



SvedbergOpen
DISSEMINATION OF KNOWLEDGE

International Journal of Artificial Intelligence and Machine Learning

Publisher's Home Page: <https://www.svedbergopen.com/>



Research Paper

Open Access

Data-Driven Systematic Literature Review and Bibliometric Analysis of Teaching Empathy, Compassion, and Mindfulness in Health Professions Education

Ramachandran Vengrasalam^{1*}, Andrew Lai Sun Foong², Sivabala Naidu³, Ranjit Singh Gill⁴, Samikkanu Jabamoney⁵, Nirumala Rothinam⁶, Ruban Paul Durai⁷

¹Quest International University, Perak, Malaysia. E-mail: rama.vengra@qiu.edu.my

²Quest International University, Perak, Malaysia.

³Quest International University, Perak, Malaysia.

⁴Quest International University, Perak, Malaysia.

⁵Quest International University, Perak, Malaysia.

⁶Quest International University, Perak, Malaysia.

⁷Quest International University, Perak, Malaysia.

*Corresponding Author: Ramachandran Vengrasalam

Abstract

Empathy, compassion, and mindfulness are increasingly treated as curricular and professional capabilities in health professions education, yet the evidence remains dispersed across medical, nursing, allied-health, and professional-wellbeing literatures. This study combines a systematic review of 40 empirical journal articles with a VOSviewer bibliometric analysis of 738 Scopus-indexed records published between 1983 and 2026. The broad corpus was analysed for publication growth, document type, source productivity, citation influence, and thematic structure. A focused PRISMA-guided screening process retained 40 journal studies for structured extraction of design, sampling, location, instruments, and findings. The bibliometric corpus involved 2,308 unique author-name records and 15,215 citations, with an h-index of 63. Publication activity accelerated markedly after 2015, and the VOSviewer network revealed three interconnected clusters: humanistic education and compassion-oriented pedagogy; learner and professional characteristics with psychological correlates; and occupational burnout. The systematic synthesis showed that empathy and compassion are teachable but sensitive to role modelling, assessment practices, hidden curricula, and organisational climate. Arts-based learning, clinical simulation, reflective writing, feedback, coaching, and patient narratives supported relational development. Mindfulness and self-compassion interventions generally reduced stress, burnout, depersonalisation, or self-criticism, although abbreviated or weakly supported formats produced inconsistent effects. Across studies, common limitations included small samples, single-site designs, self-report outcomes, limited follow-up, and uneven geographic coverage. The review concludes that relational competence should be embedded longitudinally across formal, informal, and clinical curricula, while learner wellbeing and institutional conditions must be addressed as prerequisites for sustained compassionate practice.

Keywords: empathy; compassion; mindfulness; health professions education; wellbeing; burnout; systematic review; bibliometric analysis; VOSviewer

1. Introduction

Empathy, compassion, and mindful presence are central to safe, patient-centred, and ethically responsive health care. In education, these qualities are not merely desirable personal traits. They influence how learners communicate, interpret suffering, respond to uncertainty, and form professional identities. Medical, nursing, and allied-health programmes therefore face a dual obligation: to develop technical competence and to cultivate relational competence without exposing learners to unmanageable empathic burden.

The educational challenge is substantial because relational capabilities are shaped by more than formal teaching. Assessment systems, clinical role models, workload, institutional culture, hidden curricula, and repeated exposure to suffering can either strengthen or erode empathic and compassionate practice. Learners may master scripted communication while feeling increasingly detached, and clinicians may interpret self-care as weakness when professional cultures reward invulnerability (Laughey et al., 2021; Phillips & Dalgarno, 2017).

A wide range of approaches has been introduced, including narrative and visual arts, role-play, simulation, patient stories, reflective writing, service learning, communication-skills training, coaching, compassion-

focused education, mindfulness-based stress reduction, and mindful self-compassion. These approaches differ in their intended outcomes. Some seek to strengthen empathy and compassionate behaviour, while others target resilience, burnout, depersonalisation, self-criticism, stress, or professional wellbeing. The literature is interdisciplinary and conceptually fragmented. Empathy, compassion, caring, mindfulness, self-compassion, professional quality of life, and burnout are often examined in separate research traditions even though they interact within educational and clinical environments. Bibliometric mapping can reveal the field's broad conceptual organisation, while systematic review can compare how empirical studies were designed and what they found. This study integrates both approaches using a broad Scopus corpus and a focused sample of 40 empirical journal articles.

The study addressed the following research questions:

RQ1. How has Scopus-indexed research on empathy, compassion, mindfulness, teaching, wellbeing, and burnout developed between 1983 and 2026?

RQ2. Which journals, publications, and conceptual themes are most prominent in the bibliometric corpus?

RQ3. What conceptual clusters are represented in the supplied VOSviewer keyword co-occurrence network?

RQ4. What methodological, sampling, geographic, and instrumental characteristics define the 40 empirical journal studies?

RQ5. What common findings and research gaps emerge regarding relational pedagogy, mindfulness, self-compassion, wellbeing, and burnout in health professions education?

2. Method

2.1 Review design

The study used an integrated systematic-review and bibliometric design. Reporting followed the transparency principles of PRISMA 2020 (Page et al., 2021). Bibliometric performance analysis and science mapping were informed by Donthu et al. (2021), while network interpretation followed the VOS mapping approach described by Van Eck and Waltman (2010). The broad bibliometric corpus was kept separate from the focused systematic-review sample so that field-level structure could be mapped without weakening the empirical eligibility criteria used for qualitative synthesis.

2.2 Data source and bibliometric corpus

The author supplied a Scopus export containing 738 records published from 1983 to 2026. The file contained titles, abstracts, author and index keywords, document types, sources, citation counts, DOIs, and other bibliographic fields. The corpus was thematically centred on empathy, compassion, mindfulness, teaching, curriculum, wellbeing, professional burnout, and related health-professions concepts. All 738 records were retained for bibliometric performance analysis and for interpretation of the supplied VOSviewer network. The exact Scopus TITLE-ABS-KEY expression should be copied from the author's Scopus search history into the marked field in Table 1 before journal submission.

Table 1. Scopus data and review strategy

Component	Specification
Database	Scopus
Bibliometric corpus	738 records
Publication period	1983-2026
SLR document restriction	Peer-reviewed journal articles only
Reports assessed for focused eligibility	66
Studies included in the systematic review	40 empirical journal articles

2.3 Eligibility criteria for the focused systematic review

Studies were eligible when they were peer-reviewed journal articles, reported primary empirical research, examined empathy, compassion, caring, mindfulness, self-compassion, wellbeing, burnout, or closely related relational outcomes as a central phenomenon, and involved health-professions students, trainees, educators, or practitioners in an educational, training, or professional-development context. Eligible reports also had to describe a recognisable research design, sample, instrument or data source, and interpretable results. Reviews, editorials, notes, book chapters, conference papers, protocols, purely conceptual discussions, non-health-professions populations, and reports with insufficient methodological detail were excluded from the focused synthesis.

2.4 Screening and study selection

The 738 records were checked for exact DOI duplication, and none was identified. Before title and abstract screening, 261 non-journal formats were removed, leaving 477 journal records. Screening excluded 411 records that did not meet the focused educational and empirical criteria. Sixty-six reports were assessed

in greater detail, and 26 were excluded because they were outside health-professions education or training, conceptual or review-based, insufficiently focused on the review outcomes, inadequately reported, or represented protocols or overlapping reports. The final systematic review included 40 empirical journal articles. The bibliometric analysis retained all 738 records.

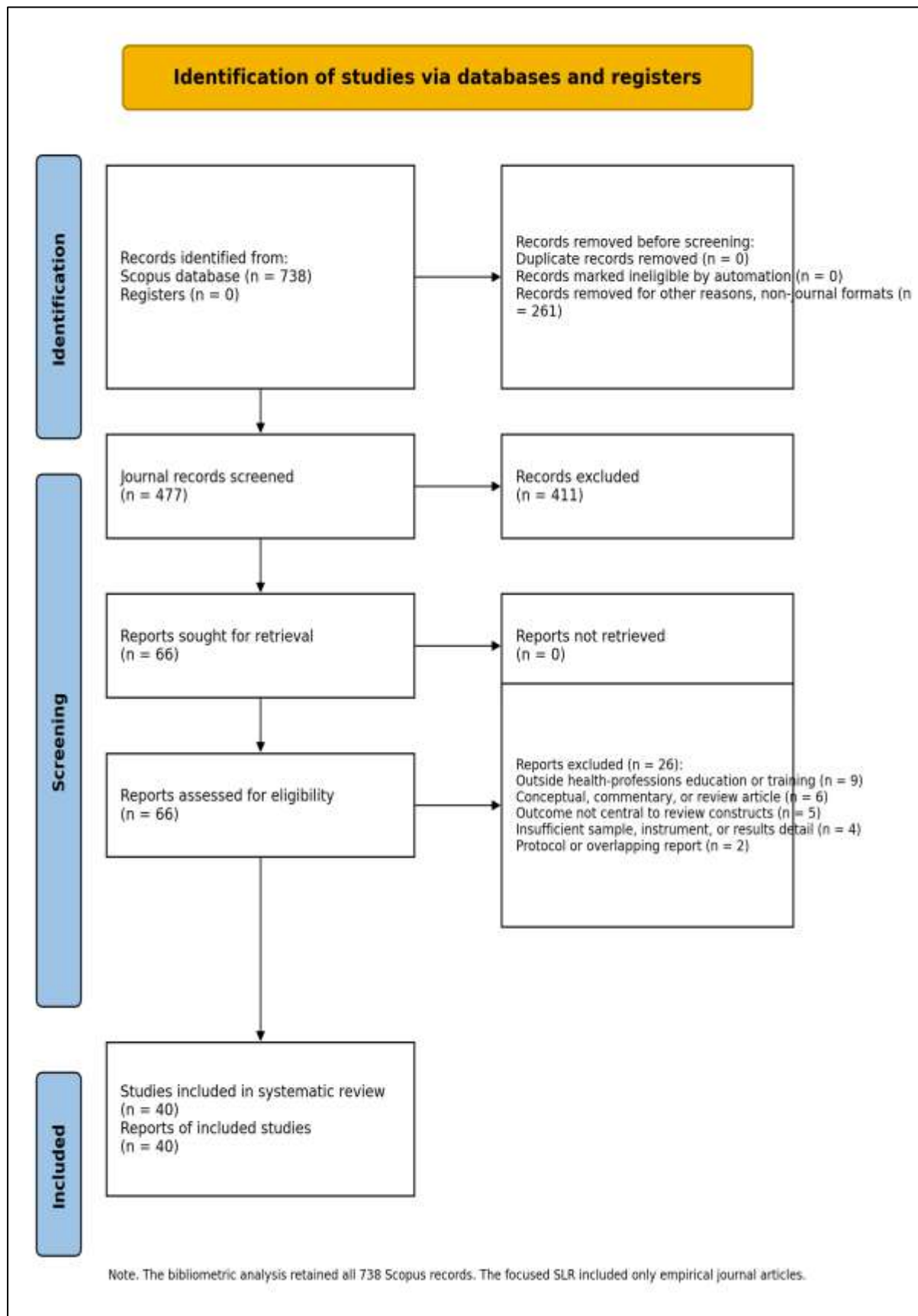


Figure 1. PRISMA 2020 flow diagram for selection of the 40 empirical journal studies.

2.5 Bibliometric and systematic-review analysis

Performance analysis covered annual publication output, document types, journal productivity, citation counts, mean citations, and the corpus h-index. The supplied VOSviewer network was interpreted according to node size, cluster colour, proximity, and link density. Abstracts and keywords were additionally assigned to broad thematic domains using rule-based text classification to support descriptive comparison. For the systematic review, each included study was extracted into a structured matrix containing APA-style reference, two topical keywords, research design, sampling and sample size, location, instruments, and principal results. Findings were synthesised thematically rather than meta-analytically because designs, populations, interventions, and outcome measures were highly heterogeneous.

3. Results

3.1 Bibliometric profile and publication growth

The corpus comprised 738 documents published between 1983 and 2026. It contained 2,308 unique author-name records and 15,215 citations. The mean citation count was 20.62 per document, the median was 5, and the corpus h-index was 63. Single-authored publications accounted for 205 records (27.8%), while 533 records (72.2%) involved multiple authors. Publication growth accelerated markedly after 2015. Records published from 2020 to 2026 represented 60.8% of the complete corpus, showing intensified interest in wellbeing, compassion education, and burnout prevention.

Table 2. Main characteristics of the Scopus bibliometric corpus

Indicator	Result
Documents	738
Publication period	1983-2026
Unique author-name records	2,308
Mean authors per document	3.34
Single-authored documents	205 (27.8%)
Multi-authored documents	533 (72.2%)
Total citations	15,215
Mean citations per document	20.62
Median citations	5
Corpus h-index	63

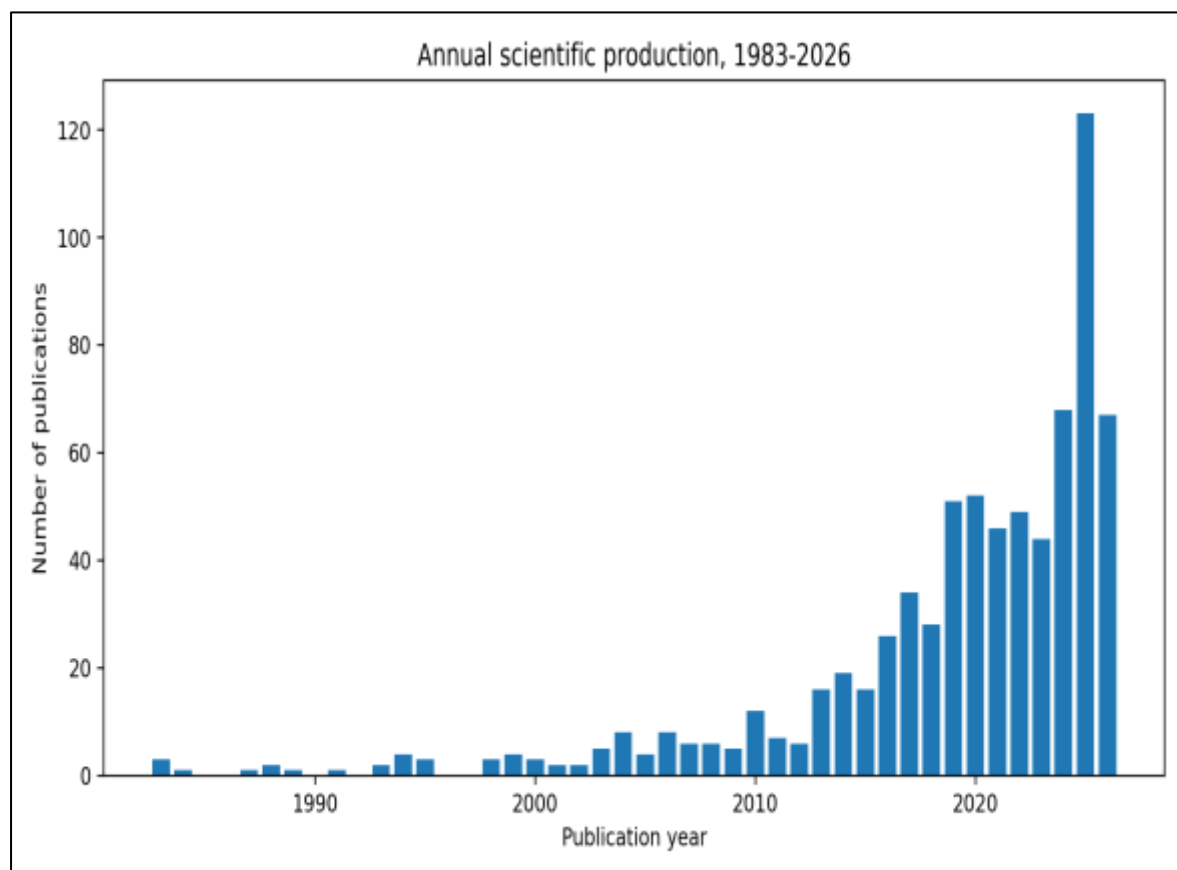


Figure 2. Annual publication output, 1983-2026.

3.2 Document types and publication sources

Journal articles were the largest document category, with 477 records (64.6%). Reviews accounted for 59 records, while books, book chapters, conference papers, notes, editorials, letters, and other formats represented the remainder. The document-type distribution confirms that the corpus combines an empirical journal core with broader educational and professional scholarship.

Table 3. Distribution of document types

Document type	Number	Percentage
Article	477	64.6%
Book chapter	104	14.1%
Review	59	8.0%
Book	50	6.8%
Conference paper	29	3.9%
Note	8	1.1%
Editorial	7	0.9%
Letter	2	0.3%
Retracted	1	0.1%
Short survey	1	0.1%

Academic Medicine was the most productive journal in the corpus, followed by Mindfulness, BMC Medical Education, and Nurse Education Today. The leading sources demonstrate the field's intersection of medical education, nursing education, contemplative science, professionalism, and clinical workforce wellbeing.

Table 4. Leading journal sources in the corpus

Journal	Documents	Citations	Mean citations
Academic Medicine	16	1054	65.88
Mindfulness	15	571	38.07
BMC Medical Education	13	357	27.46
Nurse Education Today	12	432	36.00
Medical Education	9	347	38.56
International Journal of Environmental Research and Public Health	9	128	14.22
Medical Teacher	8	432	54.00
Frontiers in Psychology	7	245	35.00
Nursing Ethics	5	148	29.60
Teaching and Teacher Education	5	104	20.80

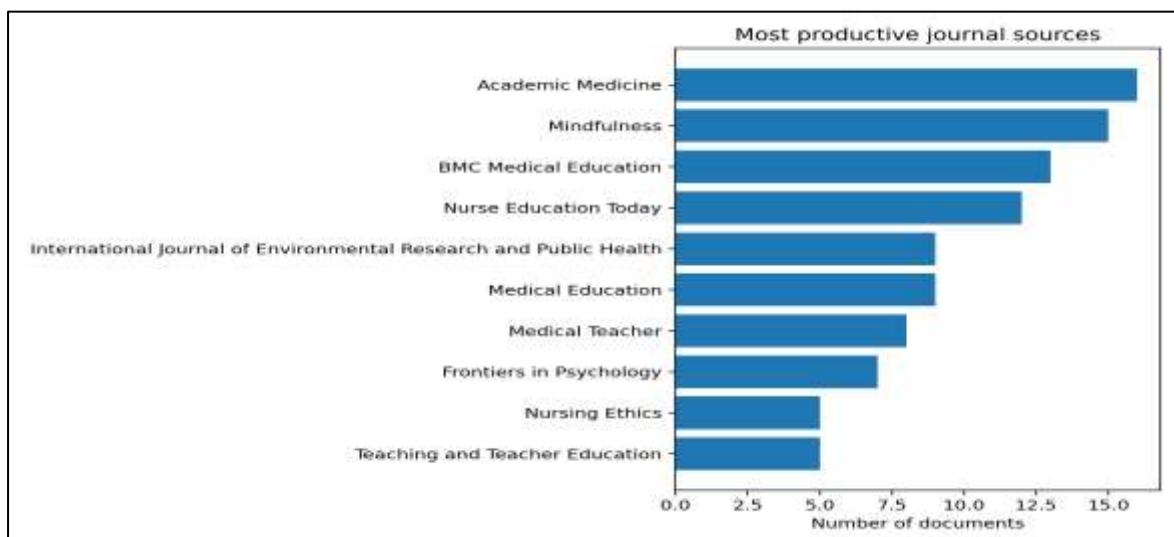


Figure 3. Most productive journal sources.

3.3 Citation influence

The most cited publications were concentrated in mindfulness-based stress reduction, educator and trainee wellbeing, compassion fatigue, and professional development. Shapiro et al. (2007) was the most cited record, followed by Roeser et al. (2013). Highly cited nursing studies linked empathy and self-compassion with professional quality of life and identified predictors of compassion fatigue and compassion satisfaction (Duarte et al., 2016; Kelly et al., 2015). These patterns show that wellbeing and occupational strain are not peripheral to relational care; they form a major intellectual foundation of the field.

Table 5. Ten most cited documents in the bibliometric corpus

Author and year	Title	Source	Citations
Shapiro S.L. (2007)	Teaching self-care to caregivers: Effects of mindfulness-based stress reduction on the mental health of therapists in training	Training and Education in Professional Psychology	827
Roeser R.W. (2013)	Mindfulness training and reductions in teacher stress and burnout: Results from two randomized, waitlist-control field trials	Journal of Educational Psychology	617
Duarte J. (2016)	Relationships between nurses' empathy, self-compassion and dimensions of professional quality of life: A cross-sectional study	International Journal of Nursing Studies	298
Benn R. (2012)	Mindfulness training effects for parents and educators of children with special needs	Developmental Psychology	272
Milota M.M. (2019)	Narrative medicine as a medical education tool: A systematic review	Medical Teacher	229
Kelly L. (2015)	Predictors of Compassion Fatigue and Compassion Satisfaction in Acute Care Nurses	Journal of Nursing Scholarship	227
Miyaji N.T. (1993)	The power of compassion: Truth-telling among American doctors in the care of dying patients	Social Science and Medicine	182
Branch Jr. W.T. (2000)	Supporting the moral development of medical students	Journal of General Internal Medicine	174
Bramley L. (2014)	How does it really feel to be in my shoes? Patients' experiences of compassion within nursing care and their perceptions of developing compassionate nurses	Journal of Clinical Nursing	167
Taylor C. (2016)	Examining Ways That a Mindfulness-Based Intervention Reduces Stress in Public School Teachers: a Mixed-Methods Study	Mindfulness	163

3.4 Keyword co-occurrence and conceptual structure

The supplied VOSviewer network contained three densely connected conceptual clusters. The red cluster was the field's educational and relational core, connecting empathy, compassion, mindfulness, teaching, curriculum, wellbeing, human, and clinical article. The green cluster represented learner and professional characteristics and psychological correlates, including female, male, young adult, middle aged, psychology, and health personnel attitude. The blue cluster contained burnout and professional burnout, positioned close to teaching, human, wellbeing, and psychology. Consistent with the interpretation of proximity and

link density in VOSviewer maps, this structure indicates that relational education and workforce wellbeing are strongly interdependent rather than separate research areas (Van Eck & Waltman, 2010).

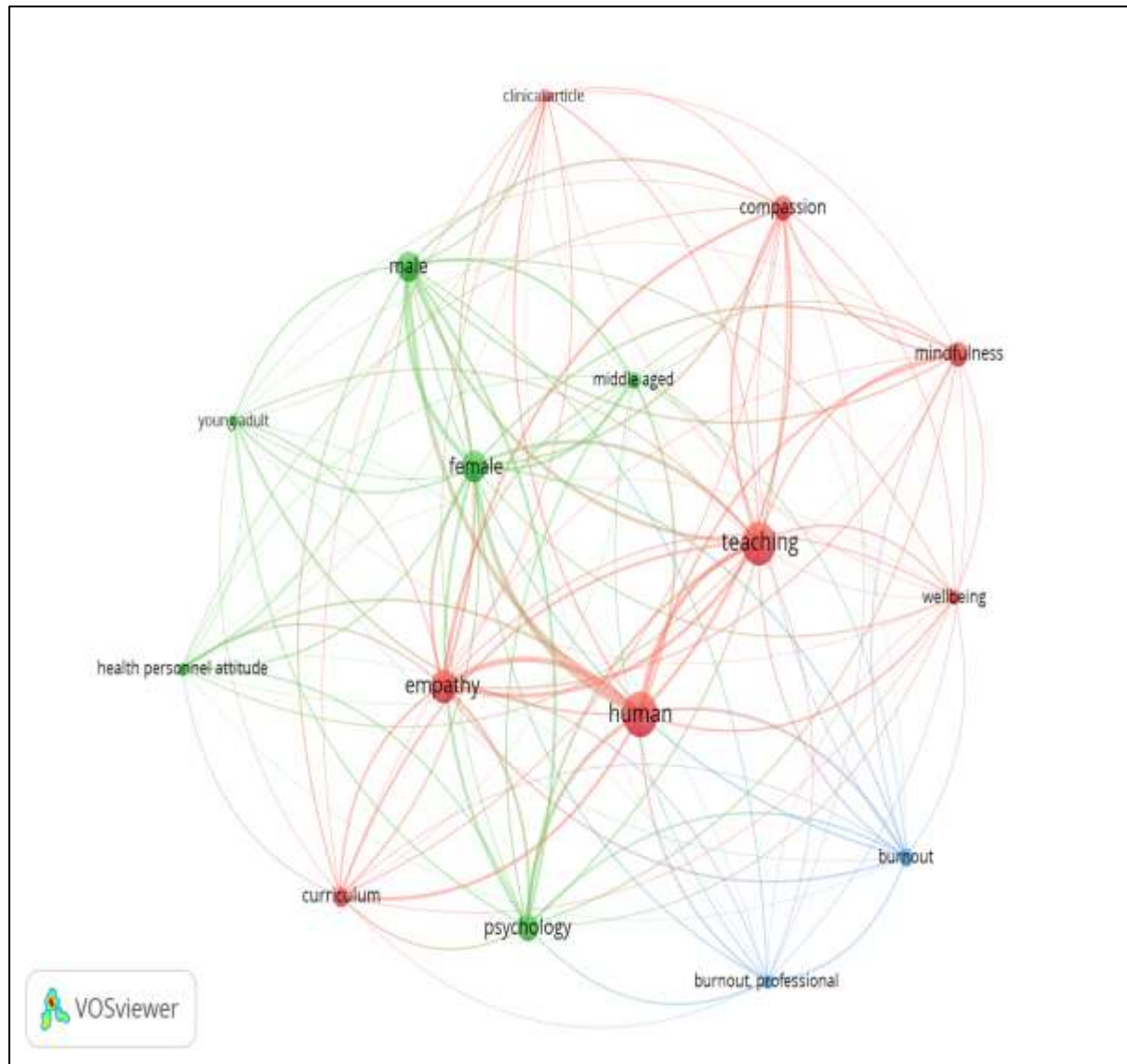


Figure 4. VOSviewer network visualisation of keyword co-occurrence in the supplied Scopus corpus.

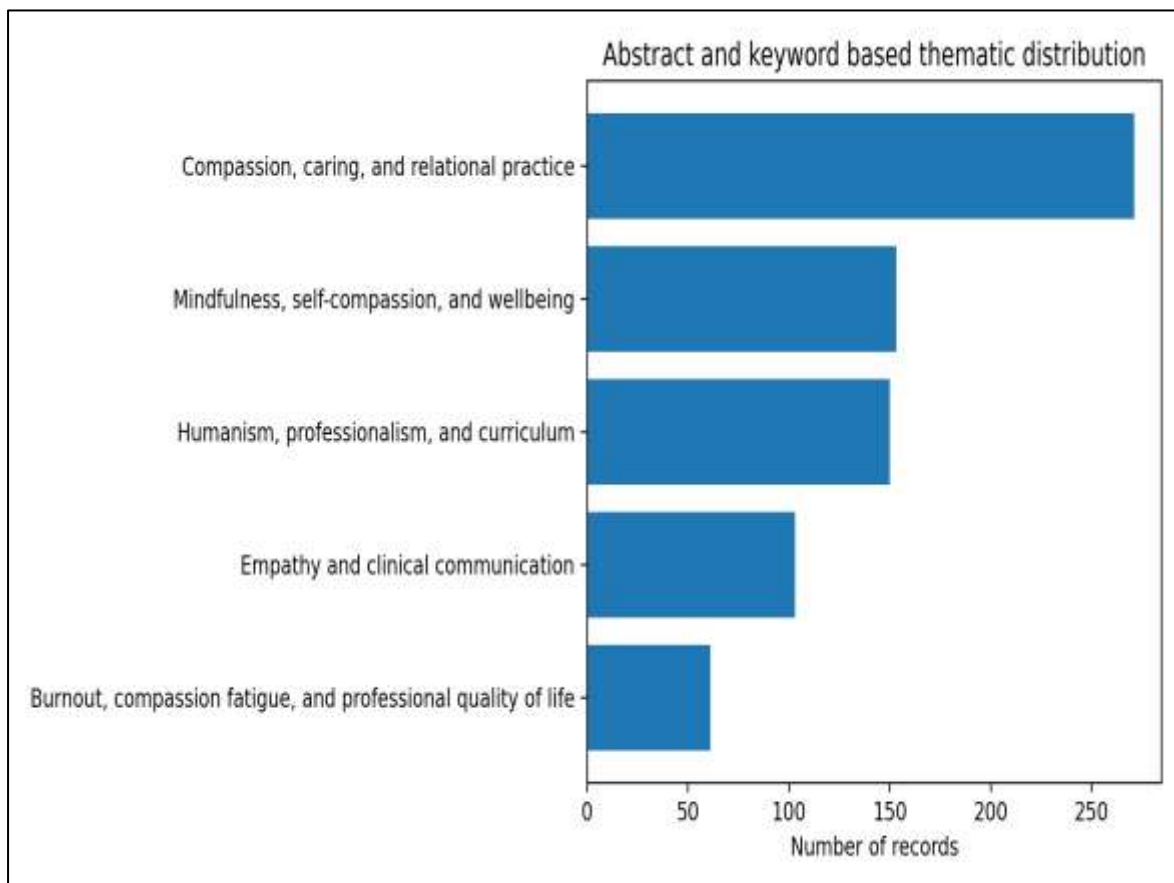
Table 6. Conceptual clusters represented in the VOSviewer network

Cluster	VOSviewer colour	Interpretive label	Leading keywords shown in the network
1	Red	Humanistic education, relational competence, and contemplative pedagogy	Empathy; compassion; mindfulness; teaching; curriculum; wellbeing; human; clinical article
2	Green	Learner and professional characteristics with psychological correlates	Female; male; young adult; middle aged; psychology; health personnel attitude
3	Blue	Occupational strain and professional burnout	Burnout; burnout, professional

The rule-based abstract and keyword classification provided a complementary field-level view. Compassion, caring, and relational practice formed the largest domain, followed by humanism, professionalism, and curriculum. Mindfulness and self-compassion generated the highest citation total, reflecting the influence of intervention research on stress reduction and professional wellbeing (Beaumont et al., 2016; Craigie et al., 2016; Mahon et al., 2017; Shapiro et al., 2007; Torres et al., 2021; Zúñiga et al., 2024).

Table 7. Abstract and keyword based thematic domains

Thematic domain	N	%	Mean year	Citations
Compassion, caring, and relational practice	271	36.7%	2019.1	4500
Mindfulness, self-compassion, and wellbeing	153	20.7%	2020.8	4998
Humanism, professionalism, and curriculum	150	20.3%	2016.3	2426
Empathy and clinical communication	103	14.0%	2018.6	2036
Burnout, compassion fatigue, and professional quality of life	61	8.3%	2021.8	1255


Figure 5. Distribution of abstract and keyword based thematic domains.

3.5 Characteristics of the 40 included empirical journal studies

The focused systematic review included 40 empirical journal studies published from 2010 to 2026. The yearly distribution was 2010: 1, 2014: 1, 2016: 4, 2017: 2, 2018: 3, 2019: 2, 2020: 3, 2021: 5, 2022: 4, 2023: 2, 2024: 6, 2025: 4, 2026: 3. The studies ranged from small qualitative investigations with 10 participants to a cross-sectional survey involving 1,701 students. Designs included randomised and quasi-experimental trials, mixed-method programme evaluations, qualitative interviews and focus groups, cross-sectional correlational surveys, and feasibility studies. Medical education, nursing education, allied-health education, residency training, and professional-development contexts were all represented.

Table 8. Characteristics and findings of the 40 empirical journal studies included in the systematic review

No.	APA-style reference	Two keywords	Research design	Sampling and sample size	Location	Instrument(s) used	Principal results
1	Didaskalu, P., Barton, C., Ling, D., Harrison, J., Leech, M., & Hassed, C. (2026). Feasibility of a compulsory online compassion training module in final year medical student curriculum. <i>BMC Medical Education</i> , 26(1), Article 69. https://doi.org/10.1186/s12909-025-08220-5	Compassion training; medical curriculum	Survey-based mixed-method educational evaluation	306 final-year medical students	Australia, Monash University	Ten Likert-scale evaluation items and open-ended survey responses	Students rated the compulsory asynchronous module positively, valued its flexible format and practical strategies, and reported more favourable attitudes towards compassion. Some requested face-to-face elements.
2	Jazan, H.F., & Mohammed, S.H. (2026). Cultivating Compassion and Reducing Depersonalization through Mindfulness-Based Cognitive Therapy in Critical Care Nurses. <i>Medical Forum Monthly</i> , 37(3), 93-98. https://doi.org/10.60110/medforum.370319	Mindfulness-based cognitive therapy; depersonalisation	Randomised quasi-experimental pretest-posttest study	88 critical-care nurses, intervention n=43 and control n=45	Karbala, Iraq	Maslach Burnout Inventory depersonalisation subscale	Eight weeks of MBCT reduced depersonalisation by 54.1% in the intervention group, with a large between-group effect, while the control group remained essentially unchanged.
3	Mehta, A., Yanez-Fox, L., Shah, N., Katzman, J., Garcia-Filion, P., & Silverman, H. (2026). Impact of improvisational theatre training on the resiliency of medical students: a mixed-methods study. <i>Academic Medicine</i> , 101(4), 438-446. https://doi.org/10.1093/academic/wvaf079	Improvisational theatre; resilience	Longitudinal mixed-method curriculum evaluation	108 consented first-year medical students; 84 completed all instruments	United States, University of Arizona College of Medicine-Phoenix	IUS-12, Self-Compassion Scale, Connor-Davidson Resilience Scale, debrief feedback and reflective writing	Self-compassion improved significantly across four sessions. Resilience and uncertainty tolerance did not change significantly, although qualitative feedback indicated generally positive effects.
4	Gutiérrez-Carmona, A., Valdivia-Rojas, Y., Garollo Piran, C., Segovia Vega, C., Ortega Galán, Á., & Ruiz-Fernández, M.D. (2025). Nursing students' experience in clinical simulation with a simulated patient: application of a compassionate approach in briefing and debriefing; [experiencia de estudiantes de enfermería en simulación clínica con paciente simulado: aplicación de un enfoque compasivo en briefing y debriefing]. <i>Horizonte de Enfermería</i> , 36(1), 49-71. https://doi.org/10.7764/Horiz_Enferm.36.1.49-71	Compassionate simulation; nursing students	Exploratory qualitative study	10 nursing students	Chile, University of Antofagasta	Semi-structured interviews and qualitative content analysis	Compassionate briefing and debriefing reduced perceived anxiety and stress, improved emotional preparation, and strengthened communication, empathy, reflection and self-efficacy.
5	Nowell, L., Johnston, S., Dolan, S., Jacobsen, M., Lorenzetti, D.L., & Oddone	Virtual caring;	Sequential explanatory	82 survey participants and 8	Online multi-profession	Cross-sectional online	Educators used reflection, modules, discussion boards,

No.	APA-style reference	Two keywords	Research design	Sampling and sample size	Location	Instrument(s) used	Principal results
	Paolucci, E. (2025). Exploring Educators' Perceptions and Experiences of Online Teaching to Foster Caring Profession Students' Development of Virtual Caring Skills: Sequential Explanatory Mixed Methods Study. <i>JMIR Nursing</i> , 8(1), Article e64548. https://doi.org/10.2196/64548	online teaching	mixed methods	interview participants from education, medicine, nursing and social work	sample, led from Canada	survey and individual semi-structured interviews	demonstrations and client consultation. Time, weak curricula and technology access were barriers, while clear objectives, support and interaction facilitated caring skills.
6	Yi, S., Cao, X., Wang, X., & Zhang, Q. (2025). Comparing Narrative and Visual Arts for Empathy Enhancement in Nursing Postgraduate Education: A Mixed Method Study. <i>Journal of Continuing Education in Nursing</i> , 56(2), 78-84. https://doi.org/10.3928/00220124-20250121-08	Arts-based education; empathy	Quasi-experimental mixed-method comparative study	27 in-service postgraduate nurses, narrative arts n=14 and visual arts n=13	China	Pre/post empathy, professional quality of life and psychological-questionnaires, plus qualitative feedback	Narrative arts increased resilience but also secondary traumatic stress. Visual arts improved compassion satisfaction and offered a calming experience. Both approaches were viewed as useful.
7	Zebardast, A., Nateghian, N., & Shakerinia, I. (2025). The Effect of Mindfulness-based Self-compassion Training on Nurses' Anger Management, Spiritual Well-being, and Job Involvement. <i>Journal of Client-Centered Nursing Care</i> , 11(3), 237-248. https://doi.org/10.32598/JCCNC.11.3.649.1	Self-compassion; nurse wellbeing	Quasi-experimental pretest-posttest control-group study	26 nurses, intervention n=13 and control n=13	Rasht, Iran	Buss-Perry Aggression Questionnaire, Spiritual Well-Being Scale and Kanungo Job Involvement Questionnaire	Eight online sessions improved anger management, spiritual wellbeing and job involvement. Reported effect estimates were 33%, 19% and 23%, respectively.
8	Fopka-Kowalczyk, M.J. (2024). Compassion for others as perceived by medical and non-medical students: a content analysis. <i>Palliative Medicine in Practice</i> , 18(2), 66-74. https://doi.org/10.5603/comp.97783	Compassion concepts; pre-professional education	Qualitative content-analysis study	274 students, including 189 medical and 85 non-medical students	Poland, Nicolaus Copernicus University in Torun	Oral and written responses to structured questions, analysed through content analysis	Students often confused compassion with pity. Fear of judgement, perceived unprofessionalism and overinvolvement hindered compassionate action, indicating a need for explicit pre-graduate teaching.
9	Jaastad, T.A., Ueland, V., & Koskinen, C. (2024). Becoming a Caring Nurse Through Reflection in a Role-Playing Simulation. <i>International Journal for Human Caring</i> , 28(3), 155-163. https://doi.org/10.20467/IJHC-2022-0041	Role-play simulation; caring	Qualitative content-analysis study	43 undergraduate nursing students	Norway	Individual written reflections after role-play simulation	Reflection connected caring theory with experience, encouraged vulnerability and responsibility, and supported compassionate relationships with patients.
10	Janes, E., Gibbons, C., Gyane, S., Irons, C., & Wilson, M. (2024). Experiences of a newly	Compassion-focused intervention; trainee	Qualitative process-evaluation study	19 trainee mental-health professionals	England, United Kingdom	In-depth semi-structured interviews	The brief intervention was perceived as helpful and prompted positive personal and professional

No.	APA-style reference	Two keywords	Research design	Sampling and sample size	Location	Instrument(s) used	Principal results
	developed brief compassion-focused intervention for Trainee mental health professionals – A qualitative study. SSM - Mental Health, 5, Article 100288. https://doi.org/10.1016/j.ssmmh.2023.100288	professionals				and thematic analysis	changes. Experiential content supported engagement, but workload and limited support obstructed implementation.
11	Tal-Saban, M., Biran, S., Fogel-Grinvald, H., & Golos, A. (2024). The Effect of a Mindfulness Course on Self-Compassion Among Occupational Therapy Students. Mindfulness, 15(10), 2622-2631. https://doi.org/10.1007/s12671-024-02444-0	Mindfulness course; self-compassion	Comparative pretest-posttest correlational study	106 first-year occupational-therapy students across three cohorts	Israel	Kentucky Inventory of Mindfulness Skills and Self-Compassion Scale	Mindfulness and self-compassion scores increased after the mandatory course. Improvements were strongest for observing, accepting and overall self-compassion.
12	White, K.A., Ruth-Sahd, L.A., & Slota, P. (2024). Relationship between Self-Directed Learning, Grit, and Compassionate Teaching in Doctoral Nursing Education. Nurse Educator, 49(1), 13-18. https://doi.org/10.1097/NE.0000000000001470	Compassionate teaching; doctoral nursing	Mixed-method survey and interview study	227 Doctor of Nursing Practice graduates	United States	Online survey and qualitative interviews	Compassionate teaching showed a weak positive relationship with grit and a weak-to-moderate relationship with self-directedness. Students valued fair treatment, relationship building and kind but critical feedback.
13	Zúñiga, D., Echeverría, G., Nitsche, P., Pedrals, N., Rigotti, A., Sirhan, M., Puschel, K., & Bitran, M. (2024). Caring for faculty: Results of a self-care online program for health professions educators; [Cuidando al profesorado: resultados de un programa a distancia de autocuidado para educadores de profesiones de la salud]. Educacion Medica, 25(1), Article 100871. https://doi.org/10.1016/j.edumed.2023.100871	Faculty self-care; online learning	Quantitative pretest-posttest programme evaluation	120 health-professions educators from two cohorts	Chile	Measures of burnout, mindfulness, psychosocial wellbeing, vitality and affectivity	A five-week online programme reduced emotional exhaustion and improved wellbeing, dispositional mindfulness and self-regulation, with generally consistent effects across sex, profession and cohort.
14	Awadallah, N.S., Jones, T.S., Christian, N., Fainstad, T., Nyquist, J., Schreiber, J., Fung C.-C., Rumack, C.M., Nehler, M., & Jaiswal, K.R. (2023). Proactive Coaching in General Surgery Internship: Incorporating Well-being Practices into Resident Professional Life. Journal of Surgical Education, 80(2), 177-184. https://doi.org/10.1016/j.j surg.2022.09.021	Coaching; resident wellbeing	Mixed-method programme evaluation	32 general-surgery interns; survey n=19 and commitment-to-act narratives n=22	United States, university-based surgical residency	End-of-program survey and commitment-to-act statements	Most respondents said coaching supported their goals and wellbeing. Mindfulness, gratitude and self-compassion strategies became prominent elements of participants' professional plans.
15	Uzen Cura, & Atay, S. (2023). Correlation	Mindfulness; compassion	Descriptive-correlational	347 nursing students	Turkey	Mindful Attention	Mindfulness was positively related to

No.	APA-style reference	Two keywords	Research design	Sampling and sample size	Location	Instrument(s) used	Principal results
	between mindfulness, empathy and compassion levels of nursing students: A cross-sectional study. Archives of Psychiatric Nursing, 42, 92-96. https://doi.org/10.1016/j.apnu.2022.12.017		cross-sectional study			Awareness Scale, Basic Empathy Scale and Compassion Scale	compassion but not to total or cognitive empathy, and was negatively related to emotional empathy. The authors recommended explicit integration into nursing education.
16	Durkin, M., Gurbutt, R., & Carson, J. (2022). Effectiveness of an online short compassion strengths course on nursing students compassion: A mixed methods non-randomised pilot study. Nurse Education Today, 111, Article 105315. https://doi.org/10.1016/j.nedt.2022.105315	Compassion strengths; online learning	Non-randomised mixed-method pilot study	67 first-year nursing students, online n=33 and on-site n=34	North-west England, United Kingdom	Bolton Compassion Strengths Indicator and reflective accounts	The on-site course produced significantly higher compassion-strength scores than the online format, whose participants did not complete the course. Delivery mode and engagement were decisive.
17	Everitt-Reynolds, A., Treacy, J., Murphy, E., & Colwell, M. (2022). Compassion within an academic setting: Experiences of student nurses. Nurse Education Today, 109, Article 105241. https://doi.org/10.1016/j.nedt.2021.105241	Academic compassion; nursing education	Qualitative descriptive focus-group study	32 student nurses	United Kingdom	Digitally recorded focus groups and thematic analysis	Students described predominantly positive experiences of compassion but requested more formal curricular space and supportive relationships within academic programmes.
18	Pearson, M. (2022). Learning about compassion during midwifery education: exploring student midwives' perspectives. British Journal of Midwifery, 30(8), 444-449. https://doi.org/10.12968/bjom.2022.30.8.444	Midwifery education; compassion learning	Three-phase mixed-method study	24 free-writing participants, 81 questionnaire responses and 16 focus-group participants	United Kingdom	Free-writing exercise, self-completion questionnaire and focus-group interviews	Formal study increased understanding of compassion, while placements reinforced learning. Compassion developed through both planned curriculum and informal professional experience.
19	Zdun-Ryżewska, A., Sobczak, K., & Rudnik, A. (2022). Fatigue, Pro-Social Attitude and Quality of Life as Predictors of Empathy in Medical and Social-Oriented Students. International Journal of Environmental Research and Public Health, 19(23), Article 15853. https://doi.org/10.3390/ijerph192315853	Empathy predictors; student wellbeing	Large cross-sectional regression study	1,701 medical and social-oriented university students	Poland	EQ-40, Chalder Fatigue Questionnaire, Perceived Stress Scale and self-designed quality-of-life and prosocial measures	Higher quality of life and pleasure in helping predicted empathy, whereas fatigue and inflated social self-esteem predicted lower empathy. Medical students reported greater exhaustion.
20	Guo M.-M., Kang F.-Y., Yang Y.-J., & Liu X.-F. (2021). The application modified mindful self-compassion (MSC) training program for master of nursing specialist; [改良版正念自我同情训练在护理硕士专业学位研究生中的应用].	Mindful self-compassion; graduate nursing	Pretest-posttest educational intervention	66 master's nursing students	Shanxi Province, China	Chinese version of the Self-Compassion Scale	Eight weeks of modified mindful self-compassion training significantly improved total self-compassion and every measured dimension.

No.	APA-style reference	Two keywords	Research design	Sampling and sample size	Location	Instrument(s) used	Principal results
	Chinese Journal of Nursing Education, 18(8), 690-694. https://doi.org/10.3761/j.issn.1672-9234.2021.08.004						
21	Laughey, W.F., Atkinson, J., Craig, A.M., Douglas, L., Brown, M.E., Scott, J.L., Alberti, H., & Finn, G.M. (2021). Empathy in Medical Education: Its Nature and Nurture — a Qualitative Study of the Views of Students and Tutors. <i>Medical Science Educator</i> , 31(6), 1941-1950. https://doi.org/10.1007/s40670-021-01430-8	Clinical empathy; hidden curriculum	Constructivist qualitative interview study	13 senior medical students and 9 tutors	United Kingdom	Individual interviews and thematic analysis	Empathy development depended on role modelling, assessment and hidden-curriculum experiences. Tick-box assessment and negative modelling threatened authenticity, while resilience and humanities-based approaches supported growth.
22	Laughey, W.F., Brown, M.E.L., Dueñas, A.N., Archer, R., Whitwell, M.R., Liu, A., & Finn, G.M. (2021). How medical school alters empathy: Student love and break up letters to empathy for patients. <i>Medical Education</i> , 55(3), 394-403. https://doi.org/10.1111/medu.14403	Empathic erosion; medical students	Qualitative creative-method study	20 medical students	United Kingdom	Forty love and breakup letters to empathy, followed by three focus groups	Students rejected scripted empathy, developed personal communication styles and experienced empathic burden. Negative role modelling and difficult-patient narratives contributed to erosion.
23	Torres, L.Á.P., Verdes-Montenegro-atalaya, J.C., Palazón, E.M., de Vinuesa, L.G., Valverde, F.J., Rodríguez, L.A., Lieter-Villajos, N., Bartolomé-Moreno, C., Moreno-Martos, H., García-Campayo, J., González-Santos, J., Rodríguez-Fernández, P., León-Delbarco, B., Soto-Cámara, R., González-Bernal, J.J., Zabala, L.B., Grande, T.G., & Moreno C.M.-V. (2021). Comparison of the effectiveness of an abbreviated program versus a standard program in mindfulness, self-compassion and self-perceived empathy in tutors and resident intern specialists of family and community medicine and nursing in Spain. <i>International Journal of Environmental Research and Public Health</i> , 18(8), Article 4340. https://doi.org/10.3390/ijerph18084340	Mindfulness; self-perceived empathy	Randomised controlled comparative trial	112 tutors and resident specialists from six teaching units	Spain	Five Facet Mindfulness Questionnaire, Self-Compassion Scale-short form and Jefferson Scale of Physician Empathy	The standard programme improved mindfulness and self-compassion, with self-compassion effects maintained at follow-up. The abbreviated programme was less effective.

No.	APA-style reference	Two keywords	Research design	Sampling and sample size	Location	Instrument(s) used	Principal results
24	Verdes-Montenegro-atalaya, J.C., Pérula-De Torres, L.Á., Lietor-Villajos, N., Bartolomé-Moreno, C., Moreno-Martos, H., Rodríguez, L.A., Grande-Grande, T., Pardo-Hernández, R., León-Delbarco, B., Santamaría-Peláez, M., Mínguez, L.A., González-Santos, J., Soto-Cámara, R., & González-Bernal, J.J. (2021). Effectiveness of a mindfulness and self-compassion standard training program versus an abbreviated training program on stress in tutors and resident intern specialists of family and community medicine and nursing in Spain. <i>International Journal of Environmental Research and Public Health</i> , 18(19), Article 10230. https://doi.org/10.3390/ijerph181910230	MBSR; occupational stress	Randomised controlled comparative trial	112 tutors and resident specialists from six teaching units	Spain	Perceived Stress Questionnaire at pretest, posttest and three-month follow-up	The standard eight-week programme significantly reduced stress at posttest. The abbreviated four-week programme did not show comparable effects, and gains were not fully maintained.
25	Filho, C.K.C., Meska, M.H.G., Machado, G.C.C., Franzone, J.C., Mano, L.Y., & Mazza, A. (2020). Empathy of nursing students in a simulated clinical activity; [Empatia de estudantes de enfermagem em atividade clínica simulada]; [Empatía de estudiantes de enfermería en actividad clínica simulada]. <i>Cogitare Enfermagem</i> , 25, 1-10. https://doi.org/10.5380/cogitare.v25i0.68142	Clinical simulation; empathy	Quantitative quasi-experimental pretest-posttest study	107 nursing students	São Paulo State, Brazil	Validated medium-fidelity simulation scenario and Empathy Inventory	Simulation improved cognitive empathy but did not substantially change affective empathy, suggesting that distinct empathy components may require different instructional methods.
26	Lin, Y.K., Yen-Ju Lin, B., & Chen D.-Y. (2020). Do teaching strategies matter? Relationships between various teaching strategies and medical students' wellbeing during clinical workplace training. <i>Medical Teacher</i> , 42(1), 39-45. https://doi.org/10.1080/0142159X.2019.1648777	Clinical teaching; student wellbeing	Longitudinal cohort survey with structural-equation modelling	87 medical students contributing 1,364 rotation responses	Taiwan, tertiary medical centre	Validated structured questionnaire on teaching strategies, burnout and compassion satisfaction	Inspiring strategies based on articulation, reflection and exploration reduced burnout and improved compassion satisfaction. Directing strategies reduced burnout but did not improve compassion satisfaction.
27	O'Riordan, S., O'Donoghue, K., & McNamara, K. (2020). Interventions to improve wellbeing among obstetricians and midwives at Cork University Maternity Hospital. <i>Irish</i>	Staff wellbeing; compassion fatigue	Pretest-posttest feasibility intervention	97 eligible staff; 40 baseline respondents and 13 follow-up respondents	Ireland, Cork University Maternity Hospital	Validated burnout, Professional Quality of Life and perceived-stress	Burnout scores decreased after self-care promotion, team bonding and debriefing activities, but low participation and poor attendance limited

No.	APA-style reference	Two keywords	Research design	Sampling and sample size	Location	Instrument(s) used	Principal results
	Journal of Medical Science, 189(2), 701-709. https://doi.org/10.1007/s11845-019-02098-1					questionnaires	feasibility and interpretation.
28	Durkin, M., Gurbutt, R., & Carson, J. (2019). Stakeholder perspectives of compassion in nursing: The development of the compassion strengths model; [利益关系人对同情式护理服务的观点:同情力量模型的发展.]. Journal of Advanced Nursing, 75(11), 2910-2922. https://doi.org/10.1111/jan.14134	Compassion strengths; nursing curriculum	Qualitative exploratory stakeholder study	34 nurse educators, students, registered nurses and service users	England, United Kingdom	Focus groups and semi-structured interviews with directed content and thematic analysis	Eight characteristics of compassionate nursing and five teaching themes informed the Compassion Strengths Model, which emphasised self-care, connection, communication, competence and engagement.
29	Vreeling, K., Kersemaekers, W., Cillessen, L., Van Dierendonck, D., & Speckens, A. (2019). How medical specialists experience the effects of a mindful leadership course on their leadership capabilities: A qualitative interview study in the Netherlands. BMJ Open, 9(12), Article e031643. https://doi.org/10.1136/bmjopen-2019-031643	Mindful leadership; medical specialists	Qualitative interview study	17 medical specialists	Netherlands, university medical centre	In-depth interviews analysed using grounded theory	A ten-week course increased self-awareness, self-regulation, openness, appreciation of others and more deliberate leadership behaviours grounded in mindfulness and compassion.
30	Rodrigues, N.P., Cohen, L.L., McQuarrie, S.C., & Reed-Knight, B. (2018). Burnout in Nurses Working With Youth With Chronic Pain: A Pilot Intervention. Journal of pediatric psychology, 43(4), 382-391. https://doi.org/10.1093/jpepsy/jsx132	Burnout intervention ; paediatric nursing	Single-group repeated-measures pilot intervention	33 paediatric nurses	United States, paediatric inpatient unit	Feasibility and acceptability measures, burnout, self-compassion and general-health outcomes	A tailored 90-minute group intervention was feasible and acceptable and improved self-care, self-compassion, general health and burnout, but not all empathic or patient-focused target behaviours.
31	Son, D., Shimizu, I., Ishikawa, H., Aomatsu, M., & Leppink, J. (2018). Communication skills training and the conceptual structure of empathy among medical students. Perspectives on Medical Education, 7(4), 264-271. https://doi.org/10.1007/s40037-018-0431-z	Communication skills; empathy	Retrospective pre/post survey with qualitative responses	295 fourth-year medical students from three universities	Japan	Jefferson Scale of Empathy, willingness-to-show-empathy items and open-ended responses	Willingness to behave empathically was more strongly associated with perspective taking than compassionate care. Students reported difficulty feeling compassion despite displaying empathic behaviours.
32	Verweij, H., Van Ravesteijn, H., Van Hooff, M.L.M., Lagro-Janssen, A.L.M., & Speckens, A.E.M. (2018). Does mindfulness training enhance the professional development of residents? A qualitative study. Academic Medicine, 93(9), 1335-1340.	Mindfulness; resident professionalism	Qualitative evaluation study	19 medical and surgical residents	Netherlands, Radboud University Medical Center	In-depth interviews and constant-comparison analysis	MBSR increased awareness, reflection, acceptance, resilience, self-care, communication, receptiveness to feedback and compassion for others.

No.	APA-style reference	Two keywords	Research design	Sampling and sample size	Location	Instrument(s) used	Principal results
	https://doi.org/10.1097/ACM.0000000000002260						
33	Mahon, M.A., Mee, L., Brett, D., & Dowling, M. (2017). Nurses' perceived stress and compassion following a mindfulness meditation and self compassion training. <i>Journal of Research in Nursing</i> , 22(8), 572-583. https://doi.org/10.1177/1744987117721596	Mindfulness meditation; nurse stress	Quasi-experimental pretest-posttest pilot	90 nurses at baseline and 64 matched posttest cases	Three university teaching hospitals, Ireland	Perceived Stress Scale and Compassion Scale	Perceived stress declined significantly and compassion increased after training. Six- and eight-week versions produced no significant difference.
34	Phillips, S.P., & Dalgarno, N. (2017). Professionalism, professionalization, expertise and compassion: a qualitative study of medical residents. <i>BMC Medical Education</i> , 17(1), 1-7. https://doi.org/10.1186/s12909-017-0864-9	Professional identity; compassion	Qualitative vignette-based study	21 first-year medical residents	Canada	Audio-recorded clinical vignette, written responses and thematic analysis	Residents supported compassion and self-care in principle but feared appearing weak. Informal modelling prioritised detachment and expertise over compassion, revealing tension between professionalism and professionalisation.
35	Beaumont, E., Irons, C., Rayner, G., & Dagnall, N. (2016). Does compassion-focused therapy training for health care educators and providers increase self-compassion and reduce self-persecution and self-criticism?. <i>Journal of Continuing Education in the Health Professions</i> , 36(1), 4-10. https://doi.org/10.1097/CEH.000000000000023	Compassion-focused therapy; educator development	Pretest-posttest workshop evaluation	28 healthcare educators and providers	United Kingdom	Self-Compassion Scale and Functions of Self-Criticising and Self-Attacking Scale	A three-day workshop increased self-compassion and reduced self-critical judgement, but did not significantly reduce self-persecution or self-correction.
36	Craigie, M., Slatyer, S., Hegney, D., Osseiran-Moisson, R., Gentry, E., Davis, S., Dolan, T., & Rees, C. (2016). A Pilot Evaluation of a Mindful Self-care and Resiliency (MSCR) Intervention for Nurses. <i>Mindfulness</i> , 7(3), 764-774. https://doi.org/10.1007/s12671-016-0516-x	Mindful self-care; nurse resilience	Single-group pretest-posttest-follow-up pilot	21 nurses	Western Australia, large teaching hospital	Standardised measures of compassion satisfaction, burnout, affect, stress, resilience, anxiety and secondary traumatic stress	The intervention improved compassion satisfaction, burnout, negative affect and stress. High burnout fell from 45% to 15%, although resilience, anxiety and secondary traumatic stress did not change.
37	Papadopoulos, I., Zorba, A., Koulouglioti, C., Ali, S., Aagard, M., Akman, O., Alpers L.-M., Apostolara, P., Biles, J., Martín-García, Á., González-Gil, T., Kouta, C., Krepinska, R., Kumar, B.N., Lesińska-Sawicka, M., Lopez, L., Malliarou, M., Nagórska, M., Nissim, S., Nortvedt, L., Oter-Quintana,	Compassion teaching; international nursing	International cross-sectional descriptive survey	1,323 nurses from 15 countries	International, 15 countries	International Online Compassion Questionnaire	Most respondents considered compassion very important and teachable, but only 26.8% believed education provided an adequate amount of compassion teaching. Managerial compassion was also reported as scarce.

No.	APA-style reference	Two keywords	Research design	Sampling and sample size	Location	Instrument(s) used	Principal results
	C., Ozturk, C., Pangilinan, S.B., Papp, K., Eldar Regev, O., Rubiano, F.O., Tolentino Diaz, M.Y., Tóthová, V., & Vasiliou, M. (2016). International study on nurses' views and experiences of compassion. <i>International nursing review</i> , 63(3), 395-405. https://doi.org/10.1111/inr.12298						
38	Runyan, C., Savageau, J.A., Potts, S., & Weinreb, L. (2016). Impact of a family medicine resident wellness curriculum: A feasibility study. <i>Medical Education Online</i> , 21(1), Article 30648. https://doi.org/10.3402/meo.v21.30648	Wellness curriculum; family-medicine residency	Single-group pretest-follow-up feasibility study	12 second-year family-medicine residents	United States	Measures of burnout, empathy, self-compassion and perceived stress	A one-month curriculum produced favourable trends in empathy, mindfulness and self-compassion and high satisfaction, although the small sample prevented strong statistical conclusions.
39	Bramley, L., & Matiti, M. (2014). How does it really feel to be in my shoes? Patients' experiences of compassion within nursing care and their perceptions of developing compassionate nurses. <i>Journal of Clinical Nursing</i> , 23(19-20), 2790-2799. https://doi.org/10.1111/jocn.12537	Patient perspectives; compassionate nursing	Qualitative exploratory descriptive study	10 hospital patients	United Kingdom, large teaching hospital	In-depth semi-structured interviews and thematic-network analysis	Patients described compassion as being known, given time and understood. Views were divided on whether compassion can be taught, but patient narratives were recommended for education.
40	Camp, C.L., Gregory, J.K., Lachman, N., Chen, L.P., Juskewitch, J.E., & Pawlina, W. (2010). Comparative efficacy of group and individual feedback in gross anatomy for promoting medical student professionalism. <i>Anatomical Sciences Education</i> , 3(2), 64-72. https://doi.org/10.1002/ase.142	Professionalism feedback; anatomy education	Comparative pretest-posttest educational study	49 first-year medical students	United States, Mayo Medical School	Weekly peer ratings of seven professionalism dimensions, written comments and individual or group feedback	Students receiving individual feedback showed stronger subsequent professionalism scores than those receiving group feedback, supporting personalised formative feedback.

3.6 Synthesis of empirical findings

3.6.1 Empathy and compassion are teachable but relationally fragile

Across medical, nursing, midwifery, pharmacy, occupational-therapy, and allied-health education, the evidence rejected a simple trait-based understanding of empathy and compassion. Learners' responses changed through teaching, simulation, reflection, clinical role modelling, and institutional experience. However, the direction of change depended on curricular authenticity. Communication-skills training could strengthen perspective taking without necessarily deepening compassionate feeling, and scripted assessment practices encouraged learners to perform empathy rather than inhabit it (Laughey, Atkinson, et al., 2021; Son et al., 2018).

Compassion was also frequently misunderstood. Medical and non-medical students sometimes equated it with pity, emotional weakness, overinvolvement, or lack of professionalism (Fopka-Kowalczyk, 2024). Residents similarly valued compassion while fearing that self-care or emotional openness would signal

weakness (Phillips & Dalgarno, 2017). These findings indicate that explicit conceptual teaching is required, particularly to distinguish empathy, compassion, pity, sympathy, and professional boundaries.

3.6.2 Arts, simulation, reflection, and dialogue support relational learning

Experiential pedagogies were consistently promising. Narrative and visual arts, patient stories, love and breakup letters, role-play, clinical simulation, reflective writing, and personalised feedback allowed learners to examine emotion, vulnerability, communication, and professional identity (Bramley & Matiti, 2014; Jaastad et al., 2024; Laughey, Brown, et al., 2021; Mehta et al., 2026; Yi et al., 2025). Art-based interventions improved resilience or compassion satisfaction among postgraduate nurses (Yi et al., 2025), while compassionate simulation reduced anxiety and strengthened empathy, communication, and self-efficacy (Gutiérrez-Carmona et al., 2025). Individual professionalism feedback in anatomy produced stronger behavioural improvement than group feedback (Camp et al., 2010).

The value of these strategies arose from structured reflection rather than exposure alone. Patient narratives and arts activities were most productive when they were linked to facilitated discussion, theoretical concepts, and opportunities to reinterpret professional assumptions (Bramley & Matiti, 2014; Gutiérrez-Carmona et al., 2025; Jaastad et al., 2024; Yi et al., 2025). This supports longitudinal pedagogies that move from conceptual clarification to practice, reflection, feedback, and clinical application.

3.6.3 Mindfulness and self-compassion support wellbeing and professional capacity

Mindfulness, mindful self-compassion, and compassion-focused training generally improved one or more outcomes related to stress, self-compassion, burnout, depersonalisation, self-criticism, emotional regulation, or compassion satisfaction (Beaumont et al., 2016; Craigie et al., 2016; Mahon et al., 2017; Tal-Saban et al., 2024; Zebardast et al., 2025). The most substantial effects appeared in structured programmes of sufficient duration. Eight-week programmes reduced stress or depersonalisation (Jazan & Mohammed, 2026; Torres et al., 2021; Verdes-Montenegro-Atalaya et al., 2021), and mindful self-care interventions lowered the proportion of nurses with high burnout (Craigie et al., 2016). By contrast, abbreviated or weakly supported programmes often produced weaker or less durable effects (Durkin et al., 2022; Torres et al., 2021; Verdes-Montenegro-Atalaya et al., 2021).

The evidence also showed that wellbeing interventions can affect professional practice. Residents reported better reflection, boundary setting, communication, openness to feedback, and compassion for others after mindfulness training (Verweij et al., 2018). Medical specialists described changes in leadership attitudes and behaviour (Vreeling et al., 2019), while surgical interns incorporated mindfulness, gratitude, and self-compassion into their professional plans after coaching (Awadallah et al., 2023). These findings position self-compassion as a professional resource rather than an individual indulgence.

3.6.4 Curriculum and organisational climate determine sustainability

Teaching methods operated within wider organisational conditions. Inspiring clinical teaching reduced burnout and increased compassion satisfaction (Lin et al., 2020), while underdeveloped curricula, limited technology, time pressure, low participation, and unsupportive role models constrained intervention effects (Durkin et al., 2022; Laughey, Atkinson, et al., 2021; Nowell et al., 2025; O'Riordan et al., 2020). International nursing evidence showed that most nurses considered compassion teachable, but relatively few believed their education provided adequate preparation (Papadopoulos et al., 2016). The gap between curricular aspiration and institutional practice was therefore a recurring theme.

A sustainable model requires vertical integration across preclinical teaching, clinical placements, postgraduate training, faculty development, and workforce support. Relational competence cannot be delegated to a single workshop if assessment, workload, and hidden curricula communicate conflicting values (Didaskalu et al., 2026; Laughey, Brown, et al., 2021; Pearson, 2022; Phillips & Dalgarno, 2017).

4. Discussion

4.1 Intellectual structure of the field

The bibliometric and systematic findings converge on a field organised around three mutually dependent concerns. The first is humanistic and relational education, represented by empathy, compassion, teaching, curriculum, and clinical practice. The second concerns psychological and demographic variation in learners and professionals. The third concerns burnout and occupational strain. The network was interpreted through VOSviewer principles of proximity and link strength (Van Eck & Waltman, 2010), and its structure aligns with empirical evidence that compassionate practice is linked to educational design and to the wellbeing of the person providing care (Lin et al., 2020; Uzen Cura & Atay, 2023; Zdun-Ryżewska et al., 2022).

The bibliometric record also shows a strong contemplative-science influence. Mindfulness and self-compassion studies generated substantial citation visibility and supplied practical interventions for stress, burnout, and emotional regulation (Craigie et al., 2016; Mahon et al., 2017; Shapiro et al., 2007; Torres et al., 2021). Nevertheless, the SLR indicates that wellbeing outcomes should not substitute for relational outcomes. A programme may reduce stress without improving empathy, or increase perspective taking

without strengthening compassionate action (Jazan & Mohammed, 2026; Son et al., 2018; Verdes-Montenegro-Atalaya et al., 2021). Future studies should therefore measure multiple levels of effect.

4.2 Implications for health professions education

First, empathy and compassion should be defined explicitly and revisited longitudinally. Learners need conceptual distinctions, behavioural models, and language for balancing emotional engagement with professional boundaries (Fopka-Kowalczyk, 2024; Phillips & Dalgarno, 2017). Second, curricula should combine experiential and dialogic methods. Arts, simulation, patient narratives, reflection, feedback, and coaching create opportunities to translate abstract values into observable practice (Awadallah et al., 2023; Bramley & Matiti, 2014; Camp et al., 2010; Gutiérrez-Carmona et al., 2025; Jaastad et al., 2024; Yi et al., 2025). Third, mindfulness and self-compassion should be framed as professional competencies related to ethical attention, self-regulation, and sustainable care (Tal-Saban et al., 2024; Verweij et al., 2018). Fourth, assessment should reward authentic listening, judgement, responsiveness, and reflection rather than scripted verbal markers of empathy (Laughey, Atkinson, et al., 2021; Son et al., 2018).

Faculty development is equally important. Educators and clinical supervisors transmit the hidden curriculum through their responses to distress, uncertainty, error, workload, and difficult patients (Laughey, Atkinson, et al., 2021; Laughey, Brown, et al., 2021; Phillips & Dalgarno, 2017). Institutions should align formal compassion curricula with staffing, feedback cultures, technology support, protected reflection time, and psychologically safe learning environments (Didaskalu et al., 2026; Nowell et al., 2025; O'Riordan et al., 2020; Zúñiga et al., 2024).

4.3 Research gaps and future agenda

The evidence base remains limited by small convenience samples, single-site studies, self-report scales, short follow-up periods, and inconsistent outcome definitions (Beaumont et al., 2016; Bramley & Matiti, 2014; Runyan et al., 2016; Vreeling et al., 2019). More multicentre randomised and longitudinal studies are needed, particularly in underrepresented regions. Studies should combine validated self-report measures with behavioural assessment, patient or simulated-patient ratings, observation, qualitative process data, and objective indicators of educational engagement.

Future research should examine mechanisms and boundary conditions. Important questions include whether self-compassion mediates the effect of mindfulness on empathic behaviour, how hidden curricula moderate formal teaching, whether arts and simulation interventions transfer to clinical encounters, and which programme duration and delivery mode produce durable outcomes (Laughey, Atkinson, et al., 2021; Torres et al., 2021; Verdes-Montenegro-Atalaya et al., 2021; Yi et al., 2025). Research should also evaluate potential adverse effects, including empathic burden, secondary traumatic stress, or disengagement when compassion training is compulsory (Didaskalu et al., 2026; Durkin et al., 2022; Laughey, Brown, et al., 2021; Yi et al., 2025).

5. Limitations

The bibliometric analysis was based on a single Scopus export and therefore reflects Scopus coverage, indexing practices, and the search strategy used by the author. The exact Scopus search expression was not embedded in the CSV export and must be inserted from the Scopus search history before submission. The VOSviewer interpretation was based on the supplied network image rather than the original map and network files, so total-link-strength statistics and threshold settings could not be independently recalculated. The abstract-based thematic classification was descriptive and rule-based. The focused SLR used 40 empirical journal articles selected for relevance and reporting completeness, but heterogeneity prevented meta-analysis. Some study characteristics were derived from abstracts and available article records, and reporting quality varied across publications.

6. Conclusion

Research on empathy, compassion, mindfulness, wellbeing, and burnout has developed into a substantial interdisciplinary field linking health professions education with contemplative practice, professional identity, and workforce sustainability. The bibliometric network shows that teaching and curriculum are tightly connected to empathy, compassion, mindfulness, wellbeing, and burnout. The systematic review demonstrates that relational capacities can be developed through arts, simulation, reflection, feedback, coaching, mindfulness, and compassion-focused education, but effects depend on duration, authenticity, role modelling, institutional support, and alignment with clinical culture. Health professions programmes should therefore embed relational competence and self-compassion longitudinally, assess them through multiple methods, and address organisational conditions that undermine humane practice.

References

1. Awadallah, N.S., Jones, T.S., Christian, N., Fainstad, T., Nyquist, J., Schreiber, J., Fung C.-C., Rumack, C.M., Nehler, M., & Jaiswal, K.R. (2023). Proactive Coaching in General Surgery Internship: Incorporating Well-being Practices into Resident Professional Life. *Journal of Surgical Education*, 80(2), 177-184. <https://doi.org/10.1016/j.jsurg.2022.09.021>
2. Beaumont, E., Irons, C., Rayner, G., & Dagnall, N. (2016). Does compassion-focused therapy training for health care educators and providers increase self-compassion and reduce self-persecution and self-criticism?. *Journal of Continuing Education in the Health Professions*, 36(1), 4-10. <https://doi.org/10.1097/CEH.0000000000000023>
3. Bramley, L., & Matiti, M. (2014). How does it really feel to be in my shoes? Patients' experiences of compassion within nursing care and their perceptions of developing compassionate nurses. *Journal of Clinical Nursing*, 23(19-20), 2790-2799. <https://doi.org/10.1111/jocn.12537>
4. Camp, C.L., Gregory, J.K., Lachman, N., Chen, L.P., Juskewitch, J.E., & Pawlina, W. (2010). Comparative efficacy of group and individual feedback in gross anatomy for promoting medical student professionalism. *Anatomical Sciences Education*, 3(2), 64-72. <https://doi.org/10.1002/ase.142>
5. Craigie, M., Slatyer, S., Hegney, D., Osseiran-Moisson, R., Gentry, E., Davis, S., Dolan, T., & Rees, C. (2016). A Pilot Evaluation of a Mindful Self-care and Resiliency (MSCR) Intervention for Nurses. *Mindfulness*, 7(3), 764-774. <https://doi.org/10.1007/s12671-016-0516-x>
6. Didaskalu, P., Barton, C., Ling, D., Harrison, J., Leech, M., & Hased, C. (2026). Feasibility of a compulsory online compassion training module in final year medical student curriculum. *BMC Medical Education*, 26(1), Article 69. <https://doi.org/10.1186/s12909-025-08220-5>
7. Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, 133, 285-296. <https://doi.org/10.1016/j.jbusres.2021.04.070>
8. Durkin, M., Gurbutt, R., & Carson, J. (2019). Stakeholder perspectives of compassion in nursing: The development of the compassion strengths model; [利益关系人对同情式护理服务的观点:同情力量模型的发展.]. *Journal of Advanced Nursing*, 75(11), 2910-2922. <https://doi.org/10.1111/jan.14134>
9. Durkin, M., Gurbutt, R., & Carson, J. (2022). Effectiveness of an online short compassion strengths course on nursing students compassion: A mixed methods non-randomised pilot study. *Nurse Education Today*, 111, Article 105315. <https://doi.org/10.1016/j.nedt.2022.105315>
10. Duarte, J., Pinto-Gouveia, J., & Cruz, B. (2016). Relationships between nurses' empathy, self-compassion and dimensions of professional quality of life: A cross-sectional study. *International Journal of Nursing Studies*, 60, 1-11. <https://doi.org/10.1016/j.ijnurstu.2016.02.015>
11. Everitt-Reynolds, A., Treacy, J., Murphy, E., & Colwell, M. (2022). Compassion within an academic setting: Experiences of student nurses. *Nurse Education Today*, 109, Article 105241. <https://doi.org/10.1016/j.nedt.2021.105241>
12. Filho, C.K.C., Meska, M.H.G., Machado, G.C.C., Franzon, J.C., Mano, L.Y., & Mazzo, A. (2020). Empathy of nursing students in a simulated clinical activity; [Empatia de estudantes de enfermagem em atividade clínica simulada]; [Empatía de estudiantes de enfermería en actividad clínica simulada]. *Cogitare Enfermagem*, 25, 1-10. <https://doi.org/10.5380/ce.v25i0.68142>
13. Fopka-Kowalczyk, M.J. (2024). Compassion for others as perceived by medical and non-medical students: a content analysis. *Palliative Medicine in Practice*, 18(2), 66-74. <https://doi.org/10.5603/pmp.97783>
14. Guo M.-M., Kang F.-Y., Yang Y.-J., & Liu X.-F. (2021). The application modified mindful self-compassion (MSC) training program for master of nursing specialist; [改良版正念自我同情训练在护理硕士专业学位研究生中的应用]. *Chinese Journal of Nursing Education*, 18(8), 690-694. <https://doi.org/10.3761/j.issn.1672-9234.2021.08.004>
15. Gutiérrez-Carmona, A., Valdivia-Rojas, Y., Garollo Piran, C., Segovia Vega, C., Ortega Galán, Á., & Ruiz-Fernández, M.D. (2025). NURSING STUDENTS' EXPERIENCE IN CLINICAL SIMULATION WITH A SIMULATED PATIENT: APPLICATION OF A COMPASSIONATE APPROACH IN BRIEFING AND DEBRIEFING; [EXPERIENCIA DE ESTUDIANTES DE ENFERMERÍA EN SIMULACIÓN CLÍNICA CON PACIENTE SIMULADO: APLICACIÓN DE UN ENFOQUE COMPASIVO EN BRIEFING Y DEBRIEFING]. *Horizonte de Enfermería*, 36(1), 49-71. https://doi.org/10.7764/Horiz_Enferm.36.1.49-71
16. Jaastad, T.A., Ueland, V., & Koskinen, C. (2024). Becoming a Caring Nurse Through Reflection in a Role-Playing Simulation. *International Journal for Human Caring*, 28(3), 155-163. <https://doi.org/10.20467/IJHC-2022-0041>
17. Janes, E., Gibbons, C., Gyane, S., Irons, C., & Wilson, M. (2024). Experiences of a newly developed brief compassion-focused intervention for Trainee mental health professionals – A qualitative study. *SSM - Mental Health*, 5, Article 100288. <https://doi.org/10.1016/j.ssmmh.2023.100288>

18. Jazan, H.F., & Mohammed, S.H. (2026). Cultivating Compassion and Reducing Depersonalization through Mindfulness-Based Cognitive Therapy in Critical Care Nurses. *Medical Forum Monthly*, 37(3), 93-98. <https://doi.org/10.60110/medforum.370319>
19. Kelly, L., Runge, J., & Spencer, C. (2015). Predictors of compassion fatigue and compassion satisfaction in acute care nurses. *Journal of Nursing Scholarship*, 47(6), 522-528. <https://doi.org/10.1111/jnu.12162>
20. Laughhey, W.F., Atkinson, J., Craig, A.M., Douglas, L., Brown, M.E., Scott, J.L., Alberti, H., & Finn, G.M. (2021). Empathy in Medical Education: Its Nature and Nurture — a Qualitative Study of the Views of Students and Tutors. *Medical Science Educator*, 31(6), 1941-1950. <https://doi.org/10.1007/s40670-021-01430-8>
21. Laughhey, W.F., Brown, M.E.L., Dueñas, A.N., Archer, R., Whitwell, M.R., Liu, A., & Finn, G.M. (2021). How medical school alters empathy: Student love and break up letters to empathy for patients. *Medical Education*, 55(3), 394-403. <https://doi.org/10.1111/medu.14403>
22. Lin, Y.K., Yen-Ju Lin, B., & Chen D.-Y. (2020). Do teaching strategies matter? Relationships between various teaching strategies and medical students' wellbeing during clinical workplace training. *Medical Teacher*, 42(1), 39-45. <https://doi.org/10.1080/0142159X.2019.1648777>
23. Mahon, M.A., Mee, L., Brett, D., & Dowling, M. (2017). Nurses' perceived stress and compassion following a mindfulness meditation and self compassion training. *Journal of Research in Nursing*, 22(8), 572-583. <https://doi.org/10.1177/1744987117721596>
24. Mehta, A., Yanez-Fox, L., Shah, N., Katzman, J., Garcia-Filion, P., & Silverman, H. (2026). Impact of improvisational theater training on the resiliency of medical students: a mixed-methods study. *Academic Medicine*, 101(4), 438-446. <https://doi.org/10.1093/acamed/wvaf079>
25. Nowell, L., Johnston, S., Dolan, S., Jacobsen, M., Lorenzetti, D.L., & Oddone Paolucci, E. (2025). Exploring Educators' Perceptions and Experiences of Online Teaching to Foster Caring Profession Students' Development of Virtual Caring Skills: Sequential Explanatory Mixed Methods Study. *JMIR Nursing*, 8(1), Article e64548. <https://doi.org/10.2196/64548>
26. O'Riordan, S., O'Donoghue, K., & McNamara, K. (2020). Interventions to improve wellbeing among obstetricians and midwives at Cork University Maternity Hospital. *Irish Journal of Medical Science*, 189(2), 701-709. <https://doi.org/10.1007/s11845-019-02098-1>
27. Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, 372, n71. <https://doi.org/10.1136/bmj.n71>
28. Papadopoulos, I., Zorba, A., Koulouglioti, C., Ali, S., Aagard, M., Akman, O., Alpers L.-M., Apostolara, P., Biles, J., Martín-García, Á., González-Gil, T., Kouta, C., Krepinska, R., Kumar, B.N., Lesińska-Sawicka, M., Lopez, L., Malliarou, M., Nagórska, M., Nissim, S., Nortvedt, L., Oter-Quintana, C., Ozturk, C., Pangilinan, S.B., Papp, K., Eldar Regev, O., Rubiano, F.O., Tolentino Diaz, M.Y., Tóthová, V., & Vasiliou, M. (2016). International study on nurses' views and experiences of compassion. *International nursing review*, 63(3), 395-405. <https://doi.org/10.1111/inr.12298>
29. Pearson, M. (2022). Learning about compassion during midwifery education: exploring student midwives' perspectives. *British Journal of Midwifery*, 30(8), 444-449. <https://doi.org/10.12968/bjom.2022.30.8.444>
30. Phillips, S.P., & Dalgarno, N. (2017). Professionalism, professionalization, expertise and compassion: a qualitative study of medical residents. *BMC Medical Education*, 17(1), 1-7. <https://doi.org/10.1186/s12909-017-0864-9>
31. Rodrigues, N.P., Cohen, L.L., McQuarrie, S.C., & Reed-Knight, B. (2018). Burnout in Nurses Working With Youth With Chronic Pain: A Pilot Intervention. *Journal of pediatric psychology*, 43(4), 382-391. <https://doi.org/10.1093/jpepsy/jsx132>
32. Roeser, R. W., Schonert-Reichl, K. A., Jha, A., Cullen, M., Wallace, L., Wilensky, R., Oberle, E., Thomson, K., Taylor, C., & Harrison, J. (2013). Mindfulness training and reductions in teacher stress and burnout: Results from two randomized, waitlist-control field trials. *Journal of Educational Psychology*, 105(3), 787-804. <https://doi.org/10.1037/a0032093>
33. Runyan, C., Savageau, J.A., Potts, S., & Weinreb, L. (2016). Impact of a family medicine resident wellness curriculum: A feasibility study. *Medical Education Online*, 21(1), Article 30648. <https://doi.org/10.3402/meo.v21.30648>
34. Shapiro, S.L., Brown, K.W., & Biegel, G.M. (2007). Teaching self-care to caregivers: Effects of mindfulness-based stress reduction on the mental health of therapists in training. *Training and Education in Professional Psychology*, 1(2), 105-115. <https://doi.org/10.1037/1931-3918.1.2.105>
35. Son, D., Shimizu, I., Ishikawa, H., Aomatsu, M., & Leppink, J. (2018). Communication skills training and the conceptual structure of empathy among medical students. *Perspectives on Medical Education*, 7(4), 264-271. <https://doi.org/10.1007/s40037-018-0431-z>

36. Tal-Saban, M., Biran, S., Fogel-Grinvald, H., & Golos, A. (2024). The Effect of a Mindfulness Course on Self-Compassion Among Occupational Therapy Students. *Mindfulness*, 15(10), 2622-2631. <https://doi.org/10.1007/s12671-024-02444-0>
37. Torres, L.Á.P., Verdes-Montenegro-atalaya, J.C., Palazón, E.M., de Vinuesa, L.G., Valverde, F.J., Rodríguez, L.A., Lietor-Villajos, N., Bartolomé-Moreno, C., Moreno-Martos, H., García-Campayo, J., González-Santos, J., Rodríguez-Fernández, P., León-Del-barco, B., Soto-Cámara, R., González-Bernal, J.J., Zabala, L.B., Grande, T.G., & Moreno C.M.-V. (2021). Comparison of the effectiveness of an abbreviated program versus a standard program in mindfulness, self-compassion and self-perceived empathy in tutors and resident intern specialists of family and community medicine and nursing in Spain. *International Journal of Environmental Research and Public Health*, 18(8), Article 4340. <https://doi.org/10.3390/ijerph18084340>
38. Uzen Cura, & Atay, S. (2023). Correlation between mindfulness, empathy and compassion levels of nursing students: A cross-sectional study. *Archives of Psychiatric Nursing*, 42, 92-96. <https://doi.org/10.1016/j.apnu.2022.12.017>
39. Van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, 84(2), 523-538. <https://doi.org/10.1007/s11192-009-0146-3>
40. Verdes-Montenegro-atalaya, J.C., Pérula-De Torres, L.Á., Lietor-Villajos, N., Bartolomé-Moreno, C., Moreno-Martos, H., Rodríguez, L.A., Grande-Grande, T., Pardo-Hernández, R., León-Del-barco, B., Santamaría-Peláez, M., Mínguez, L.A., González-Santos, J., Soto-Cámara, R., & González-Bernal, J.J. (2021). Effectiveness of a mindfulness and self-compassion standard training program versus an abbreviated training program on stress in tutors and resident intern specialists of family and community medicine and nursing in Spain. *International Journal of Environmental Research and Public Health*, 18(19), Article 10230. <https://doi.org/10.3390/ijerph181910230>
41. Verweij, H., Van Ravesteijn, H., Van Hooft, M.L.M., Lagro-Janssen, A.L.M., & Speckens, A.E.M. (2018). Does mindfulness training enhance the professional development of residents? A qualitative study. *Academic Medicine*, 93(9), 1335-1340. <https://doi.org/10.1097/ACM.0000000000002260>
42. Vreeling, K., Kersemaekers, W., Cillessen, L., Van Dierendonck, D., & Speckens, A. (2019). How medical specialists experience the effects of a mindful leadership course on their leadership capabilities: A qualitative interview study in the Netherlands. *BMJ Open*, 9(12), Article e031643. <https://doi.org/10.1136/bmjopen-2019-031643>
43. White, K.A., Ruth-Sahd, L.A., & Slota, P. (2024). Relationship between Self-Directed Learning, Grit, and Compassionate Teaching in Doctoral Nursing Education. *Nurse Educator*, 49(1), 13-18. <https://doi.org/10.1097/NNE.0000000000001470>
44. Yi, S., Cao, X., Wang, X., & Zhang, Q. (2025). Comparing Narrative and Visual Arts for Empathy Enhancement in Nursing Postgraduate Education: A Mixed Method Study. *Journal of Continuing Education in Nursing*, 56(2), 78-84. <https://doi.org/10.3928/00220124-20250121-08>
45. Zdun-Ryżewska, A., Sobczak, K., & Rudnik, A. (2022). Fatigue, Pro-Social Attitude and Quality of Life as Predictors of Empathy in Medical and Social-Oriented Students. *International Journal of Environmental Research and Public Health*, 19(23), Article 15853. <https://doi.org/10.3390/ijerph192315853>
46. Zebardast, A., Nateghian, N., & Shakerinia, I. (2025). The Effect of Mindfulness-based Self-compassion Training on Nurses' Anger Management, Spiritual Well-being, and Job Involvement. *Journal of Client-Centered Nursing Care*, 11(3), 237-248. <https://doi.org/10.32598/JCCNC.11.3.649.1>
47. Zúñiga, D., Echeverría, G., Nitsche, P., Pedrals, N., Rigotti, A., Sirhan, M., Puschel, K., & Bitran, M. (2024). Caring for faculty: Results of a self-care online program for health professions educators; [Cuidando al profesorado: resultados de un programa a distancia de autocuidado para educadores de profesiones de la salud]. *Educacion Medica*, 25(1), Article 100871. <https://doi.org/10.1016/j.edumed.2023.100871>

Acknowledgements

This publication is supported by Quest International University under the QIU Academic Publication Funding.

Conflict of Interest

The authors declare that there is no conflict of interest concerning the research, authorship, or publication of this study.