

Assessment of older adults differs substantially from assessment of younger populations because age-related physiological changes often alter disease presentation (Inouye et al., 2021). Older adults may present with nonspecific symptoms such as confusion, weakness, falls, anorexia, or functional decline rather than classic disease manifestations (Boltz et al., 2021).

Gerontological nurses therefore require advanced competencies in recognizing atypical presentations, identifying early functional decline, detecting frailty, and evaluating psychosocial determinants of health (Fulmer et al., 2021; Resnick et al., 2022).

### 3 Health Promotion and Disease Prevention

Contemporary gerontological nursing increasingly emphasizes health promotion and prevention rather than exclusively focusing on disease management (WHO, 2020; Beard et al., 2016). Evidence suggests that many age-related health outcomes can be modified through preventive interventions targeting physical activity, nutrition, cognitive stimulation, vaccination, medication management, and social engagement (Livingston et al., 2020; Cesari et al., 2022).

Health promotion initiatives implemented by gerontological nurses include:

- Falls prevention programs
- Chronic disease self-management education
- Vaccination campaigns
- Nutritional interventions
- Physical activity promotion
- Cognitive health programs
- Social engagement initiatives

These interventions contribute significantly to maintenance of functional ability and independence among older adults (Resnick et al., 2022; WHO, 2021).

#### 4 Care Coordination and Transitional Care

Care transitions represent periods of increased vulnerability for older adults, particularly during movement between hospitals, rehabilitation facilities, nursing homes, and community settings (Naylor et al., 2018; Hirschman et al., 2021).

Poorly coordinated transitions are associated with medication errors, adverse events, rehospitalization, and increased mortality (Coleman et al., 2020). Gerontological nurses play critical roles in facilitating communication among healthcare providers, ensuring continuity of care, educating patients and caregivers, and monitoring outcomes following discharge (Naylor et al., 2018).

**Table 5. Fried Frailty Phenotype**

Criterion	Description
Weight loss	Unintentional loss
Weakness	Reduced grip strength
Exhaustion	Self-reported fatigue
Slow gait	Reduced walking speed
Low activity	Decreased physical activity

Frailty is generally diagnosed when three or more criteria are present (Fried et al., 2001).

#### 2 Falls

Falls represent one of the leading causes of injury, disability, hospitalization, and mortality among older adults (Rubenstein, 2020; Montero-Odasso et al., 2022). Approximately one-third of adults aged 65 years and older experience at least one fall annually, with prevalence increasing among those aged 80 years and above (WHO, 2021).

Risk factors include:

- Frailty
- Sarcopenia
- Visual impairment
- Polypharmacy
- Cognitive impairment
- Environmental hazards
- Balance dysfunction

Falls often initiate a cascade of functional decline, fear of falling, reduced activity, social isolation, and institutionalization (Montero-Odasso et al., 2022). Consequently, fall prevention represents a major focus of gerontological nursing interventions.

#### 3 Dementia

Dementia constitutes one of the most significant global health challenges associated with population aging (Livingston et al., 2020; Prince et al., 2021). Alzheimer’s disease accounts for approximately 60–70% of dementia cases worldwide (Alzheimer’s Association, 2024).

Dementia is characterized by progressive decline in memory, executive function, language, judgment, and functional ability (Petersen et al., 2020). As disease severity advances, affected individuals become increasingly dependent upon caregivers for daily activities and healthcare management.

Gerontological nurses play critical roles in:

- Early recognition
- Behavioural symptom management
- Family education
- Environmental modification
- End-of-life planning

Evidence increasingly supports multidomain interventions aimed at reducing modifiable dementia risk factors including hypertension, hearing loss, physical inactivity, social isolation, and diabetes mellitus (Livingston et al., 2020).

#### 4 Delirium

Delirium is an acute neurocognitive disorder characterized by disturbances in attention, awareness, and cognition that develop over a short period and fluctuate throughout the day (Inouye et al., 2021).

Hospitalized older adults are particularly vulnerable to delirium due to age-related physiological changes, multimorbidity, polypharmacy, and acute illness (Marcantonio, 2017; Inouye et al., 2021).

Importantly, delirium is associated with:

- Increased mortality
- Functional decline
- Longer hospitalization
- Institutionalization
- Accelerated cognitive decline

Nurse-led multicomponent interventions have demonstrated effectiveness in preventing delirium among high-risk populations (Hshieh et al., 2018).

#### 5 Polypharmacy

Polypharmacy generally refers to the use of five or more medications and is increasingly common among older adults with multiple chronic conditions (Maher et al., 2014; Tinetti et al., 2021).

Polypharmacy is associated with:

- Falls
- Adverse drug reactions
- Hospitalization
- Cognitive impairment
- Medication nonadherence

The American Geriatrics Society Beers Criteria and STOPP/START tools have become important frameworks for identifying potentially inappropriate medications among older adults (American Geriatrics Society, 2023; O'Mahony et al., 2023).

Medication optimization and deprescribing are therefore important components of gerontological nursing practice.

## 6 Social Isolation and Loneliness

Growing evidence demonstrates that social isolation and loneliness significantly affect physical and mental health outcomes among older adults (National Academies of Sciences, Engineering, and Medicine, 2020).

Loneliness has been associated with:

- Depression
- Cognitive decline
- Cardiovascular disease
- Functional decline
- Increased mortality

Holt-Lunstad et al. (2020) reported that chronic social isolation may have health consequences comparable to established risk factors such as smoking and obesity.

Gerontological nurses increasingly recognize social connectedness as a critical determinant of healthy aging and quality of life (WHO, 2021).

## Comprehensive Geriatric Assessment

### 1 Conceptual Foundations

Comprehensive Geriatric Assessment (CGA) is widely regarded as the gold standard for evaluation of older adults with complex healthcare needs (Ellis et al., 2017; British Geriatrics Society, 2022).

CGA is defined as a multidimensional, interdisciplinary diagnostic and management process designed to determine medical, functional, psychological, and social capabilities in order to develop coordinated care plans (Ellis et al., 2017).

Unlike traditional disease-focused assessments, CGA recognizes that health outcomes in older adults are influenced by multiple interacting factors extending beyond medical diagnoses alone (Boltz et al., 2021).

### 2 Components of Comprehensive Geriatric Assessment

CGA typically includes evaluation of:

1. Medical status
2. Functional ability
3. Cognitive function
4. Psychological well-being
5. Nutritional status
6. Medication use
7. Social support
8. Environmental safety

Numerous studies have demonstrated that CGA improves functional outcomes, reduces institutionalization, and enhances quality of life (Ellis et al., 2017; Pilotto et al., 2018).

**Table 6. Core Domains of Comprehensive Geriatric Assessment**

Domain	Assessment Focus
Medical	Chronic disease burden
Functional	ADLs and IADLs
Cognitive	Memory and executive function
Psychological	Depression and anxiety
Nutritional	Weight and intake
Medication	Polypharmacy review
Social	Support systems
Environmental	Home safety

### 3 Functional Assessment

Functional status is among the strongest predictors of health outcomes in older adults (Katz, 1983; Lawton & Brody, 1969). Consequently, assessment of activities of daily living (ADLs) and instrumental activities of daily living (IADLs) represents a core component of gerontological nursing practice.

Functional decline often precedes overt clinical deterioration and may provide early indicators of emerging health problems (Boltz et al., 2021).

### 4 Cognitive Assessment

Cognitive screening is essential because cognitive impairment frequently remains undiagnosed during early stages (Borson et al., 2021). Common assessment tools include:

- Mini-Mental State Examination
- Montreal Cognitive Assessment
- Mini-Cog
- Saint Louis University Mental Status Examination

Early detection facilitates timely intervention, caregiver support, and care planning (Petersen et al., 2020).

## Evidence-Based Nursing Interventions

The movement toward evidence-based practice has significantly transformed gerontological nursing over the past three decades (Melnik & Fineout-Overholt, 2023). Contemporary interventions are increasingly guided by systematic reviews, clinical practice guidelines, randomized trials, and implementation of science research.

### 1 Physical Activity Interventions

Physical activity is consistently recognized as one of the most effective interventions for promoting healthy aging (WHO, 2020; Izquierdo et al., 2021). Exercise programs improve:

- Strength
- Mobility
- Balance
- Cognitive function
- Cardiovascular health
- Quality of life

Resistance training is particularly effective in addressing sarcopenia and frailty (Dent et al., 2019; Izquierdo et al., 2021).

## 2 Nutritional Interventions

Malnutrition remains highly prevalent among older adults and is associated with increased morbidity and mortality (Volkert et al., 2019).

Evidence supports:

- Adequate protein intake
- Vitamin D supplementation
- Mediterranean dietary patterns
- Oral nutritional supplementation when indicated

Nutrition-focused interventions are particularly important for prevention and management of frailty and sarcopenia (Cesari et al., 2022).

## 3 Cognitive Health Promotion

Research increasingly supports multidomain interventions targeting cognitive health (Livingston et al., 2020).

Effective approaches include:

- Physical activity
- Social engagement
- Cognitive stimulation
- Hearing loss management
- Cardiovascular risk reduction

Such interventions may delay cognitive decline and reduce dementia risk among vulnerable populations.

**Table 7. Evidence-Based Interventions in Gerontological Nursing**

Intervention	Primary Outcomes
Exercise	Strength, mobility, function
Nutrition support	Frailty prevention
Medication review	Reduced adverse events
Cognitive stimulation	Cognitive maintenance
Fall prevention	Reduced injuries
Caregiver education	Improved support capacity
Transitional care	Reduced readmissions
Social engagement	Reduced loneliness

## 4 Person-Centered Care

Person-centered care has become a defining principle of contemporary gerontological nursing (McCormack & McCance, 2017; WHO, 2020). This approach prioritizes individual preferences, values, goals, and lived experiences rather than focusing solely on disease management.

Evidence indicates that person-centered approaches improve satisfaction, engagement, quality of life, and healthcare outcomes among older adults (McCormack & McCance, 2017; Fulmer et al., 2021).

The transition from disease-centered care to person-centered care represents one of the most significant paradigm shifts in modern gerontological nursing.

## Long-Term Care and Institutional Care

### 1 The Growing Importance of Long-Term Care

The rapid growth of aging populations has intensified global demand for long-term care (LTC) services. Long-term care encompasses a broad range of medical, personal, social, rehabilitative, and supportive services designed to assist individuals who experience significant declines in intrinsic capacity and functional ability (WHO, 2021; Organisation for Economic Co-operation and Development [OECD], 2023). The need for LTC is expected to increase substantially over coming decades due to increasing life expectancy, rising prevalence of chronic disease, expanding numbers of older adults living with dementia, and changing family structures that may limit the availability of informal caregivers (Prince et al., 2021; OECD, 2023).

Historically, long-term care was provided primarily by family members. However, demographic transitions, urbanization, migration, declining household size, and increased female workforce participation have altered traditional caregiving patterns worldwide (Colombo et al., 2011; WHO, 2021). Consequently, healthcare systems are increasingly required to develop formal care structures capable of meeting growing demands.

The World Health Organization's framework for healthy aging emphasizes that long-term care should not be viewed merely as custodial support but rather as an essential component of health systems designed to optimize functional ability, autonomy, and dignity throughout later life (WHO, 2020; Beard et al., 2016).

### 2 Models of Long-Term Care

Long-term care services exist along a continuum that includes home-based care, community-based services, assisted living facilities, nursing homes, rehabilitation centers, and hospice programs (Stone, 2022; OECD, 2023).

Home-based care has gained increasing prominence because many older adults prefer to remain within familiar environments for as long as possible (Wiles et al., 2012). Aging in place has been associated with improved psychological well-being, enhanced autonomy, and greater satisfaction compared with institutional care (WHO, 2021).

Community-based models emphasize integration of healthcare, social services, rehabilitation, and caregiver support to facilitate independent living (Goodwin et al., 2014). Such models align closely with contemporary healthy aging frameworks that prioritize maintenance of function rather than disease management alone (WHO, 2020).

**Table 8. Major Long-Term Care Models**

Component	Description
What Matters	Individual goals and preferences
Medication	Appropriate medication management
Mentation	Prevention of delirium, dementia, depression
Mobility	Preservation of function and movement

### 3 Nursing Homes and Residential Care

Nursing homes continue to provide essential services for individuals with advanced functional dependency, severe frailty, complex multimorbidity, or advanced dementia (White et al., 2020; Stone, 2022). However, nursing home care has undergone substantial transformation over recent decades.

Contemporary nursing home models increasingly emphasize person-centered care, resident autonomy, quality of life, and culture change initiatives (Koren, 2010; White et al., 2020). Research demonstrates that institutional environments promoting resident choice, social engagement, and meaningful activities are associated with improved outcomes compared with traditional custodial models (Castle et al., 2020).

The COVID-19 pandemic exposed significant vulnerabilities within nursing home systems worldwide, including staffing shortages, infection control challenges, and disparities in resource allocation (Grabowski & Mor, 2020; Comas-Herrera et al., 2021). These experiences have stimulated renewed attention to workforce development, quality improvement, and emergency preparedness within long-term care settings.

#### 4 The Role of Gerontological Nurses in Long-Term Care

Gerontological nurses serve central roles in long-term care systems. Their responsibilities extend beyond direct clinical care to include leadership, quality improvement, staff education, family support, and interdisciplinary coordination (Capezuti et al., 2023).

Key nursing responsibilities include:

- Comprehensive assessment
- Medication management
- Falls prevention
- Pressure injury prevention
- Dementia care
- Palliative care
- Caregiver education
- Quality monitoring

Research consistently demonstrates that adequate nurse staffing levels are associated with improved resident outcomes, reduced hospitalizations, and enhanced quality of care (White et al., 2020; Spilsbury et al., 2021).

## Current Developments in Geriatric and Gerontological Nursing

### 1 The WHO Decade of Healthy Ageing (2021–2030)

The United Nations Decade of Healthy Ageing represents one of the most influential contemporary initiatives shaping gerontological nursing practice worldwide (WHO, 2020; Cacchione, 2022). The initiative was established in response to growing recognition that healthcare systems must move beyond disease-oriented models toward approaches that support functional ability, autonomy, and well-being throughout older age.

The Decade of Healthy Ageing identifies four major action areas:

1. Combating ageism.
2. Creating age-friendly environments.
3. Delivering integrated care.
4. Expanding access to long-term care.

These priorities align closely with contemporary gerontological nursing values emphasizing person-centered care, social inclusion, and functional health promotion (WHO, 2020; Neville et al., 2026).

### 2 Healthy Aging and Functional Ability

A major conceptual shift in contemporary aging research involves movement away from disease-focused definitions of health toward frameworks emphasizing functional ability (Beard et al., 2016; WHO, 2020).

Functional ability refers to the capacity to perform activities and pursue goals that individuals value. This concept integrates intrinsic capacity, environmental supports, social participation, and personal preferences (WHO, 2020).

Consequently, gerontological nursing increasingly focuses on maintaining mobility, cognition, psychological well-being, social engagement, and independence rather than exclusively treating disease processes (Cacchione, 2022).

### 3 Age-Friendly Health Systems

Age-friendly health systems have emerged as a major innovation in healthcare delivery for older adults (Fulmer et al., 2021). Developed through collaboration between healthcare organizations and geriatric experts, these systems seek to align care delivery with the specific needs of aging populations.

**Table 9. The Age-Friendly Health System 4Ms Framework**

Component	Description
What Matters	Individual goals and preferences
Medication	Appropriate medication management
Mentation	Prevention of delirium, dementia, depression
Mobility	Preservation of function and movement

Research demonstrates that implementation of age-friendly principles improves patient outcomes, reduces complications, and enhances care quality (Mate et al., 2021; Fulmer et al., 2021).

#### 4 Telehealth and Remote Monitoring

The COVID-19 pandemic accelerated adoption of telehealth technologies across healthcare systems worldwide (Monaghesh & Hajizadeh, 2020). Telehealth has proven particularly valuable for older adults who face transportation barriers, mobility limitations, or geographic isolation (Kruse et al., 2022).

Applications include:

- Chronic disease monitoring
- Medication management
- Cognitive assessment
- Mental health support
- Rehabilitation services
- Caregiver education

Evidence suggests that telehealth can improve access, enhance continuity of care, and reduce avoidable hospitalizations among older populations (Kruse et al., 2022; Batsis et al., 2021).

#### 5 Artificial Intelligence in Elder Care

Artificial intelligence (AI) is increasingly influencing gerontological nursing practice and aging research (Topol, 2019; Sun et al., 2024). AI systems can analyze large datasets, identify risk patterns, and support clinical decision-making.

Potential applications include:

- Fall prediction
- Delirium detection
- Medication management
- Early dementia screening
- Predictive analytics
- Personalized care planning

Emerging evidence suggests that AI-assisted systems may enhance efficiency and support proactive intervention, although concerns regarding privacy, transparency, bias, and ethical governance remain significant (Topol, 2019; Sun et al., 2024).

#### 6 Smart Technologies and Aging in Place

Technological innovations are increasingly supporting independent living among older adults (Peek et al., 2019; Sixsmith & Gutman, 2020).

Examples include:

- Wearable monitoring devices
- Smart home systems
- Fall detection sensors
- Medication reminders
- Virtual assistants
- Remote monitoring platforms

These technologies may contribute to improved safety, earlier detection of health problems, and reduced caregiver burden (Peek et al., 2019).

## Education, Workforce, and Leadership

### 1 Workforce Challenges

One of the greatest challenges confronting healthcare systems is the shortage of professionals trained in geriatric and gerontological care (Institute of Medicine, 2008; WHO, 2020).

Despite increasing demand, relatively few nurses pursue careers in gerontological nursing (Chen et al., 2025). Factors contributing to workforce shortages include:

- Limited educational exposure
- Ageist stereotypes
- Perceived complexity of care
- Workforce aging
- Insufficient faculty preparation

These challenges threaten healthcare systems' capacity to meet future demands associated with population aging (Neville et al., 2026).

### 2 Gerontological Nursing Education

Educational institutions increasingly recognize the importance of integrating gerontology throughout nursing curricula (American Association of Colleges of Nursing, 2021).

Contemporary curricula emphasize:

- Healthy aging
- Frailty management
- Dementia care
- Palliative care
- Interprofessional collaboration
- Age-friendly healthcare

Educational reforms seek to ensure that all nurses, not only specialists, possess competencies necessary for caring for older adults (Kim et al., 2025).

**Table 10. Core Competencies in Gerontological Nursing**

Competency Domain	Key Skills
Assessment	Comprehensive evaluation
Clinical Care	Evidence-based intervention
Communication	Patient and family engagement
Leadership	Quality improvement
Ethics	Advocacy and autonomy
Research	Evidence translation
Health Promotion	Prevention strategies
Collaboration	Interdisciplinary teamwork

### 3 Leadership and Advanced Practice

Advanced practice nurses increasingly serve leadership roles in geriatric care delivery, policy development, and healthcare system redesign (Boltz et al., 2021).

Responsibilities include:

- Clinical consultation
- Program development
- Research leadership
- Policy advocacy
- Workforce development

Strong nursing leadership is increasingly recognized as essential for achieving goals associated with healthy aging and age-friendly healthcare systems (Neville et al., 2026).

## Ethical and Legal Considerations

### 1 Respect for Autonomy

Respect for autonomy remains a fundamental ethical principle in gerontological nursing (Beauchamp & Childress, 2019). Older adults retain the right to participate actively in healthcare decisions regardless of age.

Contemporary practice increasingly emphasizes shared decision-making and supported autonomy rather than paternalistic models of care (McCormack & McCance, 2017).

### 2 Ageism

Ageism has emerged as a major global public health concern (Levy, 2021; WHO, 2021). Negative stereotypes regarding aging may influence healthcare decisions, resource allocation, and treatment recommendations.

Research indicates that ageism contributes to poorer physical health, reduced access to healthcare services, lower quality of care, and diminished psychological well-being (Levy, 2021).

Combating ageism is therefore a major priority within contemporary gerontological nursing practice.

### 3 Elder Abuse

Elder abuse includes physical, psychological, sexual, and financial abuse as well as neglect (Yon et al., 2019).

Gerontological nurses play important roles in:

- Identification
- Screening
- Documentation
- Reporting
- Advocacy

Recognition of elder abuse has become increasingly important as populations age globally (WHO, 2021).

## Future Directions

The future of gerontological nursing will likely be shaped by major scientific, technological, demographic, and policy developments.

### Emerging priorities include:

#### ***Precision Gerontology***

Integration of biomarkers, genomics, and personalized interventions to optimize aging trajectories (Kirkland, 2022; López-Otín et al., 2023).

#### ***Geroscience***

Development of interventions targeting biological mechanisms of aging rather than individual diseases (Ferrucci et al., 2021; Partridge, 2021).

#### ***Artificial Intelligence***

Expansion of predictive analytics and decision-support systems (Sun et al., 2024).

#### ***Digital Health***

Growth of telehealth, remote monitoring, wearable technologies, and smart homes (Peek et al., 2019; Kruse et al., 2022).

#### ***Age-Friendly Communities***

Development of environments that support participation, accessibility, and social inclusion (WHO, 2021).

#### ***Workforce Expansion***

Investment in education, faculty development, and advanced practice roles to address future workforce demands (Kim et al., 2025; Neville et al., 2026).

## Conclusion

Population aging represents one of the most significant societal transformations of the twenty-first century. Geriatric and gerontological nursing have evolved from modest beginnings in charitable care systems into sophisticated specialties grounded in evidence-based practice, interdisciplinary collaboration, and person-centered care. Historical developments, ranging from Nightingale's environmental philosophy to Marjory Warren's pioneering rehabilitation model, established foundations that continue to influence contemporary practice.

Current gerontological nursing emphasizes healthy aging, functional ability, resilience, autonomy, and quality of life. The specialty now encompasses health promotion, chronic disease management, frailty prevention, dementia care, long-term care, palliative care, leadership, policy advocacy, and research. Emerging innovations including age-friendly health systems, artificial intelligence, telehealth, precision gerontology, and digital health technologies are expected to further transform care delivery in coming decades.

As global populations continue to age, gerontological nurses will remain essential in promoting dignity, independence, and well-being among older adults. Continued investment in education, research, workforce development, and policy innovation will be critical for ensuring that healthcare systems are prepared to meet the complex needs of aging societies.

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# FLORENCE NIGHTINGALE'S ENVIRONMENTAL AND HUMAN THEORY IN AN AGE OF NEO-BARBARISM: A NARRATIVE REVIEW

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## Abstract

The Principles of Florence Nightingale are the backbone of most Nursing systems globally. Nightingale's 1860 book, Notes on Nursing encompasses required environmental factors and principles to assist patient recovery to full health and they thus represent the birth of modern nursing.

Particularly, the principles were born of her work in the Crimean War which saw the introduction of technology to warfare, resulting in larger and quicker casualty lists as well as new types of injuries.

This paper revisits those principles in a time of neo-barbarism where not only innocent civilians are deliberately killed en masse but 'modern' warfare also deliberately targets medical and health workers, along with aid workers attempting to deliver medical assistance, food and shelter to the injured and displaced.

**Key words:** nurses, medical personnel, aid workers, war zones, Florence Nightingale

## Background

Florence Nightingale was an English social reformer, statistician and the founder of modern nursing. Nightingale came to prominence while serving as a statistician, manager and trainer of nurses during the Crimean War. The Crimean War was one of the first conflicts in which military forces used modern technologies of that time, such as explosive naval shells, railways, and telegraphs. This form of warfare resulted in different types of injury and injuries en masse. Nightingale significantly reduced death rates by improving basic hygiene and sanitary conditions for housing the injured. She reintroduced into hospitals the basic needs of all life on earth, including clean air and water, adequate and quality nutrition and a safe and healthy, caring environment.

Florence Nightingale's Environmental Theory is now the foundation of modern nursing. It posits that the role of a nurse is to manipulate a patient's physical and social environment so that nature can act upon them to restore health and prevent further illness.

Almost all nursing schools worldwide base their foundational curricula on Florence Nightingale's core principles. These foundational concepts, such as sanitation, infection control, ethical patient care, and holistic, individual-centered environments, are integrated into standard nursing education across North America, the UK, Europe, Australia, and many parts of Asia and Africa.

While medical science has evolved significantly since Nightingale founded the first professional nursing school at St Thomas' Hospital in London in 1860, her ethical and environmental principles remain central to the profession. Countries heavily influenced by her educational models include:

- **United Kingdom:** The original site of her methods, at the Florence Nightingale Faculty of Nursing, Midwifery & Palliative Care at King's College London.
- **United States:** Programs, such as those that trace their roots to the Bellevue Hospital Training School, were built on her plan.
- **Australia:** Nightingale sent disciples to establish high-quality nursing training practices to Australia in the 19th century, and modern Australian curricula reflect her holistic approach.
- **Japan & Spain:** Nightingale-type training schools spread globally to these regions to professionalize civilian nursing.

## Nightingale's 5 Key Environmental Factors

Florence Nightingale identified five critical environmental elements that nurses must control to promote healing:

1. **Pure (Clean) Air:** Ensuring optimal ventilation to keep the room free of foul odours and provide the patient with fresh air.
2. **Pure (Clean) Water:** Access to clean drinking water and a sanitary environment.
3. **Efficient Drainage:** Proper sewage systems to prevent the build-up of filth and disease-causing pathogens.
4. **Cleanliness:** Thorough sanitation of bedding, rooms, hospital wards, and personal hygiene to prevent infection.
5. **Light:** Access to direct sunlight, which Nightingale considered a primary source of healing energy for the human body.

## Secondary Principles

In addition to the five physical elements, her theory emphasizes:

- **Noise Levels:** Reducing sudden or unnecessary noises, which Nightingale believed startle or fatigued the patient.
- **Nutrition:** Carefully assessing a patient's dietary needs, intake times, and the nutritional value of their food.
- **Variety:** Providing stimulation (such as flowers, reading materials, or visitors) to relieve the monotony and emotional toll of a prolonged recovery.
- **Hope and Advice:** Offering positive encouragement and actively observing the patient's condition to gauge their response to care.

## Critical Roles & Responsibilities

- **Triage & Trauma Care:** Assessing and prioritizing patients with severe injuries, often relying on acute physical assessment skills when advanced diagnostic imaging is unavailable.
- **Displaced Populations:** Setting up field clinics and treating victims of intense fighting or natural disasters close to the frontlines in makeshift structures like shipping containers and tents.
- **Infectious Disease Control:** Managing sanitation, vaccination campaigns, and infection control to prevent outbreaks in crowded refugee camps or damaged urban areas.
- **Psychological Support:** Delivering trauma-informed care to both patients and local communities suffering from immense psychological distress and grief.

### Modern day conflict challenges

- Working in environments where healthcare facilities are increasingly targeted, violating international humanitarian law.
- Working in and adapting to clinical practice with limited or no shelter, equipment, medications, and basic diagnostic tools.
- Navigating the extreme psychological toll of caring for the wounded, while managing personal safety, and coping with ongoing concern for the patients, fellow medical workers and their own families.

Nurses in war and disaster zones increasingly operate on the frontlines of humanitarian crises, providing life-saving medical triage and care in heavily compromised environments. These places of conflict are increasingly targeted by weapons of mass destruction and weapons that actively target humans, be they population or Aid workers. Their daily work involves acute trauma, advanced clinical care, and managing scarce resources under the constant threat of violence, infrastructure collapse, and disease outbreaks. These days the principles of decent and healthy society and medical aid and food and fresh water are often deliberately withheld to increase the death toll among populations under siege. A major trauma for health workers is to see casualties among their own members who have often been deliberately targeted. This increases their workload within an environment of high stress. The psychological burden on such health workers is extreme and those who have family at home must weigh up their priorities each day at the same time as their presence in the disaster zone being more imperative. It is unimaginable trauma to see defenceless, innocent children targeted and murdered.

The current world situation represents a dramatic return to the worst of barbarous autocracy like the infamous monsters of old, such as Vlad the Impaler, Ivan the Terrible and of course such barbarities can be conducted by tyrants against their own national populations. Once sacrosanct, medical aid workers and aid organisations, such as the Office of the United Nations High Commissioner for Human Rights (OHCHR), Médecins Sans Frontières (MSF), United Nations, Red Cross, WHO etc are also targeted when their intent is to maintain a civilised outlook in an increasingly barbarous and tyrannical world, and on a planet that is suffering from the same misuse and abuse, endangering all life on earth.

### Statistics from war zones and climate catastrophes

A new report published by MSF called *Medical Care in the Cross Hairs* has revealed that attacks on medical personnel in armed conflicts have reached unprecedented levels.

That finding is based on the Safeguarding Health in Conflict Coalition's (SHCC) latest data from 2024, which documented 3,623 incidents targeting healthcare facilities, staff and patients, 15 per cent more than in 2023, and 62 per cent more than in 2022. In 2024, approximately 81 per cent of incidents of violence against healthcare were attributed to state groups.

This is in conjunction with findings from the World Health Organization's Surveillance System for Attacks on Health Care. In 2025, it reported a total of 1,348 attacks on medical facilities, resulting in the deaths of 1,981 people. That marked a significant increase in fatalities among medical personnel and patients in conflict zones, which doubled from 944 in 2024. Sudan was the most affected country, with 1,620 people killed, followed by Myanmar with 148, Palestine with 125, Syria with 41, and Ukraine with 19 people killed.

On 20 November 2023, five MSF vehicles parked in front of a clinic in Gaza city were destroyed by the intervention of the Israeli forces. The clinic was also damaged as a result, and part of the building was engulfed by fire for a few hours.

The release of *Medical Care in the Cross Hairs* comes as 2026 marks 10 years since the United Nations Security Council (UNSC) adopted resolution 2286 in the aftermath of the attack against the MSF hospital in Kunduz. On 3 October 2015, at least 42 people, including 14 MSF staff, were killed, and dozens more were injured when a United States AC-130 gunship bombed the Kunduz Trauma Centre in Afghanistan. It remains one of the deadliest attacks ever on MSF staff, patients and facilities.

Seven months later, following advocacy from the humanitarian sector, the UN Security Council adopted Resolution 2286 on the protection of medical facilities and personnel, which called for an end to impunity for those responsible and to respect international humanitarian law.

This resolution was a glimmer of hope, as it was the first time these concerns were addressed in a binding decision,"

While a total figure is difficult to determine, major relief organizations provide a snapshot of the scale:

- Médecins Sans Frontières (Doctors Without Borders): Employs over 10,000 nurses across its operations globally, many of whom are stationed in active conflict zones and crisis areas.
- International Committee of the Red Cross (ICRC): Deploys hundreds of medical personnel and emergency nurses every year, working alongside thousands of local volunteers to treat war trauma.

### Local Nurses Bear the Brunt

In most conflict zones, local national nurses and midwives provide the vast majority of care, often working extended shifts with limited resources and facing extreme personal danger. Working in these zones carries profound risks. According to reports from the World Health Organization and the Safeguarding Health in Conflict Coalition, attacks on healthcare facilities and personnel have surged dramatically, with hundreds of health workers killed annually in warzones.

### Remember Covid?

While Covid may have also been 'man made' or a result of our poor ecological practices and our cruelty toward and disregard for other creatures, in National Health systems it still fell to doctors and nurses to treat and provide care for the sick and dying while jeopardising their own health and the health of their families.

A recent multi-country hantavirus outbreak was linked to passengers and crew aboard the Dutch-flagged cruise ship MV Hondius, which departed from Argentina. This specific cluster involved the Andes virus strain, along with the new Ebola-zaire strain for which there are currently no approved Bundibugyo virus-specific therapeutics or vaccine. Local health workers are the front line on these cases and attempt to stop these viruses becoming yet another pandemic. The outbreak of Avian flu has just spread to the last unaffected continent, Australia, with birds infected on Antarctic islands where seal populations have been decimated by the virus. These outbreaks are born of the same mentality that the world's warmongers show. They are usually the same offenders.

**With the advent of a technological patient focus the imperative is to not forget the non-technical aspects of human health which should be the primary focus of patient care and where new disease and outbreaks initially present in patient care admissions / nursing.**

### World view

If we do an educational audit on the Nightingale Principles, they are still the backbone of modern nursing. However these principles were forged in the theatre of warfare and the treatment of the injured which took a more benign focus not only on soldiers but also populations under siege.

A review of current warfare has seen a surge of neo-barbarism where death, not glory, is the aim and particularly genocide and scorched earth policies. Populations are to be removed from their land and the land and civilisation putrefied and destroyed so that no-one, not even the barbarians can use it. The aim is simple, death of the innocent population and the destruction of their land.

Further those who dare to help these populations - not for defence of their own political classes but rather defence of civilisation and humanity itself are now first line targets. This includes health professionals and aid workers and our most sacred global institutions, that represent humanity as a whole, are the new targets. These include, but are not limited to the UN, WHO, MSF, Red Cross and national medical and non-medical organisations trying to save the lives of fellow humans. No longer can 'sides' be taken on merit, or assumed merit. The aim of modern warfare is to murder and destroy and one can only assume the motive is hatred and evil as that is what is playing out right across our ailing planet. The only logic that can be applied to such inanity is that some people want everything for themselves and want to be the last that die, as indeed that is the final outcome of their insanity. Certainly the effort being put into destroying innocent populations could be wisely employed saving ourselves from the destruction of the planet and the life here still holding hope of some intelligence being shown.

The imperative to protect healthcare in conflict settings is enshrined in international humanitarian law, enacted through humanitarian principles such as the distinction between civilians and combatants, the concept of necessity, the proportionality of harm to civilians in relation to military advantage, impartiality and humanity. These principles ensure that medical personnel, facilities and transports are safeguarded, and provide care without discrimination.

Lies are the language of reply of the neo-barbarians.

Hospitals, clinics and ambulances are frequently bombed, looted or significantly hampered from the delivery of essential medical services. Healthcare workers have been assaulted, blocked from administering care and killed. These assaults severely disrupt vital health services, leaving vulnerable populations without essential care, with catastrophic effects on public health, health workers and healthcare facilities.

### Key challenges:

1. Trends in global conflict that highlight the scale and nature of attacks and its effect on population health.
2. Protective mechanisms for the delivery of healthcare in armed conflict that set out existing legal frameworks and accountability and the context of IHL.
3. Building resilience and preparedness through capacity building, exploring protective measures through adaptive design, engaging more effectively with armed forces and non-state actors, fostering greater community engagement and education and the challenges presented by the lack of standardized data collection.

4. Action on the proliferation of debauched 'leaders' that enact their brutal fantasies upon innocent populations.

### Increased local violence against medical staff

And the problem is not just in conflict zones. Doctors and nurses are being attacked in their practices and emergency wards. Paramedics are being attacked and indeed killed when attending emergency calls. This may in some cases be due to drug addiction (yes there are many ways to destroy lives for money) and resultant or general psychosis and perhaps even as a result of the global problem where no-one is respected and where the grossly uninformed spout their incorrect and dangerous medical theories on social media.

### Technology

No matter how much technology can perform major tasks in medicine and hospitalisation the basic care will always be paramount for humans. We are physical creatures relying on clean air and water and unadulterated food to survive. We have survived long before technology was invented and still only need the basics that only the planet and each other can provide. Beware the baubles of the untrustworthy. The real war is within the species. It always has been.

We have long endured wars and oppression. It is the continuing theme of life on earth, perhaps this is the major medical problem to overcome.

The level of technology involved in patient care whether paper based or computerised is almost incidental to the personal care and healthy environment required for healing - modern tools may assist practitioners in relation to information available and information recorded but being human and remaining human, people will need the care and conditions required by our physiology and psychology.

While technology can provide modern tools, keep records and medicine charts and can arrange bookings and logistics, which assist in busy wards and even crisis situations, they cannot provide care.

### Summary

Florence Nightingale's Principles for optimum healing of patients were developed during a time of war and have since been adopted worldwide as the basis of healing and care.

We now find ourselves in even a worse period of not only war and conflict, but brutal autocratic rulers having no respect for ordinary people, be they their own populations or others. They are happy to destroy the planet itself to serve their own economic and skewed political (egotistical)

interests. And they are. We are faced with multiple wars, extreme poverty in up to 90% of the population(s) while the obscenely rich try to garner the global wealth for themselves. This results in decreasing access to healthcare, climate catastrophes and general despoiling of our once rich and fertile planet and seas and the other creatures who we rely on and they us. Most of the current technology innovators have shown themselves to be extremely self-serving for both monetary gain and manipulation of people, and are quite happy to destroy lives of young people with unlimited personal wealth as their aim. They are also deliberately breeding a cruel and unempathic populace, again for monetary gain and in some cases, skewed personal interests. They are not heroes.

While modern medicine has added antibiotics and antiseptics, Nightingale's focus on basic hygiene, infection control, and holistic, patient-centered care remains the backbone of nursing today. Nurses still use these principles to mitigate risks like falls, reduce hospital-acquired infections, and promote peaceful, healing spaces for recovery. As war zones become more primitive and cruel the original rules of conduct are being hampered by deliberately antisocial actions of modern war protagonists. Let us be honest. Theirs is the world of cowards using technology to murder en masse innocent starving, broken and unprotected civilians for personal gain.

What we have is the technologically advanced cowardly warmongers using a scorched earth policy on undefended and undefendable populations.

However with the endless evolution of viruses and with manmade health and hygiene issues increasing along with environmental and manmade disasters something else may step in and put an end to it all, and let us not forget about air quality, food additives, body mutilation, and environmental toxins. There are many types of tyrants.

We also have obscure (deranged or despicable) let alone unidentifiable, global actors deliberately trying to influence mothers against childhood immunisation. I can guess at their motivations even while they try to protect their identity.

Attacks on doctors, nurses and health workers reflect the rise of total disrespect of humanity, particularly of women and children, which can be used as a tool for enslavement.

### On a positive note ..

On top of clinical care, nurses and midwives can play a significant role in helping end this catastrophic situation and bridge divides – including cultural, political and social – through their daily advocacy and action as well as their never ending human example.

The UN International Day of Peace was established in 1981 by the United Nations General Assembly to promote peace among all nations and peoples. Each year on 21 September, the reflective day of global ceasefire and non-violence aims to strengthen those ideals and reduce conflicts around the world.

Amid escalating geopolitical tensions and ongoing conflicts, including the Russian invasion of Ukraine, the Gaza war, and tensions between India and Pakistan, just to name a few, there has never been a better time for health workers like nurses and midwives to step up as torchbearers for global peace.

The International Council of Nurses (ICN) is among many peak global bodies leading the collective movement for change.

In response to global conflicts, particularly the war in Ukraine, ICN launched its #NursesForPeace campaign, condemning the violence and showing solidarity and support for the nurses of Ukraine. It quickly expanded and now raises awareness and funds to support nurses working on the frontlines in crisis zones worldwide.

Speaking at a World Health Organization (WHO) Member State meeting in 2023, ICN Chief Executive Officer Howard Catton revealed that as the #NursesForPeace campaign grew, a strong link emerged between the work of all nurses and promoting peace. Giving one example, he said when supporting the health of migrants and refugees, issues of discrimination, marginalisation, sexual violence, can be laid bare. In these moments, nurses can build relationships through their trusted advice and care, which, as a by-product, supports peace efforts.

## Conclusions

Most nurses express a positive willingness to respond to epidemics, although they do not believe they are adequately prepared. Some measures should be taken for improving nurses' emergency preparedness, including providing ongoing training, protective equipment, safe working environment and psychological intervention, improving nurses' resilience and accelerating the sharing of scientific information about epidemics.

Our gratitude and respect is forwarded to all medical and aid workers who are targeted in the many inane conflicts around the world. They not only assist the innocent with medical and holistic care but witness the very worst of man's machinations every day.

Those being killed in modern warfare are not the protagonists at all – they are the innocent population, all of them. They are also not wealthy. All they ask of the planet is the right to exist, or at least subsist, in the place they live.

Together, we must speak out, stand in solidarity, and demand an end to violence to ensure that humanitarian assistance reaches all who need it, and that those who provide care are protected and respected.

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- Special Editorial: Peace, Reconstruction and Justice for Palestinians - in Gaza, the West Bank and beyond [pdf] Lesley Pocock
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## THE MODERN MIRROR: THE AGE OF MANUFACTURED APPEARANCE

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### Abstract

This article explores the rapid evolution of beauty standards and cosmetic enhancement in contemporary society. Beauty has shifted from subtle self-expression to a highly visible social currency shaped by media, influencers, commercial interests, and digital culture. The discussion traces the expansion of aesthetic practices, including permanent make-up, eyelash and hair enhancements, nail modifications, body art, fillers, botulinum toxin, thread lifts, fat transfer, and other cosmetic procedures. While marketed as empowerment, self-improvement, and youth preservation, many interventions carry physical, psychological, and ethical concerns. The article also examines the influence of colourism, skin-lightening practices, pharmaceutical marketing, and the pursuit of idealised appearances that often reflect social conformity rather than individuality. Alongside these trends, a counter-movement promoting natural appearance has emerged. Ultimately, the paper questions how beauty ideals affect identity, self-worth, and mental well-being. It argues for ethical, patient-centred practice that prioritises safety, authenticity, and informed decision-making over relentless aesthetic modification and enhancement.

**Keywords:** cosmetic enhancement, body modification, mental well-being, safety, self-esteem, influencers, contemporary society

## Synopsis/ point of view

The definition of “beautiful” has shifted from a uniform, synthetic look to embracing a natural, unique identity and individualistic features. In the last two decades, the concept has skyrocketed, potentially driven by social media with fancy, appealing words, like skin reset, summer skin, a quick fix, influencers, and the propagation of unrealistic standards, mostly among the youngest, promising enhanced attractiveness, appearances, and self-esteem in contemporary society, creating an image-conscious society.

Perceptions of beauty are deeply rooted in societal norms and ominously impact self-esteem, self-concept, and mental well-being.

Beauty has never been static; it has always evolved and changed. What once began as a simple enhancement has expanded into a vast industry that reshapes not only faces and bodies, but identity itself. It moves with culture, society, media, commerce, and identity. Traditionally centred on women, it has long been a powerful force, sometimes expressive, sometimes oppressive. What began as a subtle enhancement has gradually evolved into an expansive global industry reshaping overcorrected, expressionless faces and bodies in increasingly dramatic ways. More recently, men too have joined in and stepped into this feminine space, competing and adopting cosmetic routines to feminise their appearance, including chiselled defining jaws, plumped cheeks, pursing and puckering their lips by having them injected and moulded, and, in some cases, pursuing physical transformation to align with different gender identities, and are breaking the old misconception that fillers are “for women only”.

Beauty is no longer a quiet practice; it has become a public domain and a dynamic for performance to conform to a certain ideology. The boundaries of beauty have widened, but so have the pressures surrounding it.

The modern wave began years back with permanent make-up: tattooed eyeliner, lip definition, and implanted pigment designed to fix features in place, day and night, with the same tidy facial look. From there came eyebrow dyeing, tattooing, microblading, and microcrafting brows hair by hair. Eyelashes have taken their own evolutions and developments. They have grown much thicker and longer through glue-based extensions in dramatic shapes, like in certain instances, grossly thick brooms, or those solo long lashes (like a spider stretched and lashed out their slender protracted legs, rhythmically playing a rare symphony of life to allure), where the wearers are barely able to open their eyes, or glance. Later on, and very recently, it was replaced or supplemented by magnetic eyelash systems to match the advanced technology and the modern, fast-paced life, to match their fashionable, alluring outlook.

Hair power, has taken many various tolls, like hair extensions, clipped, bonded, long untidy plaits (some white men are using long tangled plaits which can be a risk for acute hair matting), bleached various colours, or various in partition, ironing, or woven, entangled, braids, waved, which promised instant volume, though sometimes at the cost of traction damage, destruction, and imminent hair loss from weight and tension, leading to traction alopecia and also tricholellomania.

For the nail industry, it has always been on the lookout; however, it has bloomed like everything else around us. The nail world expanded into their sculpted acrylics endlessly, hardened gel systems cured under ultraviolet lamps with their risks (UV lamps), layers cemented into exaggerated forms with standout spiky ornaments on the surface, and ignoring the risks of UV lamps and the synthetic glue, to the surface of nails and nail beds.

Of course the body joined in, and it took its big toll as well to complete the whole package craft. For instance, body decoration followed a similar path: like multiple piercings, extensive tattooing, sometimes covering the whole face, entire neck, and even the scalp, until natural features blurred beneath ink and became unrecognizable and unfounded.

Then came the era, of so-called and marketed “non-invasive procedures” to polish the endless look: with all sorts of dermal fillers to inflate the deflate and to protrude and maximise lips where you hardly and rarely see a woman or a man with their natural lips apart from the popped out lips in all ages which look like a fish lip or hugely made sausages, along with plumped up cheeks, chins, nose and eyebrows, along with botulinum toxin to freeze facial expression and abolish lines, like a masked up face, expressionless and frozen. Nowadays you can glimpse the same look like moving plastic flowers of all sorts of ages on the streets. Then followed shortly by the various threads lifts to pull skin tight in the saggy areas, and also somewhere like sewing the underneath skin on the claim to trigger and boost the natural elastin and collagen.

Additionally, in the filler world, a permanent calcium-based volumiser was invented, introduced, and injected permanently. Then the industry thought of a self-body filler-like substance and started promoting fat suction and transfer to sculpt the body in different places, along with removing the last free ribs to align with the tiny alluring waist. It didn't stop there; it started experimenting in different places, like butt lifts and augmented breasts into many forms, shapes and cups, and some have gone extreme, besides the butt work, lift, popped and dramatically lifted sculptured buttocks with all those fancy names. Not only that, some wanted to have cheek and chin dimples created to achieve beauty, either one-sided or both.

Another promoted substance is called the growth factor injection, which causes, after a year or so, it morphs and mutates, leading to what is called a bubble face, due to triggering cellular growths. Upon removal, it turns out lipomas which are fat promoting growths. Growth factors are short chains of proteins called peptides, and their applicability can be utilised only in promoting wound healing to regenerate.

Several shady clinics inject cheap counterfeit products in transient public spaces, including toilets, on the street sides, in residential properties, local nail bars, beauty parlours, or via mobile pop-up space services, renting cheap hotel rooms (to inject multiple clients on one day before switching to another space, in another place), as I once read on the local bus news in the UK.

Botox can be injected at so-called “Botox parties” and social gathering events. Black market injection like the one promoted on social media, TikTok, and Instagram, with booking direct through those channels, including WhatsApp and Snapchat who demand cash or bank transfer beforehand, along with masking their physical address or true identity to be untraceable. And all of these are mostly conducted by non-medical professionals or untrained hairdressers who buy unapproved cheap products online (only Botox needs a prescription from licensed professionals to buy), and the loophole keeps ongoing, unregulated.

Beauty extended to some risky procedures, like the permanent eye dyeing to have the alien look. These procedures spread rapidly through advertising and various social media platforms, influencers, and bloggers, and are often presented as routine maintenance or a quick lunch-break fix, and are often followed without deep reflection on long-term consequences.

Of course, all that is marketed under different names, like the yearning youthful look, restore your youth, reverse your age, better looking skin, look your best, whitening and brightening your skin, glowing up, and the list can go on forever. Pharmaceuticals are always on the lookout to keep clients hopeful, watchful, and in the thrill of running, hitting, and trying. I recall years back when I started practicing, some psoriatic medications have privileged side effects like increasing eyelash growth and colouring the iris, which, of course, some consider as an advantage, but at what cost?

Correspondingly, pigmentation issues and darkness are something where the blackness and bloneness and the distress around it, along with the intense psychic damage it does, lead someone to lighten their skin with a bleaching cream to conform and affirm some social identity, and the deep cultural hatred of blackness and darkness, which feels as if ruled under the thumb

of whiteness supremacy. I recall many patients of the skin of colour, or dark skin, were coming and asking for glutathione when it became the ultimate desire to become a lighter and whiter version of oneself, at some shots given under different fancy names, such as boosting your energy with vitamin cocktails. Also, some used various bleaching creams at a stronger concentration and ended up with various depigmentary conditions that can't be fixed later on.

Conversely pale skinned women burn themselves in sunbeds, risking skin cancers to attain a darker look, like a porcelain doll baked in an oven.

At the same time, a contrasting movement emerged: radical naturalism. This has called for preserving the visible body hair, rejection of cosmetic alteration, deliberate rebelliousness of beauty standards, and deliberate return to an unaltered state. Two extremes growing side by side.

And as always, the pharmaceutical companies like to keep us watchful and busy. Now, the pharmaceutical companies promote self-injected medications for weight loss, many originally manufactured and developed for diabetes, offered at high cost and framed as a quick fix and the best solution. However, now many compete on social media, with price matching and affordability. The conversation rarely centres on lifestyle, balance, or long-term consequences. All are on the lookout for a quick fix without thinking of the long-term consequences, which no one ever knows, as they are still in their infancy.

The evolution of beauty has become a social currency, a social identity, a mass signature, when it feels polarised, radicalised, mentally brainwashed, less like gradual change and more like acceleration without pause, unstoppable, just enhancement chasing enhancement, on one side, intentional rawness on the other (Figure 1). It is a vicious cycle that raises an uneasy question about self-image, influence, and social pressure, and how individuals truly perceive themselves when they stand before the mirror, or something in between?

After all, we are living in the digital age with its potential and convoluted challenges. Doctors should uphold core values of safety, ethics, and patient satisfaction, and should harness the power of technology with its digital tools in providing meticulous care to empower patients in deciding their cosmetic journey with ultimate responsibility and foresight of empowerment, and not distortion in creating aliens. Doctors should deliver skilful, artistic, exceptional, tailored, and authentic masterpieces of art according to each client's anatomy that suit them the most, beautify them in a subtle way and enhance their mental well-being. It's about feeling good and satisfied with the yield of the piece of work.

The problem is once the aesthetic journey starts, it can't stop or end, and the first shift begins when a person loses reference to their original identity, where there is the constant feeling of inadequacy and striving for more. Often, aesthetic distortion is not born out of vanity. It is actually a silent escape of someone's own image, from pain, difficulty of belonging or fitting, self-rejection, or hyperexposure, and how the world perceives you. Additionally, for the medical professional, a serious question arises: why does the professional keep agreeing to continue when it seems not to, and how do ethics work in these kinds of situations with their complexity. Sometimes it can be considered an unlimited aesthetic crime to continue and lose identity.

It seems the aesthetic work is always obsessed with being seen as youthful, beautiful, attractive, and pleasantness, within the connotation of being blonde (Blonded life), and with a brighter outlook of bleached skin or hair (Black blondes) (Peroxide nation) to meet and untangle social conformity.

Also, other somewhat extreme surgical aesthetics like upper lip cut and under philtrum cut to lift the upper lip, and evidence shows that the scar doesn't heal well and can thicken with time.

The worst four procedures are the butt implant, as they are thick, feel hard, and can move around, with increased risk of infection, as it's not a cleaned area of the body. Also, thread lift, which was abandoned for some years, seems to have come back, though it doesn't last long. Permanent fillers can cause problems in a few years' time, along with infections, and they need to be removed surgically. So it is best to revert to hyaluronic acid filler rather than those permanent cemented ones. And lastly, breast implants carry the risk of some sort of carcinoma.

To come to a close, it seems the idea that white life and blondness counteract and are the standard for normal life, to meet male gaze approval and validation, besides self-expression and self-affirmation, which reflects the pressure for women to conform to a certain social look, and thus all that leads to lost identity and individuality. For instance, if we observe male painters and how they paint women in a certain era in history, we would notice sensual and nude women's bodies in various difficult poses to imply and describe explicitly how art is often in the mind of a male viewer, and how it objectifies women.

All in all, it seems that there is societal pressure which has pushed some women and men to undertake unacceptable, risky procedures, and additionally there is the element of underlying self-hatred for one's own

nature and wanting a change, always, to attract the opposite gender, confront and challenge oneself, self-worthiness, and because people always judge based on the external outlook.

It's, after all, about the mirror illusion "see me": I am here, and I am still youthful and attractive, and to be embraceable, and to become someone else (Figure 1).

**Figure 1: Mirror illusions**

by E. Elghblawi ©.



## Poetry

**Plastic**

An artificial world to tempt  
Fresh-blown faces drifted here and there  
Distorted beyond sensible eyes

Like blown-up, feverish giant rose petals  
Moving heads sharply here and there  
Adapting itself to the restless eyes

As thrown dust in your eyes  
Redolent of orchids and pleasant, cheerful  
orchestra snobbery of life rhythm

Tangled among some dying orchids  
Inciting the power of overcorrection  
Suggestive of life in new tunes

She extracts words  
Through her plastic, puffy lips  
She pursed her lips with artificial laughter

They hardly dangle  
The light shines on her lips  
Forked the tongue like a flag

She might feel something other than unmade  
She doesn't feel awkward  
Waved the triumph with a sigh around

Hooves paddling through  
Walk off to nowhere  
Illuminating like flashes of solar  
Anticipating compliments  
Awaiting  
Unutterable fact

**Plastic fantastic**

Of distorted reflections  
Some cosmo-aesthetically tempting  
All overdone and big just gone  
In a too-blonde mother  
Lips gone massive sipping  
She parted her lips in an aborted laughter  
Cheeks gone dangling  
Eyelets sunken and lost  
Bush Brows heavily tinted  
Decorating heavily boomer eyes  
Hair's dangling in various lengthy extensions  
Fingertips holing in its spiky  
Just artificial flowers walking around

**Flatten signatures**

On the story of worn, flaky faces

Sprayed by freckles like galaxies

Botox writes its subtle signature

Silence in the wrinkles

Inscribing a poetry tale

Whispers a soft embrace

Of a fady face

With a needle, it dances with each line

Of subtle lines of ageism

Leaving face in the flat stillness of bloom