

eSupplement: Predictors of physician compassion, empathy and related constructs: a systematic review

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eSupplement 1: ECRC construct selection rationale

It has been recognised for some time that research on “compassion” substantially overlaps with studies of empathy, care, and other constructs¹. While most healthcare professionals are encouraged to practice with compassion specifically, it has been suggested that research specific to medical compassion is scarce, with the majority of studies focusing on compassion fatigue, empathy, and other related constructs such as kindness and patient-centred care². Making matters more complex is that such terms and constructs are often used interchangeably – conceptually as well as with respect to measurement. Braker³, for example, defines empathy as “the act of perceiving, understanding, experiencing, and responding to the emotional state and ideas of another person” (p.141) while Geer, Estupinan, and Manguno Mire⁴ define empathy as “the ability to perceive another person’s point-of-view, experience the emotions of another and behave compassionately” (p. 101), despite the fact that compassion is typically differentiated from empathy because of its focus on *actively* alleviating suffering⁵. Compassion and empathy, in particular, are similarly conflated in measurement with commonly-used measures such as the Jefferson Scale of Physician Empathy incorporating “Compassionate Care” as a subscale⁶.

Nevertheless, while a more restrictive review might be beneficial, the empirical overlap in studies suggests that only allowing reports including the term “compassion” would both misrepresent the state of the literature and preclude commentary on where prior studies are focused. Thus, to characterise the extent to which compassion versus related constructs has been the focus of research and to evaluate whether the factors predicting compassion versus constructs are similar or different, this review included both compassion and related constructs. In addition to compassion, studies included in the review looked at the factors that also predicted such constructs as compassionate care, empathy, empathetic or empathic concern, prosocial behaviours such as motivation or desire to help, patient-centred or person-centred care, caring behaviour, kindness, humanistic care and cynicism (a reverse construct defined as inability to understand and be moved by someone’s suffering, leading to inaction⁷).

The following constructs were excluded due to limited construct validity: compassion or empathy fatigue, sympathy; depersonalization (internal process); communication-related studies (e.g., patient-centred communication, empathic communication); doctor-patient relationships or therapeutic alliance; and confidence in providing compassionate care.

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eSupplement 2: Search strategies (24.04.2020) (N=total/deduplicated)

EMBASE (N=7142/3547), MEDLINE/PreMEDLINE (N=4324/4319), PsycINFO

(N=1009/654), OvidJournals (N=947/323), AMED (N=58/39) (OVID SP interface)

#	Search Statement
1	health personnel/ or case managers/ or medical staff/ or medical staff, hospital/ or hospitalists/ or personnel, hospital/ or general practitioners/ or health care personnel/ or advanced practice provider/ or care coordinator/ or clinician/ or health workforce/ or hospital personnel/ or medical personnel/ or paramedical personnel/ or medical staff/ or medical assistant/ or medical expert/ or medical registrar/ or medical specialist/ or medical staff/ or psychotherapist/ or health practitioner/ or health visitor/
2	nurses/ or nurse practitioners/ or family nurse practitioners/ or pediatric nurse practitioners/ or nurse specialists/ or nurse clinicians/ or nurse midwives/ or nurses, pediatric/ or nurses, neonatal/ or nursing staff/ or nursing staff, hospital/ or physicians/ or physicians, family/ or physicians, primary care/ or nurse anesthetists/ or nurse/ or advanced practice nurse/ or nursing assistant/ or nursing staff/ or case manager/ or expert nurse/ or first assistant/ or foreign nurse/ or licensed practical nurse/ or male nurse/ or nurse consultant/ or practical nurse/ or registered nurse/ or staff nurse/ or nurse specialist/ or clinical nurse specialist/ or neonatal nurse/ or nurse anesthetist/ or nurse midwife/ or oncology nurse/ or pediatric nurse/ or nurse practitioner/ or acute care nurse practitioner/ or adult nurse practitioner/ or emergency nurse practitioner/ or family nurse practitioner/ or gerontologic nurse practitioner/ or infection control practitioner/ or neonatal nurse practitioner/ or pediatric nurse practitioner/ or physician/ or hospital physician/ or physician assistant/ or female physician/ or foreign physician/ or emergency physician/ or occupational physician/ or osteopathic physician/
3	anesthetists/ or anesthesiologists/ or audiologists/ or dental staff/ or dental staff, hospital/ or dentists/ or nutritionists/ or occupational therapists/ or optometrists/ or physical therapists/ or allergists/ or cardiologists/ or dermatologists/ or endocrinologists/ or gastroenterologists/ or geriatricians/ or nephrologists/ or neurologists/ or occupational health physicians/ or oncologists/ or radiation oncologists/ or ophthalmologists/ or osteopathic physicians/ or otolaryngologists/ or pediatricians/ or neonatologists/ or physiatrists/ or pulmonologists/ or radiologists/ or rheumatologists/ or surgeons/ or neurosurgeons/ or orthopedic surgeons/ or urologists/ or andrologist/ or anesthesiologist/ or cardiologist/ or dermatologist/ or diabetologist/ or endocrinologist/ or epileptologist/ or gastroenterologist/ or general practitioner/ or geriatrician/ or gerontologist/ or gynecologist/ or hematologist/ or hepatologist/ or immunologist/ or infectious disease specialist/ or intensivist/ or internist/ or medical geneticist/ or neonatologist/ or

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5	<p>(physician? or doctor? or nurse? or clinician? or specialist? or practitioner? or hospital-personnel or health-care-personnel or healthcare-personnel or medical-staff or medical-resident? or advanced-practice-provider* or advanced-practice-professional? or care-coordinator* or allied-health-provider? or allied-health-personnel or allied-health-worker? or allied-health-staff or allied-health-employee? or clinical-associate? or health-personnel or medical-personnel or paramedic? or paramedical-professional? or paramedical-personnel or paramedical-worker? or paramedical-employee? or paramedical-staff? or paramedical-assistant? or registrar? or trainee-intern* or house-officer* or medical-officer? or case-manager* or midwif* or midwif* or</p>

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	healthcare-professional? or medical-professional? or health-care-professional? or consultant? or trainee? or intern? or resident? or student? or trainee-intern? or clinical-clerk? or medical-staff or healthcare-staff or hospital-staff or health-care-staff or hospital-staff or nursing-staff or medical-expert? or health-expert? or healthcare-expert? or health-care-expert? or medical-assistant? or healthcare-assistant or health-care-assistant or medical-worker? or health-worker? or healthcare-worker? or health-care-worker? or hospital-worker? or medical-employee? or health-employee? or healthcare-employee? or health-care-employee? or hospital-employee? or health-visitor or case-manager? or first-assistant? or nursing-assistant? or radiologist-assistant? or dental-personnel or dental-staff or dental-care-provider? or dental-care-professional? or dental-professional? or eye-care-professional? or eyecare-professional? or mid-level-provider? or non-physician-provider? or physician-extender?).ti,ab,kw.
6	(anesthetist? or anesthesiologist? or anaesthetist? or anaesthesiologist? or audiologist? or dental-staff or dentist? or hospitalist? or nursing-staff or nutritionist? or therapist? or optometrist? or allergist? or cardiologist? or dermatologist? or endocrinologist? or gastroenterologist? or geriatrician? or nephrologist? or neurologist? or oncologist? or ophthalmologist? or Otolaryngologist? or pediatrician? or paediatrician? or neonatologist? or physiatrist? or pulmonologist? or radiologist? or rheumatologist? or surgeon? or neurosurgeon? or urologist? or andrologist? or diabetologist? or gerontologist? or gynecologist? or gynaecologist? or haematologist? or hematologist? or hepatologist? or immunologist? or intensivist? or internist? or geneticist? or obstetrician? or pathologist? or phlebologist? or podiatrist? or vaccinologist? or orthotist? or prosthetist? or transplant-coordinator? or radiologist? or neuroradiologist? or roentgenologist? or rontgenologist? or radiographer? or radiotherapist? or neurosurgeon? or urogynecologist? or endoscopist? or bronchoscopist? or laparoscopist? or orthoptist? or orthopaedist? or orthopedist? or dietitian? or occupational-therapist? or occupational-therapy-assistant? or phlebotomist? or physiotherapist? or physiotherapist-assistant? or respiratory-therapist? or sonographer? or speech-language-pathologist?).ti,ab,kw.
7	or/1-6
8	empathy/ or compassion fatigue/
9	(compassion or compassionate or empathy or empathetic or empathic or compassion-fatigue or empathy-fatigue or motivation-to-help* or desire-to-help* or kindness or prosocial-attitude? or prosocial-behavior? or prosocial-behaviour? or prosocial-concern or prosocial-motivation).ti,kw.
10	or/8-9
11	(factor? or influenc* or affect* or hinder* or caus* or facilitator? or barrier? or antecedent* or precursor* or challenge? or impact* or

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	predict* or facilitat* or interfer* or foster* or enhanc* or increas* or enabl* or worsen* or decreas*).ti,ab,kw.
12	7 and 10 and 11
13	limit 12 to "humans only (removes records about animals)"

* Note, that after a pilot study of 500 records we shifted the focus of this review from broadly defined healthcare professionals to medical doctors only (excluding pharmacists and dentists – another broad categories) as it became apparent that the numbers of studies outlining factors that affect compassion and compassion-related constructs for all healthcare professionals would be too high (i.e., circa 900-1000 studies). Large number of studies can compromise the quality of the evidence synthesis (1). Therefore, we have decided to focus on qualified physicians only, with a parallel review focusing on medical students.

CINAHL (24.04.2021) (N=2160/1273)

S1

SU (empathy or compassion or caring or "compassion fatigue" or "empathy fatigue") OR TI (compassion or compassionate or empathy or empathetic or empathic or "compassion fatigue" or "empathy fatigue" or "motivation to help*" or "desire to help*" or kindness or "prosocial attitude?" or "prosocial behavior?" or "prosocial behaviour?" or "prosocial concern" or "prosocial motivation") OR MW (compassion or compassionate or empathy or empathetic or empathic or "compassion fatigue" or "empathy fatigue" or "motivation to help*" or "desire to help*" or kindness or "prosocial attitude?" or "prosocial behavior?" or "prosocial behaviour?" or "prosocial concern" or "prosocial motivation")

S2

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S3

TI (anesthetist? or anesthesiologist? or anaesthetist? or anaesthesiologist? or audiologist? or "dental staff" or dentist? or hospitalist? or "nursing staff" or nutritionist? or therapist? or optometrist? or allergist? or cardiologist? or dermatologist? or endocrinologist? or gastroenterologist? or geriatrician? or nephrologist? or neurologist? or oncologist? or ophthalmologist? or Otolaryngologist? or pediatrician? or paediatrician? or neonatologist? or physiatrist? or pulmonologist? or radiologist? or rheumatologist? or surgeon? or neurosurgeon? or urologist? or andrologist? or diabetologist? or gerontologist? or gynecologist? or gynaecologist? or haematologist? or hematologist? or hepatologist? or immunologist? or intensivist? or internist? or geneticist? or obstetrician? or pathologist? or phlebologist? or podiatrist? or vaccinologist? or orthotist? or prosthetist? or "transplant coordinator?" or radiologist? or neuroradiologist? or roentgenologist? or rontgenologist? or radiographer? or radiotherapist? or neurosurgeon? or urogynecologist? or endoscopist? or bronchoscopist? or laparoscopist? or orthoptist? or orthopaedist? or orthopedist? or dietitian? or "occupational therapist?" or "occupational therapy assistant?" or phlebotomist? or physiotherapist? or "physiotherapist assistant?" or "respiratory therapist?" or sonographer? or "speech language pathologist?" or physician? or doctor? or nurse? or clinician? or specialist? or practitioner? or "hospital

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personnel” or “health care personnel” or “healthcare personnel” or “medical staff” or “medical resident?” or “advanced practice provider*” or “advanced practice professional?” or “care coordinator*” or “allied health provider?” or “allied health personnel” or “allied health worker?” or “allied health staff” or “allied health employee?” or “clinical associate?” or “health personnel” or “medical personnel” or paramedic? or “paramedical professional?” or “paramedical personnel” or “paramedical worker?” or “paramedical employee?” or “paramedical staff?” or “paramedical assistant?” or “registrar?” or “trainee intern*” or “house officer*” or “medical officer?” or “case manager*” or midwiv* or midwif* or “healthcare professional?” or “medical professional?” or “health care professional?” or consultant? or trainee? or intern? or resident? or student? or “trainee intern?” or “clinical clerk?” or “medical staff” or “healthcare staff” or “hospital staff” or “health care staff” or “hospital staff” or “nursing staff” or “medical expert?” or “health expert?” or “healthcare expert?” or “health care expert?” or “medical assistant?” or “healthcare assistant” or “health care assistant” or “medical worker?” or “health worker?” or “healthcare worker?” or “health care worker?” or “hospital worker?” or “medical employee?” or “health employee?” or “healthcare employee?” or “health care employee?” or “hospital employee?” or “health visitor” or “case manager?” or “first assistant?” or “nursing assistant?” or “radiologist assistant?” or “dental personnel” or “dental staff” or “dental care provider?” or “dental care professional?” or “dental professional?” or “eye care professional?” or “eyecare professional?” or “mid level provider?” or “non physician provider?” or “physician extender?”) OR AB (anesthetist? 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S1 AND S2 AND S3

Limiters - English Language; Exclude MEDLINE records; Human;

Expanders - Apply equivalent subjects

Search modes - Boolean/Phrase

Cochrane Libraries (including CENTRAL) (N=453/90)

Last Saved: 24/04/2020 16:59:26

ID Search

- #1 MeSH descriptor: [Empathy] explode all trees
- #2 MeSH descriptor: [Compassion Fatigue] explode all trees
- #3 compassion or compassionate or empathy or empathetic or empathic or "compassion fatigue" or "empathy fatigue" or "motivation to help*" or "desire to help*" or kindness or "prosocial attitude?" or "prosocial behavior?" or "prosocial behaviour?" or "prosocial concern" or "prosocial motivation"
- #4 factor? or influenc* or affect* or hinder* or caus* or facilitator? or barrier? or antecedent* or precursor* or challenge? or impact* or predict* or facilitat* or interfer* or foster* or enhanc* or increas* or enabl* or worsen* or decreas*
- #5 anesthetist? OR anesthesiologist? OR anaesthetist? OR anaesthesiologist? OR audiologist? OR "dental staff" OR dentist? OR hospitalist? OR "nursing staff" OR nutritionist? OR therapist? OR optometrist? OR allergist? OR cardiologist? OR dermatologist? OR endocrinologist? OR gastroenterologist? OR geriatrician? OR nephrologist? OR neurologist? OR oncologist? OR ophthalmologist? OR Otolaryngologist? OR pediatrician? OR paediatrician? OR neonatologist? OR physiatrist? OR pulmonologist? OR radiologist? OR rheumatologist? OR surgeon? OR neurosurgeon? OR urologist? OR andrologist? OR diabetologist? OR gerontologist? OR gynecologist? OR gynaecologist? OR haematologist? OR hematologist? OR hepatologist? OR immunologist? OR intensivist? OR internist? OR geneticist? OR obstetrician? OR pathologist? OR phlebologist? OR podiatrist?

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OR vaccinologist? OR orthotist? OR prosthetist? OR “transplant coordinator?” OR radiologist? OR neuroradiologist? OR roentgenologist? OR rontgenologist? Or radiographer? OR radiotherapist? OR neurosurgeon? OR urogynecologist? OR endoscopist? OR bronchoscopist? OR laparoscopist? OR orthoptist? OR orthopaedist? OR orthopedist? OR dietitian? OR “occupational therapist?” OR “occupational therapy assistant?” OR phlebotomist? OR physiotherapist? OR “physiotherapist assistant?” OR “respiratory therapist?” OR sonographer? OR “speech language pathologist?” OR physician? OR doctor? OR nurse? OR clinician? OR specialist? OR practitioner? OR “hospital personnel” OR “health care personnel” OR “healthcare personnel” OR “medical staff” OR “medical resident?” OR “advanced practice provider*” OR “advanced practice professional?” OR “care coordinator*” OR “allied health provider?” OR “allied health personnel” OR “allied health worker?” OR “allied health staff” OR “allied health employee?” OR “clinical associate?” OR “health personnel” OR “medical personnel” OR paramedic? OR “paramedical professional?” OR “paramedical personnel” OR “paramedical worker?” OR “paramedical employee?” OR “paramedical staff?” OR “paramedical assistant?” OR “registrar?” OR “trainee intern*” OR “house officer*” OR “medical officer?” OR “case manager*” OR midwif* OR midwif* OR “healthcare professional?” OR “medical professional?” OR “health care professional?” OR consultant? OR trainee? OR intern? OR resident? OR student? OR “trainee intern?” OR “clinical clerk?” OR “medical staff” OR “healthcare staff” OR “hospital staff” OR “health care staff” OR “hospital staff” OR “nursing staff” OR “medical expert?” OR “health expert?” OR “healthcare expert?” OR “health care expert?” OR “medical assistant?” OR “healthcare assistant” OR “health care assistant” OR “medical worker?” OR “health worker?” OR “healthcare worker?” OR “health care worker?” OR “hospital worker?” OR “medical employee?” OR “health employee?” OR “healthcare employee?” OR “health care employee?” OR “hospital employee?” OR “health visitor” OR “case manager?” OR “first assistant?” OR “nursing assistant?” OR “radiologist assistant?” OR “dental personnel” OR “dental staff” OR “dental care provider?” OR “dental care professional?” OR “dental professional?” OR “eye care professional?” OR “eyecare professional?” OR “mid level provider?” OR “non physician provider?” OR “physician extender?”

#6 MeSH descriptor: [Health Personnel] this term only

#7 MeSH descriptor: [Case Management] explode all trees

#8 MeSH descriptor: [Medical Staff] this term only

#9 MeSH descriptor: [Medical Staff, Hospital] this term only

#10 MeSH descriptor: [Hospitalists] this term only

#11 MeSH descriptor: [Personnel, Hospital] this term only

#12 MeSH descriptor: [General Practitioners] this term only

#13 MeSH descriptor: [Nursing] explode all trees

#14 MeSH descriptor: [Nurses] explode all trees

#15 MeSH descriptor: [Physicians] explode all trees

#16 MeSH descriptor: [Health Personnel] explode all trees

#17 MeSH descriptor: [Students, Health Occupations] explode all trees

#18 MeSH descriptor: [Clinical Clerkship] this term only

#19 MeSH descriptor: [Internship and Residency] this term only

#20 MeSH descriptor: [Preceptorship] this term only

#21 #1 or #2 or #3

#22 #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20

#26 #4 and #21 and #22

PREDICTORS OF PHYSICIAN COMPASSION: A SYSTEMATIC REVIEW

Scopus (24.04.2020) (N=7481/1640)

((TITLE-ABS-KEY (anesthetist? OR anesthesiologist? OR anaesthetist? OR anaesthesiologist? OR audiologist? OR "dental staff" OR dentist? OR hospitalist? OR "nursing staff" OR nutritionist? OR therapist? OR optometrist? OR allergist? OR cardiologist? OR dermatologist? OR endocrinologist? OR gastroenterologist? OR geriatrician? OR nephrologist? OR neurologist? OR oncologist? OR ophthalmologist? OR otolaryngologist? OR pediatrician? OR paediatrician? OR neonatologist? OR physiatrist? OR pulmonologist? OR radiologist? OR rheumatologist? OR surgeon? OR neurosurgeon? OR urologist? OR andrologist? OR diabetologist? OR gerontologist? OR gynecologist? OR gynaecologist? OR haematologist? OR hematologist? OR hepatologist? OR immunologist? OR intensivist? OR internist? OR geneticist? OR obstetrician? OR pathologist? OR phlebologist? OR podiatrist? OR vaccinologist? OR orthotist? OR prosthetist? OR "transplant coordinator" OR radiologist? OR neuroradiologist? OR roentgenologist? OR rontgenologist? OR radiographer? OR radiotherapist? OR neurosurgeon? OR urogynecologist? OR endoscopist? OR bronchoscopist? OR laparoscopist? OR orthoptist? OR orthopaedist? OR orthopedist? OR dietitian? OR "occupational therapist" OR "occupational therapy assistant" OR phlebotomist? OR physiotherapist? OR "physiotherapist assistant" OR "respiratory therapist" OR sonographer? OR "speech language pathologist" OR physician? OR doctor? OR nurse? OR clinician? OR specialist? OR practitioner? OR "hospital personnel" OR "health care personnel" OR "healthcare personnel" OR "medical staff" OR "medical resident" OR "advanced practice provider" OR "advanced practice professional" OR "care coordinator" OR "allied health provider" OR "allied health personnel" OR "allied health worker" OR "allied health staff" OR "allied health employee" OR "clinical associate" OR "health personnel" OR "medical personnel" OR paramedic? OR "paramedical professional" OR "paramedical personnel" OR "paramedical worker" OR "paramedical employee" OR "paramedical staff" OR "paramedical assistant" OR registrar? OR "trainee intern" OR "house officer" OR "medical officer" OR "case manager" OR midwiv* OR midwif* OR "healthcare professional" OR "medical professional" OR "health care professional" OR consultant? OR trainee? OR intern? OR resident? OR student? OR "trainee intern" OR "clinical clerk" OR "medical staff" OR "healthcare staff" OR "hospital staff" OR "health care staff" OR "hospital staff" OR "nursing staff" OR "medical expert" OR "health expert" OR "healthcare expert" OR "health care expert" OR "medical assistant" OR "healthcare assistant" OR "health care assistant" OR "medical worker" OR "health worker" OR "healthcare worker" OR "health care worker" OR "hospital worker" OR "medical employee" OR "health employee" OR "healthcare employee" OR "health care employee" OR "hospital employee" OR "health visitor" OR "case manager" OR "first assistant" OR "nursing assistant" OR "radiologist assistant" OR "dental personnel" OR "dental staff" OR "dental care provider" OR "dental care professional" OR "dental professional" OR "eye care professional" OR "eyecare professional" OR "mid level provider" OR "non physician provider" OR "physician extender")) AND (TITLE (compassion OR compassionate OR empathy OR empathetic OR empathic OR "compassion fatigue" OR "empathy fatigue" OR "motivation to help" OR "desire to help" OR kindness OR "prosocial attitude" OR "prosocial behavior" OR "prosocial behaviour" OR "prosocial concern" OR "prosocial motivation") OR KEY (compassion OR compassionate OR empathy OR empathetic OR empathic OR "compassion fatigue" OR "empathy fatigue" OR "motivation to help" OR "desire to help" OR kindness OR "prosocial attitude" OR "prosocial behavior" OR "prosocial behaviour" OR "prosocial concern" OR "prosocial motivation"))) AND (TITLE-ABS-KEY (factor? OR influenc* OR affect* OR hinder* OR caus* OR facilitator? OR barrier? OR antecedent? OR precursor? OR

PREDICTORS OF PHYSICIAN COMPASSION: A SYSTEMATIC REVIEW

challenge? OR impact* OR predict* OR facilitat* OR interfer* OR foster* OR enhance* OR increase* OR enabl* OR worsen* OR decrease*)) AND (LIMIT-TO (LANGUAGE , "English"))

Web of Science (24.04.2020) (N=2062/756)

#7 AND #2	<i>Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years</i>
# 7	#6 AND #3 <i>Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years</i>
# 6	(TS=(compassion OR compassionate OR empathy OR empathetic OR empathic OR "compassion fatigue" OR "empathy fatigue" OR "motivation to help*" OR "desire to help"* OR kindness OR "prosocial attitude?" OR "prosocial behavior?" OR "prosocial behaviour?" OR "prosocial concern" OR "prosocial motivation")) AND LANGUAGE: (English) <i>Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years</i>
# 5	#4 AND #2 <i>Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years</i>
# 4	#3 AND #1 <i>Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years</i>
# 3	(TS=(anesthetist? OR anesthesiologist? OR anaesthetist? OR anaesthesiologist? OR audiologist? OR "dental staff" OR dentist? OR hospitalist? OR "nursing staff" OR nutritionist? OR therapist? OR optometrist? OR allergist? OR cardiologist? OR dermatologist? OR endocrinologist? OR gastroenterologist? OR geriatrician? OR nephrologist? OR neurologist? OR oncologist? OR ophthalmologist? OR Otolaryngologist? OR pediatrician? OR paediatrician? OR neonatologist? OR physiatrist? OR pulmonologist? OR radiologist? OR rheumatologist? OR surgeon? OR neurosurgeon? OR urologist? OR andrologist? OR diabetologist? OR gerontologist? OR gynecologist? OR gynaecologist? OR haematologist? OR hematologist? OR hepatologist? OR immunologist? OR intensivist? OR internist? OR geneticist? OR obstetrician? OR pathologist? OR phlebologist? OR podiatrist? OR vaccinologist? OR orthotist? OR prosthetist? OR "transplant coordinator" OR radiologist? OR neuroradiologist? OR roentgenologist? OR rontgenologist? OR radiographer? OR radiotherapist? OR neurosurgeon? OR urogynecologist? OR endoscopist? OR bronchoscopist? OR laparoscopist? OR orthoptist? OR orthopaedist? OR orthopedist? OR dietitian? OR "occupational therapist" OR "occupational therapy assistant" OR phlebotomist? OR physiotherapist? OR "physiotherapist assistant" OR "respiratory therapist" OR sonographer? OR "speech language pathologist" OR physician? OR doctor? OR nurse? OR clinician? OR specialist? OR practitioner? OR "hospital

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Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 2 (TS=(factor? OR influenc* OR affect* OR hinder* OR caus* OR facilitator? OR barrier? OR antecedent? OR precursor? OR challenge? OR impact* OR predict* OR facilitat* OR interfer* OR foster* OR enhance* OR increase* OR enabl* OR worsen* OR decrease*)) **AND LANGUAGE:** (English)
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years
- # 1 (TI=(compassion OR compassionate OR empathy OR empathetic OR empathic OR "compassion fatigue" OR "empathy fatigue" OR "motivation to help*" OR "desire to help"* OR kindness OR "prosocial attitude?" OR "prosocial behavior?" OR "prosocial behaviour?" OR "prosocial concern" OR "prosocial motivation")) **AND LANGUAGE:** (English)
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI Timespan=All years

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ProQuest databases (24.04.2020) (N=2916/1522):

((((ti(compassion OR compassionate OR empathy OR empathetic OR empathic OR "compassion fatigue" OR "empathy fatigue" OR "motivation to help*" OR "desire to help*" OR kindness OR "prosocial attitude?" OR "prosocial behavior?" OR "prosocial behaviour?" OR "prosocial concern" OR "prosocial motivation") OR MESH.EXACT(compassion OR empathy OR "compassion fatigue"))) AND (noft(anesthetist? OR anesthesiologist? OR anaesthetist? OR anaesthesiologist? OR audiologist? OR "dental staff" OR dentist? OR hospitalist? OR "nursing staff" OR nutritionist? OR therapist? OR optometrist? OR allergist? OR cardiologist? OR dermatologist? OR endocrinologist? OR gastroenterologist? OR geriatrician? OR nephrologist? OR neurologist? OR oncologist? OR ophthalmologist? OR Otolaryngologist? OR pediatrician? OR paediatrician? OR neonatologist? OR physiatrist? OR pulmonologist? OR radiologist? OR rheumatologist? OR surgeon? OR neurosurgeon? OR urologist? OR andrologist? OR diabetologist? OR gerontologist? 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OR influenc* OR affect* OR hinder* OR caus* OR facilitator? OR barrier? OR antecedent? OR precursor? OR challenge? OR impact* OR predict* OR facilitat* OR interfer* OR foster* OR enhance* OR increase* OR enabl* OR worsen* OR decrease*)) NOT la.exact("ENG"))

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ProQuest Databases searched:

- ProQuest Central
- ProQuest Dissertations and Global Theses: General, Social Sciences, Health & Medicine
- Health Research Primary Collection
- ERIC
- Nursing and Allied Healthcare Database
- Health and Medical Collection
- Research Library: General, Social Sciences, Health & Medicine
- Psychology Database
- Education Database
- Sociology Database
- Public Health Database
- Sociological Abstracts
- Social Services Abstracts
- IBSS
- PTSDpubs
- Social Science Database
- Consumer Health Database
- Healthcare Administration Database
- Australia & New Zealand Database
- Turkey Database
- Eastern Europe, Central Europe Database
- Middle East & Africa Database
- UK & Ireland Database
- India Database: General, Health & Medicine
- Latin America & Iberia Database
- GenderWatch

eSupplement 3: Extraction form data points

The following data points were collected via Qualtrics extraction forms.

General information	<ul style="list-style-type: none"> - Database - Author(s) - Source - Date of publication - Publication type - Study title - Study aim
Methodology	<ul style="list-style-type: none"> - Study type (e.g., quantitative/qualitative/mixed methods) - Research design (e.g. correlation/association study, exposure, RCT) - Quantitative design (e.g. cross-sectional, longitudinal) - Data type (e.g. self-report/survey, interview, participant observation, behavioural assessment) - Method of analysis (e.g. thematic analysis, discourse analysis, regression, analysis of variance) - Sampling method - Response rate - Missing data
Constructs	<ul style="list-style-type: none"> - Construct - Measurement/scale
Participants	<ul style="list-style-type: none"> - Participant type (e.g. physician, resident) - Number of participants/sample size - Gender representativeness (%female) - Ethnicity/race representativeness (%White) - Experience - Speciality - Patient type
Context	<ul style="list-style-type: none"> - Country - Multi-centre study - Primary/secondary or tertiary healthcare settings - Public or private institution - Urban or rural settings - Large/small/or medium hospital
Factors	<ul style="list-style-type: none"> - Physician factors - Environmental factors - Patient and family factors - Clinical factors

eSupplement 4: Risk of Bias and Quality Assessment.

Quantitative studies risk of bias

We used an adaptation of ROBINS-I because most of the ROBINS-I domains are congruent with other quality assessment tools for non-intervention studies (e.g. Quality Assessment Tool for Quantitative Studies – EPHPP⁸, Joanna Briggs Checklists⁹, CASP Checklist for Cohort studies¹⁰, NICE checklist for correlations and associations¹¹, STROBE checklist for cross-sectional/cohort studies¹²). Namely, we used the following domains - 1, 2, 5, 6, 7 - for analytical cross-sectional studies, and all the domains for observational exposure studies and longitudinal or timeseries studies where we replace intervention with the appropriate exposure (e.g., time, exogenous factors, other exposures). Based on an a priori review of the relevant literature, gender and experience have been considered potential confounds. Potential confounding effects from time-based confounding (in longitudinal studies) or co-interventions were also assessed. While the authors of ROBINS-I tool recommend having a target study (i.e., a hypothetical randomized trial) in mind before the assessment, we were not able to do so as we anticipated high variation in study designs, including studies that would not be classified as trials.

The ROBINS-I tool assesses the following domains¹³:

1. **Confounding bias:** Are there common causes of the outcome of interest and a confounder?
2. **Selection bias:** Were there any eligible participants that were excluded that could affect outcomes?
3. **Bias due to classification of intervention:** Is there a chance that the intervention status/exposure was misclassified?
4. **Bias due to deviations from intended interventions:** were there deviations from the intended intervention/exposure beyond what would be expected in usual practice? What about intervention adherence?
5. **Bias due to missing data:** Were there any important data missing? Were any participants excluded due to missing data on intervention/exposure status?
6. **Bias in measurement of outcomes:** Could the outcome measure have been influenced by knowledge of the intervention/exposure/outcome received by either assessors or the participants? Were measurements comparable between groups? Were any systematic errors in measurement of the outcome related to intervention/exposure received?
7. **Bias in selection of the reported result:** Is the reported effect estimate likely to be selected, on the basis of the results, from multiple measurements, analyses, or subgroups?

We classified a study as having a low risk of bias if all of the domains of the study outcome are associated with low risk. We classified a study as having a moderate risk of bias if all of the domains of the study outcome are associated with low or moderate risk. We classified a study as having a serious risk of bias if the study contains a serious risk of bias in at least one domain, and critical if the study contains a critical risk of bias in at least one domain. If there is no clear indication that the study is at serious or critical risk of bias and there is a lack of information in one or more domains of bias that is unlikely to seriously alter the results, we classified the study as having no information sufficient to make a judgement.

Qualitative studies risk of bias

We used the Critical Appraisal Skills Programme (CASP) quality assessment, to assess the risk of bias for qualitative studies¹⁴. Studies were given the weight of evidence (low, medium, high) based on (1) data collection, research design and implementation, and grounding of results in data (i.e. researcher reflexivity and accountability of personal bias, consistency and transparency assurance, verbatim narrative support of the findings), and (2) richness of data/analysis and privileging of the participants' explanatory models. Namely, the study was considered to have a low risk of bias when risk of bias was unclear, or could be evident in less than 2 domains; the study was considered to have a medium risk of bias when risk of bias was unclear, or could be evident in more than 2 but less than 4 domains; the study was considered to have a high risk of bias when risk of bias was unclear, or could be evident in more than 4 domains. Additionally, throughout the synthesis we kept in mind that different types of participants, and different contexts, could reflect differences in findings.

Data synthesis

Following data collection and the assessment of risk of bias, we used the framework thematic synthesis approach¹⁵ to analyse the data and synthesise the evidence. This approach can be characterised by synthesising the evidence according to a theoretical framework – here the TMPC – that we have selected a priori. The Cochrane Qualitative Review Methods Group recommends the framework thematic synthesis where the evidence is largely descriptive, rather than conceptual or already theorised.

Although many qualitative synthesis studies used purposive sampling strategy to deal with large quantities of data¹⁶, this systematic review strived to use the complete list of included works because our aim is also to quantify amount of literature per factor. In addition, using the TMPC framework helped in classifying the data. We were, however, sensitive to studies coherence and relevance in terms of construct (compassion vs related construct), context (physician seniority, speciality, patient type), as well as research design and risk of bias by applying GRADE-CERQual guidance¹⁷.

In application of the framework thematic synthesis, we used the following process. We first selected the framework during the protocol stage after brief familiarisation with data. After studying the framework in depth, all three review authors independently read the selected studies and iteratively applied the factors from selected studies onto the framework. During this process, the authors discussed the characteristics and the limits of each of the categories of the framework and created subcategories that emerged from the data. We have then created charts of the evidence, further rearranging the data according to framework (sub)categories by using Miro software. After the charting process, we independently mapped all the data via extraction tables. We then used the output tables for crystallization process. More precisely, being able to visualize the data within a framework allowed us to suspend the process of the detailed examination of the data, reflect on the final output of the analysis, and make final adjustments to the framework mapping¹⁸. We used the final synthesis to interpret the findings, describing the nature and the variability of the factors, and seeking associations between the framework themes in order to develop more robust explanations of the findings.

Although we considered a formal meta-analysis, establishing pooled effect measures for the factors affecting ECRC, we were not able to conduct such analyses because, with the exemption of gender, both the measures and the outcomes lacked coherence, while some

PREDICTORS OF PHYSICIAN COMPASSION: A SYSTEMATIC REVIEW

domains lacked data adequacy. However, we summarized the effect of the factors with regards to its direction and narratively. More precisely, positive or negative factors were grouped if these had a significant positive or negative effect ($p < 0.05$) or correlation (as defined by the authors of the study in question) with ECRC constructs, or when the factors were mentioned to have a positive or negative effect in qualitative studies. Factors mentioned in a study that did not show a significant effect ($p < 0.05$) or correlation, or factors that were explicitly mentioned as unimportant in qualitative studies were reported as factors with no effect. We have only reported significant effects if these remained after authors' specified controls/confounders have been taken into account. For qualitative studies, we have only used the data from direct quotes (descriptive data), rather than interpretations by the study authors¹⁹ to ensure we are only using 'first order constructs' or direct experiences and participants own interpretations of the environments²⁰.

Subgroup analysis

We have initially planned to implement a subgroup analysis of healthcare professionals by speciality and level of experience. However, due to low coherence of results and missing data, the subgroup analysis was not feasible.

Assessment of confidence in the synthesis findings

The Grades of Recommendation, Assessment, Development, and Evaluation -Confidence in the Evidence from Qualitative Reviews (GRADE-CERQual or CERQual) approach^{15, 17} was applied to assess confidence in the review findings. Each finding can receive a high, moderate, low or very low confidence rating. We graded the quality of evidence per TMPC domain, sub-domains, and separate pieces of evidence.

The CERQual framework assesses four components which may affect confidence in the evidence¹⁷:

- Methodological limitations of the included studies and how they are reflected in the synthesis
- Coherence of the synthesis findings
- Data adequacy - the degree of richness and quantity of the data supporting this review
- Relevance of the included studies to the review question

For each of these domains, we will downgrade the evidence from high quality by one level (for serious) or by two levels (for very serious). We will then use these domains to rate the overall quality of evidence for the primary outcome according to the following:

1. High quality: further research is very unlikely to change our confidence in the findings
2. Moderate quality: further research is likely to have an important impact on our confidence in the findings, and may change the findings
3. Low quality: further research is very likely to have an important impact on our confidence in the findings, and may change the findings, or

Very low quality: we are very uncertain about the finding

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eSupplement 5: Theoretical studies

authors	title	journal	volume	issue	PublicationType	MainConstruct	Sample
Kerasidou, 2020	Artificial intelligence and the ongoing need for empathy, compassion and trust in healthcare	Bulletin of the World Health Organization	98	4	Journal article	Empathy/compassion	HCPs
Liao, Lester & Cheng, 2019	The Empathy Tank as a revised model for fostering empathy in medical education	Medical Teacher	41	1	Journal article	Empathy	Targeted at physicians
Donelli et al., 2018	Empathic disconnection and the patient-physician relationship in clinical practice	Italian Journal of Medicine	12	4	Journal article	Empathic disconnection	Physicians
Flores & Brown, 2018	The changing place of care and compassion within the English NHS: an Eliasean perspective	Social Theory & Health	16	2	Journal article	Compassion	HCPs
Gillies, 2018	Compassion, medical humanities and medical education	Education For Primary Care	29	2	Journal article	Compassion	HCPs
Rydon-Grange, 2018	Psychological perspective on compassion in modern healthcare settings	Journal of Medical Ethics	44	11	Journal article	Compassionate care	HCPs
Barratt, 2017	Exploring how mindfulness and self-compassion can enhance compassionate care	Nursing Standard	31	21	Journal article	Compassion	HCPs
Ekman & Krasner, 2017	Empathy in medicine: neuroscience, education and challenges	Medical Teacher	39	2	Journal article	Empathy	Targeted at physicians
Hardy, 2017	Empathizing with patients: the role of interaction and narratives in providing better patient care.	Empathy					HCPs
Liao, 2017	The physician as person framework: How human nature impacts empathy, depression, burnout, and the practice of medicine.	Canadian Medical Education Journal	8	4	Journal article	Empathy	Physicians
Schattner, 2017	Residents' responsibilities: adopting a wider view	Medical Teacher	39	12	Journal article	Empathy	Residents

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authors	title	journal	volume	issue	PublicationType	MainConstruct	Sample	
Baverstock & Finlay, 2016	Maintaining compassion and preventing compassion fatigue: a practical guide	Archives of Disease in Childhood	101	4	Journal article	Compassion	Targeted at all HCPs?	
Chadwick & Lown, 2016	What do we need to do to sustain compassionate medical care?	Medicine (United Kingdom)	44	10	Journal article	Compassion	HCPs	
Kerasidou & Horn, 2016	Making space for empathy: supporting doctors in the emotional labour of clinical care	BMC Medical Ethics	17		Journal article	Empathy/emotional engagement	Targeted at doctors	
Lown, 2016	A social neuroscience-informed model for teaching and practising compassion in health care	Medical Education	50	3	Journal article	Compassion	HCPs in general	
Mills & Chapman, 2016	Compassion and self-compassion in medicine: self-care for the caregiver.	Australasian Medical Journal	9	5	Journal article	Compassion	HCPs	
Wang, 2016	Smiling through clenched teeth: why compassion cannot be written into the rules	Journal of Medical Ethics	42	1	Journal article	Compassion	General - HCP	
George, 2015	Integrative medicine is integral to providing patient-centered care.	Annals of Allergy, Asthma & Immunology	114	4	Journal article	Patient-centred care	Physicians	
Gray & Cox, 2015	The roots of compassion and empathy: implementing the Francis report and the search for new models of health care.	European Journal for Person Centered Healthcare	3	1	Journal article	Compassion, empathy		
Gregory, 2015	William Pickles lecture 2014: cum scientia caritas - compassion with knowledge	British Journal of General Practice	65	630	Journal article	Compassion	Doctors in general	
Miles, Asbridge, & Caballero, 2015	Towards a person-centered medical education: challenges and imperatives (I)	Educacion Medica	16	1	Journal article	Patient-centred care	Residents	
Navarro, 2015	At the crossroads of empathy and evidence in modern medicine	Empathy						HCPs
Bynum & Goodie, 2014	Shame, guilt, and the medical learner: ignored connections and why we should care	Medical Education	48	11	Journal article	Empathy	"Learners"	
Decety et al., 2014	A social neuroscience perspective on clinical empathy	World Psychiatry	13	3	Journal article	Empathy	Physicians	

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Fernando & Consedine, 2014	Beyond compassion fatigue: the transactional model of physician compassion	Journal of Pain and Symptom Management	48	2	Journal article	Compassion	HCPs
Post et al., 2014	Routine, empathic and compassionate patient care: definitions, development, obstacles, education and beneficiaries	Journal of Evaluation in Clinical Practice	20	6	Journal article	Empathy, compassionate care	Physicians
de Zulueta, 2013	Compassion in 21st century medicine: Is it sustainable?	Clinical Ethics	8	4	Journal article	Compassion	Targeted at HCPs in general, mentions doctors and nurses specifically
Miles, 2013	Science, humanism, judgement, ethics: person-centered medicine as an emergent model of modern clinical practice.	Folia Medica	55		Journal article	Person-centred medicine	Physicians
Rushton, Kaszniak & Halifax, 2013	Addressing moral distress: application of a framework to palliative care practice	Journal of Palliative Medicine	16	9	Journal article	Empathy	HCPs in general
Rushton, Kaszniak & Halifax, 2013	A framework for understanding moral distress among palliative care clinicians	Journal of Palliative Medicine	16	9	Journal article	Compassionate responding to moral distress	Aimed at all clinicians
Smajdor, 2013	Reification and compassion in medicine: a tale of two systems.	Clinical Ethics	8	4	Journal article	Compassion	HCPs
Halifax, 2012	A heuristic model of enactive compassion	Current Opinion in Supportive and Palliative Care	6	2	Journal article	Compassion	Clinicians NOS
Heusser et al., 2012	Towards non-reductionistic medical anthropology, medical education and practitioner-patient-interaction: the example of anthroposophic medicine	Patient Education and Counseling	89	3	Journal article	Empathy	Targeted at physicians

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authors	title	journal	volume	issue	PublicationType	MainConstruct	Sample
Mealem, Siniver & Yaniv, 2012	Patient compliance, physician empathy and financial incentives within a principal-agent framework	The Journal of Socio-Economics	41	6	Journal article	Empathetic behavior	Physicians
Buckman, Tulsky & Rodin, 2011	Empathic responses in clinical practice: intuition or tuition?	Canadian Medical Association Journal	183	5	Journal article	Empathy	HCPs
Cohen et al., 2011	Stigmatization of patients with chronic pain: the extinction of empathy	Pain Medicine	12	11	Journal article	Empathy	HCPs
Cox et al., 2011	Empathy, identity and engagement in person-centred medicine: The sociocultural context	Journal of Evaluation in Clinical Practice	17	2	Journal article	Empathy	Medical practice
Zigmond, 2011	Five executive follies. How commodification imperils compassion in personal healthcare.	Journal of Holistic Healthcare	8	3	Journal article	Compassion	HCPs
Abbott Moore, 2010	Being empathetic: benefits and challenges for the clinician and client	Topics in stroke rehabilitation	17	1	Journal article	Empathy	Therapists
Finset, 2010	Emotions, narratives and empathy in clinical communication.	International Journal of Integrated Care	10		Journal article	Empathy	HCPs
Frampton & Guastello, 2010	Patient-centered care: more than the sum of its parts.	American Journal of Nursing	9		Journal article	Patient-centred care	
Pembroke, 2010	Human dimension in medical care: insights from Buber and Marcel	Southern medical journal	103	12	Journal article	Compassion	HCPs
Berwick, 2009	What 'patient-centered' should mean: confessions of an extremist.	Health Affairs	28	4	Journal article	Patient-centred care	
Neumann et al., 2009	Analyzing the "nature" and "specific effectiveness" of clinical empathy: a theoretical overview and contribution towards a theory-based research agenda	Patient education and counseling	74	3	Journal article	Empathy	HCPs
Banja et al., 2008	Toward a more empathic relationship in pain medicine	Pain Medicine	9	8	Journal article	Empathy	Targeted at HCPs in pain medicine
Looi, 2008	Empathy and competence	The Medical journal of Australia	188	7	Journal article	Empathy	HCPs

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authors	title	journal	volume	issue	PublicationType	MainConstruct	Sample
Sonnex, 2008	Empathy: improving the quality of the genitourinary medicine consultation	International journal of STD & AIDS	19	2	Journal article	Empathy	Physicians
Cohen, 2007	Linking professionalism to humanism: what it means, why it matters	Academic Medicine	82	11	Journal article	Humanism	HCPs
Macleod & McPherson, 2007	Care and compassion: part of person-centred rehabilitation, inappropriate response or a forgotten art?	Disability and Rehabilitation	29	20	Journal article	Caring	Rehabilitation clinicians
Banja, 2006	Empathy in the physician's pain practice: benefits, barriers, and recommendations	Pain medicine	7	3	Journal article	Empathy	HCPs
Hojat et al., 2003	Physician empathy in medical education and practice: experience with the Jefferson Scale of Physician Empathy.	Seminars in Integrative Medicine	1		Journal article	Empathy	Physicians
Charon, 2001	The patient-physician relationship. Narrative medicine: a model for empathy, reflection, profession, and trust.	Academic Medicine	286	15	Journal article	Empathy	Physicians
Coulehan et al., 2001	"Let me see if i have this right.": words that help build empathy.	Annals of Internal Medicine	135		Journal article	Empathy	HCPs
Markakis et al., 2000	The path to professionalism: cultivating humanistic values and attitudes in residency training.	Academic Medicine	75		Journal article	Humanistic values and attitudes	Residents
Miller & Schmidt, 1999	The habit of humanism: a framework for making humanistic care a reflexive clinical skill.	Academic Medicine	74		Journal article	Humanistic care	HCPs
White, 1999	Compassionate patient care and personal survival in orthopaedics. A 35-year perspective	Clinical Orthopaedics and Related Research				Caring for patients	Orthopaedics
Neufeld, 1998	Physician as humanist: still an educational challenge.	Cmaj	159		Journal article	Humanism	Physicians
Emanuel & Dubler, 1995	Preserving the physician-patient relationship in the era of managed care	JAMA	273	4	Journal article	Compassion	HCPs

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authors	title	journal	volume	issue	PublicationType	MainConstruct	Sample
Scott et al., 1995	Organizational aspects of caring	The Milbank Quarterly	73	1	Journal article	Caring	HCPs
Larson, 1993	Self-concealment: Implications for stress and empathy in oncology care	Journal of Psychosocial Oncology	11	4	Journal article	Empathy	Oncology staff
Nadelson, 1993	Ethics, empathy, and gender in health care.	American Journal of Psychotherapy	150		Journal article	Empathy	HCPs
Book, 1991	Is empathy cost efficient?	American Journal of Psychotherapy	45	1	Journal article	Empathy	Psychiatrists (+ by extension, doctors)
Gallop, Lancee & Garfinkel, 1990	The empathic process and its mediators. A heuristic model	The Journal of Nervous and Mental Disease	178	10	Journal article	Empathy	HCPs (aimed at teachers, therapists and researchers)
Friedland , 1988	AIDS and compassion	JAMA	259	19	Journal article	Compassion	Society and HCPs in general
Wilmer, 1987	The doctor-patient relationship and the and issues of pity, sympathy, and empathy.	Empathy					Physicians
Barber, 1976	Compassion in medicine: toward new definitions and new institutions.	New England Journal of Medicine	295		Journal article	Compassion	HCPs

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eSupplement 6: Reviews

authors	year	title	journal	volume	issue	PublicationType	Review Type	MainConstruct	Sample
Maximiano-Barreto et al., 2020	2020	Factors associated with levels of empathy among students and professionals in the health field: a systematic review.	Trends in Psychiatry and Psychotherapy	42	2	Journal article	Systematic review	Empathy	HCPs
Moudatsou et al., 2020	2020	The role of empathy in health and social care professionals	Healthcare	8	1	Journal article	Literature review	Empathy	HCPs
Kemp et al., 2020	2020	Delivery of compassionate mental health care in a digital technology-driven age: scoping review	Journal of Medical Internet Research	22	3	Journal article	Scoping review	Compassionate care	HCPs in general
Sinclair et al., 2020	2020	Compassion in pediatric healthcare: a scoping review	Journal of Pediatric Nursing-Nursing Care of Children & Families	51		Journal article	Scoping review	Compassion	Pediatric HCPs
Kondo, et al., 2019	2019	Clinical empathy in medical consultations in Japan.	Papers in Language and Communication Studies	2	3	Journal article	Literature review	Empathy	Doctors
Das & Charlton, 2018	2018	Guarding against dispassion for doctors in the NHS	Journal of the Royal Society of Medicine	111	10	Journal article	Literature review	Compassion	Aimed at doctors
Elayyan, Rankin, Janet & Chaarani, 2018	2018	Factors affecting empathetic patient care behaviour among medical doctors and nurses: an integrative literature review	Eastern Mediterranean Health Journal	24	3	Journal article	Literature review	Empathy	HCPs (including nurses + doctors)
Nightingale et al., 2018	2018	The impact of emotional intelligence in health care professionals on caring behaviour towards patients in clinical and long-term care settings: Findings from an integrative review	International Journal of Nursing Studies	80		Journal article	Integrative review	Caring behaviours (in terms of compassionate care)	Includes nurses + physicians
Han & Pappas, 2018	2018	A review of empathy, its importance, and its teaching in surgical training	Journal of Surgical Education	75	1	Journal article	Literature review	Empathy	Surgery residents

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authors	year	title	journal	volume	issue	PublicationType	Review Type	MainConstruct	Sample
									/surgeons
Brito-Pons & Librada-Flores, 2018	2018	Compassion in palliative care: a review	Current Opinion in Supportive and Palliative Care	12	4	Journal article	Literature review	Compassion	Targeted at all palliative care HCPs
Wilkinson et al., 2017	2017	Examining the relationship between burnout and empathy in healthcare professionals: a systematic review	Burnout Research	6		Journal article	Systematic review	Empathy	10 studies involving nurses (n=4), nurses + mental health workers (n=1), doctors (n=3) and mixed doctors and nurses (n=2)
Sinclair et al., 2017	2017	Can self-compassion promote healthcare provider well-being and compassionate care to others? Results of a systematic review	Applied Psychology. Health and well-being	9	2	Journal article	Systematic review	Compassion	HCPs
Mills, Wand & Fraser, 2017	2017	Palliative care professionals' care and compassion for self and others: a narrative review.	International Journal of Palliative Nursing	23		Journal article	Narrative review	Compassion	HCPs (palliative)
dle Zulueta, 2016	2016	Developing compassionate leadership in health care: an integrative review	Journal of Healthcare Leadership	8		Journal article	Integrative review	Compassion	HCPs

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authors	year	title	journal	volume	issue	PublicationType	Review Type	MainConstruct	Sample
Sinclair et al., 2016	2016	Compassion: a scoping review of the healthcare literature	BMC Palliative Care	15		Journal article	Scoping review	Compassion	HCPs
Jackson, Euguene & Tremblay, 2015	2015	Improving empathy in the care of pain patients	AJOB Neuroscience	6	3	Journal article	Literature review	Empathy	Doctors, nurses + other HCPs
Mannava et al., 2015	2015	Attitudes and behaviours of maternal health care providers in interactions with clients: a systematic review	Globalization and Health	11	1	Journal article	Systematic review	Caring behaviours	HCPs
Lachal et al., 2015	2015	Metasynthesis of youth suicidal behaviours: Perspectives of youth, parents, and health care professionals	PLoS ONE	10	5	Journal article	Metasynthesis	Empathy	Physicians
Raab, 2014	2014	Mindfulness, self-compassion, and empathy among health care professionals: a review of the literature	Journal of Health Care Chaplaincy	20	3	Journal article	Literature review	Empathy	HCPs
Borkar, 2014	2014	Empathy in physician-patient relationship: the construct and its applicability to India's health care	Social Change	44	3	Journal article	Literature review	Empathy	Physicians
Crawford et al., 2014	2014	The design of compassionate care	Journal of Clinical Nursing	23	23	Journal article	Literature review	Compassion	Targeted at all HCPs
Jani, Blane, & Mercer, 2012	2012	The role of empathy in therapy and the physician-patient relationship	Forschende Komplementarme Dizin (2006)	19	5	Journal article	Literature review	Empathy	HCPs (including doctors + psychotherapists)
Neumann et al., 2011	2011	Empathy decline and its reasons: a systematic review of studies with medical students and residents	Academic Medicine	86	8	Journal article	Systematic review	Empathy	Targeted at medical students and residents

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authors	year	title	journal	volume	issue	PublicationType	Review Type	MainConstruct	Sample
Colliver et al., 2010	2010	Reports of the decline of empathy during medical education are greatly exaggerated: a reexamination of the research	Academic Medicine	85	4	Journal article	Literature review	Empathy	Students /Residents
Pedersen, 2009	2009	Empirical research on empathy in medicine-A critical review	Patient Education and Counseling	76	3	Journal article	Critical review	Empathy	Clinicians
Garden, 2009	2009	Expanding clinical empathy: an activist perspective	Journal of General Internal medicine	24	1	Journal article	Literature review	Empathy (+ "alleviating suffering" = compassion)	Physicians
Sanghavi, 2006	2006	What makes for a compassionate patient-caregiver relationship?	The Joint Commission Journal on Quality and Patient Safety	32	5	Journal article	Review/re-analysis	Compassion	HCPs
Pompili et al., 2005	2005	Emergency staff reactions to suicidal and self-harming patients	European Journal of Emergency Medicine	12	4	Journal article	Literature review	Responses/attitudes to people who self-harm/attempt suicide	Aimed at staff, mentions doctors and nurses specifically
May et al., 2004	2004	Framing the doctor-patient relationship in chronic illness: a comparative study of general practitioners' accounts	Sociology of health & illness	26	2	Journal article	Review/re-analysis	Empathy	GPs
Yunus, 2004	2004	Suffering, science and sabotage	Journal of Musculoskeletal Pain	12	2	Journal article	Literature review	Empathy	Physicians
MacLeod, 2000	2000	Learning to care: a medical perspective	Palliative Medicine	14	3	Journal article	Literature review	Empathy	Palliative care

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eSupplement 7: A detailed portrait of studies' methodology

Author(s) and Year	Publication type	Research aim	Methodology	Qualitative research design	Qualitative data type	Quantitative research design	Quantitative data type	Analysis method
Ahrweiler et al., 2014 ¹⁵³	Journal article	to examine factors that promote and inhibit the development of empathy during medical education	Qualitative	Qualitative description/thematic analysis	Reflective writing/open-ended written questionnaires	--	--	--
Alcorta-Garza et al., 2016 ⁹⁴	Journal article	to confirm JSE psychometric properties in the cross-cultural context of Spain and Latin American countries, to measure the influence of social and cultural factors on the development of medical empathy in health practitioners	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Non-parametric tests, Regression, CFA/PCA
Anandarajah & Roseman, 2014 ¹³⁶	Journal article	to examine how physicians' spiritual beliefs related to their provision of compassionate care	Qualitative	Qualitative description/thematic analysis	Interviews, Reflective writing/open-ended written questionnaires	--	--	--
Aomatsu et al., 2013 ¹⁴²	Journal article	to compare residents' vs medical students' concepts of empathy	Qualitative	Qualitative description/thematic analysis	Focus groups	--	--	--
Avasarala, Whitehouse & Drake, 2015 ¹²²	Journal article	to investigate factors affecting empathy in PGY1 doctors	Quantitative	--	--	Non-randomised exposure: Cohort study	Self-report (questionnaire)	Regression

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Baker et al., 2018 ¹⁵¹	Journal article	to analyse the relationships between compassionate care and evidence-based practice discourse	Qualitative	Discourse analysis	Interviews, Text/document analysis	--	--	--
Bateman et al., 2017 ¹¹³	Journal article	to explore the influence of physician gender and physician parental status on (1) physician-parent communication and (2) care of pediatric patients at the end of life (EOL).	Qualitative	Grounded theory	Interviews	--	--	--
Batley et al., 2016 ¹³⁸	Journal article	to investigate cynicism/empathy in medical students and doctors working in ED	Qualitative	Qualitative description/thematic analysis	Interviews	--	--	--
Battegay et al., 1991 ¹⁸²	Journal article	to explore how doctor patient relationships exploration affects physicians working with patients with AIDS	Qualitative	Case study	Case study	--	--	--
Batton et al., 2011 ¹³³	Journal article	to examine matters of privacy, parent emotional state, NICU communication, and quality of NICU care from the perspectives of physicians who are also the parents of an infant that required admission to an NICU	Mixed-methods	Qualitative description/thematic analysis	Reflective writing/open-ended written questionnaires	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Correlation analysis, T-tests
Bayne et al., 2013 ³⁸	Journal article	to develop a model for the conceptualisation of empathy during the medical consultation, using interview data from physicians	Qualitative	Grounded theory	Interviews	--	--	--
Bellini, Baime & Shea, 2002 ⁶⁶	Journal article	to examine longitudinal changes in mood and empathy over the course of the internal medicine residency	Quantitative	--	--	Non-randomised exposure: Cohort study	Self-report (questionnaire)	Frequencies/descriptives, Analyses of variance
Bellini & Shea, 2005 ⁶⁷	Journal article	to investigate changes in empathy and mood over the course of internship year	Quantitative	--	--	Non-randomised	Self-report (questionnaire)	Frequencies/descriptives, T-

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						exposure: Cohort study		tests,Analyses of variance
Bertakis, 2011 ¹⁰¹	Journal article	to investigate whether patient and physician gender, as well as gender concordance, may influence the provision of patient-centred care	Quantitative	--	--	Non-randomised exposure: Cohort study	Self-report (questionnaire), Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders)	Frequencies/descriptives, T-tests, Regression
Bertakis & Azari, 2012 ¹⁷⁸	Journal article	to characterize patient-centered care and identify associated variables	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire), Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders)	Frequencies/descriptives, Correlation analysis, Regression
Bessen et al., 2019 ¹⁵⁴	Journal article	to qualitatively characterize methods utilized by physicians that facilitate the delivery of compassionate care at EOL	Qualitative	Qualitative description/thematic analysis, Phenomenology	Interviews	--	--	--
Bishop et al., 2014 ¹⁶⁸	Report	to understand dynamics between efficiency and compassionate care	Qualitative	Qualitative description/thematic analysis	Focus groups	--	--	--
Borracci et al., 2015 ¹¹⁸	Journal article	to investigate psychometrics of Spanish JSE among Argentinian doctors	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Non-parametric tests, CFA/PCA, KMO
Brady, Bambury & O'Reilly, 2015 ⁷⁸	Journal article	to understand empathy in effective doctor-patient relationship	Mixed-methods	Qualitative description/thematic analysis	Reflective writing/open-ended written questionnaires	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives

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Branch et al., 2017 ¹⁴⁸	Journal article	to understand how physicians who completed an intensive faculty development program in medical humanism sustain their humanistic practices	Qualitative	Case study (small group course)	Reflective writing/open-ended written questionnaires	--	--	--
Bratek et al., 2015 ⁴⁹	Journal article	to investigate empathy in medical students and professionals in Poland	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, Chi square, Non-parametric tests
Butalid, Bensing & Verhaak, 2014 ¹⁸⁶	Journal article	to investigate changes in GPs' communication behaviours in psychosocial consultations over time	Quantitative	--	--	Non-randomised exposure: (Interrupted) time-series, Analytical cross-sectional	Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders)	Frequencies/descriptives, Regression
Bylund & Makoul, 2002 ¹¹⁴	Journal article	to develops a scale for measuring empathic communication, and compares results between genders	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders)	Frequencies/descriptives, T-tests
Bylund & Makoul, 2005 ¹⁸⁴	Journal article	to investigate factors influencing empathic opportunity creation by patients, and empathic communication responses by physicians	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders)	Frequencies/descriptives, Correlation analysis, T-tests

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Carmel & Glick, 1996 ⁵⁰	Journal article	to understand personal characteristics that distinguish CEPs from other physicians, and organizational factors that might enhance or inhibit physicians' compassionate--empathic behavior (CEB)	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire), Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders)	Frequencies/descriptives, Chi square, T-tests, Analyses of variance, Duncan multiple range
Chaitoff et al., 2017 ⁹⁹	Journal article	to identify correlates of physician empathy	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Analyses of variance, Regression
Charles et al., 2018 ⁵¹	Journal article	to investigate empathy in GPs and factors affecting it	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Regression
Chou, Kellom & Shea, 2014 ⁸⁹	Journal article	to identify attitudes and habits that highly humanistic physicians perceive allow them to sustain their humanistic approach to patient care	Qualitative	Qualitative description/thematic analysis	Interviews	--	--	--
Cicekci et al., 2017 ⁹⁵	Journal article	to analyze the attitudes displayed by the relatives of patients and the physician with the purpose of determining the communication between the two parties	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Non-parametric tests
Clara et al., 2006 ³⁹	Journal article	to investigate vascular surgeons' compassionate vs pragmatic responses in ethical situations, and what factors predict "compassionate" surgeons	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire), Behavioural task	Frequencies/descriptives, Chi square, T-tests, Regression, Cluster analyses

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Crowe & Brugha, 2018 ¹⁵⁶	Journal article	to explore expressions and management of emotion in doctors' narratives of work and training for insights into how socialisation continues after graduation	Qualitative	Qualitative description/thematic analysis, Case study	Interviews	--	--	--
Cyrus et al., 2017 ⁸³	Journal article	to evaluate and investigate if gender, age, grade, marriage and specialized field affected empathy scores among trainees, interns and resident physicians	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, T-tests, Analyses of variance
Davidson & Fosgerau, 2014 ¹⁰⁰	Journal article	to investigate general practitioners' (GPs') and psychiatrists' responses to emotional disclosures in consultations with patients with depression.	Qualitative	Discourse analysis	Conversation analysis	--	--	--
Dehning et al., 2014 ¹¹⁵	Journal article	to analyse the differences bw surgeons and psychiatrists empathy	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, T-tests, Analyses of variance
Derksen et al., 2015 ⁸⁷	Journal article	to explore GP's experiences and the application of empathy in daily practice and to investigate the practical use of empathy. Facts such as preconditions, barriers and facilitating possibilities are described	Qualitative	Iterative content analysis	Interviews	--	--	--
Derksen et al., 2016 ¹⁴⁹	Journal article	to investigate barriers to empathy amongst GPs and how they manage them	Qualitative	Iterative content analysis	Interviews	--	--	--

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Derksen et al., 2018 ¹⁴⁶	Journal article	to explore why receiving and offering empathy during the encounter in general practice does not always meet the wishes of both patients and GPs	Qualitative	Qualitative description/thematic analysis	Interviews	--	--	--
Dhawan, Steinbach & Halpern, 2007 ¹⁰⁹	Journal article	to investigate differences in empathy between physicians working in correctional vs non-correctional settings	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, Chi square
Di Lillo et al., 2009 ⁷⁹	Journal article	to investigate psychometrics of JSE in Italian physicians and factors affecting empathy	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, T-tests, Analyses of variance, CFA/PCA
Epstein & Borrelli, 2001 ¹²⁵	Journal article	to show how cultural values affect empathy	Qualitative	Qualitative description/thematic analysis, Ethnography	Interviews, Participant observation	--	--	--
Epstein et al., 2007 ¹⁸⁵	Journal article	to investigate how doctors' responded to patients' empathic opportunities	Mixed-methods	Qualitative description/thematic analysis	Participant observation	Correlation/association study: Analytical cross-sectional	Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders)	Frequencies/descriptives, Correlation analysis, Regression, Sequence analyses
Ferreira, Afons & Ramos, 2020 ⁸⁴	Journal article	to investigate burnout and empathy in physicians and their relationship to each other and stage of training	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, Chi square, T-tests, Non-parametric tests, Regression
Foo et al., 2017 ¹¹²	Journal article	to investigate the role of racial differences in patient-physician communication around mental health versus biomedical issues	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Assessed by coders (e.g. (video- or audiorecorded))	Frequencies/descriptives, Correlation analysis, Regression

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							interview assessed by coders)	
Foreback et al., 2018 ⁶²	Journal article	to examine the self-reported empathy levels of internal medicine (IM) residents in 3 community-based teaching hospitals.	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Analyses of variance
Fox et al., 2009 ¹²⁸	Journal article	to investigate how GPs' personal experience of illness impacted their practice	Qualitative	Phenomenology (IPA)	Interviews	--	--	--
Fulop et al., 2011 ¹⁴⁰	Journal article	to study the causal factors of empathy and burnout and the effect of emotional involvement on medical doctors	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, Non-parametric tests, CFA/PCA
Gateshill, Kucharska-Pietura & Wattis, 2011 ¹¹⁰	Journal article	to investigate mental healthcare HCPs' and non-mental-healthcare HCPs' attitudes towards people with mental disorders and empathy	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Chi square, Non-parametric tests
Gilligan et al., 2019 ¹⁶⁰	Journal article	to investigate insitutional healthcare leaders' opinions on facilitators and barriers to high quality humanistic care	Qualitative	Qualitative description/thematic analysis	Interviews, Reflective writing/open-ended written questionnaires	--	--	--
Gleichgerrcht & Decety, 2013 ⁵²	Journal article	to investigate the factors affecting ProQoL and empathy in physicians	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, T-tests, Analyses of variance
Gottenborg et al., 2018 ¹³⁹	Journal article	to investigate female physicians' experiences of pregnancy, parental leave and return to work	Qualitative	Qualitative description/thematic analysis	Interviews	--	--	--

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Greenberg et al., 2015⁷⁰	Journal article	to investigate empathy, sense of power and personality traits in paediatric residents	Quantitative	--	--	Non-randomised exposure: Cohort study	Self-report (questionnaire)	Frequencies/descriptives, T-tests
Haider, Riaz & Gill, 2020¹²⁷	Journal article	to explore the reasons for decline in empathy among physicians to identify strategies for fostering empathetic clinical practice.	Qualitative	Qualitative description/thematic analysis	Focus groups	--	--	--
Handford et al., 2013⁴⁰	Journal article	to provide a more objective index of possible changes in empathy across the spectrum of clinical exposure	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire), Behavioural task, Heart Rate	Frequencies/descriptives, Correlation analysis, Chi square, Analyses of variance, Non-parametric tests
Hayuni et al., 2019¹⁶¹	Journal article	to examine the mediating role of the two components of secondary traumatic stress (STS) and burnout in the relation between empathy and grief among oncologists	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, Regression
Hojat et al., 2002a⁹⁶	Journal article	to investigate construct validity of JSE, and compare scores by gender and specialty	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, T-tests, Analyses of variance, CFA/PCA
Hojat et al., 2002b⁹²	Journal article	to investigate gender and specialty differences in JSE scores	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, Analyses of variance
Hojat et al., 2005¹⁴¹	Journal article	to investigate relationship between empathy scores of medical students who have become doctors to test the predictive validity of the JSE	Quantitative	--	--	Non-randomised exposure: Cohort study	Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders)	Frequencies/descriptives, T-tests, the method of contrasted groups

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Hong et al., 2011 ⁶³	Journal article	to investigate the relationship between empathy and grades, marital status and personality in psychiatric residents	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, T-tests, Analyses of variance, Regression
Jaye & Wilson, 2003 ¹²⁹	Journal article	to provide a qualitative perspective on issues identified by GPs when they tell stories about their experiences of illness, including their interactions with attending physicians	Qualitative	Qualitative description/thematic analysis	Interviews	--	--	--
Jiao et al., 2014 ⁵³	Journal article	to investigate attitudes towards suicide among psychiatrists, and factors which affect these	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, T-tests, Non-parametric tests
Jin et al., 2020 ¹⁰⁶	Journal article	to explore the potential mediating effect of PsyCap on the relationship between distress and empathy	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, T-tests, Analyses of variance, Pathway analysis (SEM)
Jing, Jin & Liu, 2019 ⁸⁵	Journal article	to investigate how monetary incentives influence physicians' prosocial behaviour in online consultations	Quantitative	--	--	Non-randomised exposure: Before-and-after study (controlled)	Behavioural task	Frequencies/descriptives, Correlation analysis, Regression
Johnson Shen et al., 2019 ¹⁷⁶	Journal article	to examine the empathic opportunities and responses within clinical consultations of lung cancer patients and how these each are associated with patient-reported outcomes	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders), Behavioural task	Frequencies/descriptives, Correlation analysis, Chi square

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Julia-Sanchis et al., 2019 ⁴¹	Journal article	to determine the prevalence of burnout syndrome among Spanish emergency medical service professionals and establish any possible relationships between their levels of empathy and sociodemographic and/or working conditions	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, T-tests, Analyses of variance
Kataoka et al., 2012 ⁴²	Journal article	to investigate factors affecting empathy in female physicians	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, T-tests, Analyses of variance
Katsari et al., 2020 ⁴³	Journal article	to investigate the Greek JSPPPE (i.e. patients' perceptions of physician empathy), and physician empathy in a sample of doctors	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, Non-parametric tests, CFA/PCA
Kealy et al., 2016 ¹⁶²	Journal article	to investigate residents' burnout, empathic functioning and coping strategies	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Chi square, Non-parametric tests
Kemper et al., 2020 ¹⁵⁸	Journal article	to describe the national epidemiology of burnout in pediatric residents	Quantitative	--	--	Non-randomised exposure: Cohort study, Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Chi square, T-tests, Analyses of variance, Regression
Kennifer et al., 2009 ¹⁷⁵	Journal article	to investigate how patient emotion influences doctors' empathic vs non-empathic responses	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders)	Frequencies/descriptives, Regression, Odds ratio

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Kerasidou & Kingori, 2019 ¹⁷¹	Journal article	to understand the effects of austerity from the standpoint of the healthcare professionals	Qualitative	Qualitative description/thematic analysis	Interviews	--	--	--
Kerasidou, 2019 ¹⁶⁹	Journal article	to investigate the impact of austerity measures and culture of efficiency on HCPs' work experiences in A&E	Qualitative	Qualitative description/thematic analysis	Interviews	--	--	--
Khajavi & Hekmat, 1971 ⁷¹	Journal article	to evaluate whether members of psychiatric team differ on empathy	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, T-tests, Analyses of variance
Kirmayer, 2008 ¹²⁶	Journal article	to explore the limits of clinical empathy in situations of radical otherness	Qualitative	Case study	Case study presented at the conference	--	--	--
Kliszcz et al., 2006 ¹¹⁶	Journal article	to investigate scale validation of Polish version of JSE in mixed group of HCPs	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, Analyses of variance, CFA/PCA
Kobayasi et al., 2018 ¹¹⁹	Journal article	to assess gender differences in the perception of quality of life with quantitative methods and to understand further, from the female residents' point of view, the reasons that may influence the perception of quality of life using qualitative method; resilience, empathy and daytime sleepiness were also scored.	Mixed-methods	Qualitative description/thematic analysis	Focus groups	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Non-parametric tests
Komisar & McFarland, 2017 ¹²³	Journal article	to understand if the ability to find meaning in the clinical situations that residents face might be associated with empathy	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Chi square, T-tests

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Kondo et al., 2013 ⁵⁴	Journal article	to clarify the relationship between personal characteristics and empathic behavior in Japanese oncologists	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders), Behavioural task	Frequencies/descriptives, Correlation analysis, Non-parametric tests, Regression
Kozeny & Tisanska, 2013 ⁵⁵	Journal article	to examine the JSPE-HP psychometric parameters, underlying dimensionality via exploratory and confirmatory factor analysis to examine the relation of empathy scores to age, gender, practice experience, and practice type using responses from a representative sample of Czech physicians	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Analyses of variance, CFA/PCA
Krenek & Zalewski, 1993 ¹³⁴	Journal article	to examine how familial psychopathology affects therapeutic relationships	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Analyses of variance, Regression
Lases et al., 2019 ¹⁷²	Journal article	to find associations of learning climate with residents' work-related well-being (incl. empathy)	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Regression
Lebowitz & Ahn, 2014 ¹⁸⁹	Journal article	to examine how biological explanations of patients' symptoms would affect mental health clinicians' empathy	Quantitative	--	--	Non-randomised exposure: Non-randomised trial	Self-report (questionnaire), Behavioural task	Frequencies/descriptives, Analyses of variance
Lee et al., 2018 ⁷²	Journal article	to evaluate empathy and burnout levels in residents in Singapore	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, T-tests, Analyses of variance

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Lelorain et al., 2013 ⁵⁶	Journal article	to examine physician practice characteristics that could explain clinical empathy beyond empathic concern	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Regression
Lin, Hsu & Chong, 2008 ¹⁵⁷	Journal article	to investigate patients' and doctors' perceptions of doctor empathy	Qualitative	Phenomenology	Interviews	--	--	--
Lown, Shin & Jones, 2019 ⁵⁷	Journal article	to understand empathy in effective doctor-patient relationship	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, Chi square, Analyses of variance
*Lyness, 1993 ¹⁴⁷	Dissertation	to understand why physicians avoid being empathetic	Qualitative	Qualitative description/thematic analysis	Interviews	--	--	--
Mahoney, Sladek & Neild, 2016 ¹⁰⁷	Journal article	to investigate doctors' and medical students' empathy and the factors affecting it	Mixed-methods	Qualitative description/thematic analysis	Reflective writing/open-ended written questionnaires	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, T-tests, Analyses of variance
Mangione et al., 2002 ⁷³	Journal article	to learn whether empathy could change at different levels of medical education	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire), Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders)	Frequencies/descriptives, Correlation analysis, Analyses of variance
McFarland & Roth, 2017 ¹⁰⁵	Journal article	to analyse whether distress and empathy associate with resilience	Quantitative	--	--	Non-randomised exposure: Before-and-after study (uncontrolled)	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, Chi square, T-tests, Non-parametric tests

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McFarland, Malone & Roth, 2017 ¹⁰⁴	Journal article	to explore physician trainee empathy, distress, death exposures, and their attributed meaning for the trainee	Quantitative	--	--	Non-randomised exposure: Before-and-after study (uncontrolled)	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, Chi square, T-tests, Non-parametric tests
McManus et al., 2011 ¹⁶⁶	Journal article	to investigate relationships between leisure activities, burnout and other variables (including empathy)	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, Regression
Meeuwesen et al., 2006 ¹⁷⁴	Journal article	to analyse whether Dutch GPs treat ethnical minority patients differently	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders)	Frequencies/descriptives, Regression
Mills, Wand & Fraser, 2018 ¹⁵⁵	Journal article	to explore the meaning and practice of self-care as described by palliative care nurses and doctors	Qualitative	Qualitative description/thematic analysis	Interviews	--	--	--
Moralle et al., 2016 ¹¹¹	Journal article	to investigate factors affecting empathy in residents	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, T-tests
Moriarty et al., 2020 ⁸⁰	Journal article	to investigate factors affecting GPs' attitudes towards young adults who self-harm	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, T-tests, SEM
Muggleton, Guy & Howard, 2015 ¹⁸⁸	Journal article	to investigate palliative HCPs' experiences of caring for patients with disgusting symptoms	Qualitative	Phenomenology (IPA)	Interviews, Participant observation	--	--	--

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Muslin & Schlessinger, 1971 ¹⁴³	Journal article	to discuss a variety of reactions and interferences in empathic observations	Qualitative	Qualitative description/thematic analysis	Reflective writing/open-ended written questionnaires, Participant observation, Observation and reflection on videotaped interviews	--	--	--
Osim et al., 2019 ⁸⁶	Journal article	to assess JSE in Nigeria	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, Regression, CFA/PCA
Paasche-Orlow & Roter, 2003 ¹⁰³	Journal article	to compare communication behaviours between internal medicine vs family practice physicians	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders)	Frequencies/descriptives
Pardeshi et al., 2017 ⁸⁸	Journal article	to investigate the attitudes or resident doctors towards patients with tuberculosis	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Chi square
Park et al., 2016 ⁶⁴	Journal article	to investigate residents' empathy and burnout and factors which affect these	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, Chi square, T-tests, Analyses of variance

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Park et al., 2018 ¹⁸¹	Journal article	to explore the nature of emotional expressions found among patients new to HIV care, how HIV clinicians respond to these expressions, and predictors of clinician responses	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders)	Frequencies/descriptives, Regression
*Passalacqua, 2011 ¹⁶³	Dissertation	to investigate how contextual demands, stress, and burnout impact empathy in residents throughout a long shift	Quantitative	--	--	Non-randomised exposure: Cohort study	Self-report (questionnaire)	Frequencies/descriptives, Chi square, T-tests
Paul-Savoie et al., 2018 ⁴⁴	Journal article	to investigate the influence of visible physical signs on caregiver's patient-centered and empathetic behaviours in chronic pain context	Quantitative	--	--	Non-randomised exposure: Case-control study	Self-report (questionnaire), Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders), Behavioural task	Frequencies/descriptives, T-tests
Pawlikowski, Sak & Marczewski, 2012 ¹³⁷	Journal article	to investigate physicians' religiosity and how this influences attitudes towards patients (including an empathy subscale)	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis
Peng, Clarkin & Doja, 2018 ¹⁴⁵	Journal article	to use online medical student discussion groups to provide insight into how cynicism in medicine is perceived, the consequences of cynicism on medical trainee development and potential links between the hidden curriculum and cynicism	Qualitative	Qualitative description/thematic analysis, Narrative research (i.e. life experience), Discourse analysis	Content analysis (e.g. forums)	--	--	--

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Pensek & Selic, 2018 ¹³⁰	Journal article	to assess the burnout prevalence and level of empathic attitude in family medicine doctors (FMDs) and its associations with demographic factors, working conditions and physician health,	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, T-tests, Analyses of variance, Regression, CFA/PCA
*Petrahai & Nwangwu, 2003 ⁷⁴	Dissertation	to investigate empathy in ED residents	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Chi square
Picard et al., 2016 ⁹³	Journal article	to investigate doctors' perceptions of how burnout and empathy are related	Qualitative	Qualitative description/thematic analysis	Interviews	--	--	--
Pinder, 1992 ¹⁵²	Journal article	to examine how GPs strike balance between detachment and empathy	Qualitative	Qualitative description/thematic analysis	Interviews	--	--	--
Pollak et al., 2007 ⁵⁸	Journal article	to study whether oncologist traits were associated with empathic opportunities and empathic responses	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders)	Frequencies/descriptives, Chi square, T-tests
Pollak et al., 2010 ¹⁷⁹	Journal article	to investigate whether patient attributes predict oncologist empathic responses	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders)	Frequencies/descriptives, Regression
Polonsky et al., 2014 ¹⁸³	Journal article	to understand how challenges affect empathy	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, Regression, CFA/PCA

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Porthe et al., 2018¹⁵⁹	Journal article	to investigate HCPs and immigrant patients' perceptions of quality of care during Spanish economic crisis	Qualitative	Qualitative description/thematic analysis	Interviews	--	--	--
*Psyhojos, 2017¹⁰⁸	Dissertation	to examine how the inclusion and analysis of patient-generated health data from internet of things may affect provider empathy and the physician-patient relationship	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Analyses of variance, Regression
Putrino et al., 2018⁵⁹	Journal article	to investigate factors impacting empathy in psychologists, doctors, psychology students and medical students	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire), Behavioural task	Frequencies/descriptives, Correlation analysis, Analyses of variance
Rawal, Strahlendorf & Nimmon, 2020⁶⁵	Journal article	to investigate trajectory of residents' empathy over time and factors affecting it	Qualitative	Phenomenology	Interviews	--	--	--
Reed et al., 2018⁷⁵	Journal article	to determine the short-term stability of factors associated with burnout (empathy)	Quantitative	--	--	Non-randomised exposure: Cohort study, Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, Regression
Rider et al., 2018¹⁷⁰	Journal article	to identify organizational factors that promote or inhibit humanistic practice of medicine by faculty physicians	Qualitative	Qualitative description/thematic analysis	Reflective writing/open-ended written questionnaires	--	--	--
Roberts et al., 2011⁴⁵	Journal article	to investigate how doctors' personal experiences of illness influence their compassion/empathy	Mixed-methods	Qualitative description/thematic analysis	Reflective writing/open-ended written questionnaires	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Analyses of variance

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Rosen et al., 2006 ⁶⁸	Journal article	to explore the relationships between sleep deprivation and the evolution of mood disturbances, empathy, and burnout among a cohort of interns	Quantitative	--	--	Non-randomised exposure: Cohort study	Self-report (questionnaire)	Frequencies/descriptives, Chi square, T-tests
*Ross & Indart, 2017 ¹⁵⁰	Dissertation	to investigate residents' empathy scores, impact of previous training, and to develop a new training curriculum to enhance doctor empathy	Mixed-methods	Qualitative description/thematic analysis	Reflective writing/open-ended written questionnaires	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives
Roth, Burgess & Mahowald, 2007 ¹⁸⁷	Journal article	to assess and compare residents' beliefs and concerns about using opioids for treating pain in patients with cancer and noncancer low back pain (NLBP).	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, T-tests
Roze des Ordon et al., 2020 ¹⁶⁷	Journal article	to describe how individual and contextual challenges can impact compassion within critical care and palliative care settings	Qualitative	Ethnography, Phenomenology	Interviews, Focus groups, Participant observation	--	--	--
Rubinstein & Bentwich, 2017 ¹⁸⁰	Journal article	to investigate Israeli-Jewish doctors experiences of treating Syrian patients vs Palestinian/enemy combatant patients	Qualitative	Phenomenology	Interviews	--	--	--
Saguem et al., 2020 ⁷⁶	Journal article	to assess empathy dimensions in Tunisian psychiatry trainees and to evaluate their relationship with relevant professional and extra-professional factors	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, T-tests, Analyses of variance, Regression
Salyers et al., 2015 ¹⁶⁴	Journal article	to identify ways that professional burnout may affect clinical work and consumer outcomes	Mixed-methods	Qualitative description/thematic analysis	Reflective writing/open-ended written questionnaires	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis

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Sandikci et al., 2017 ¹⁰²	Journal article	to investigate physicians' definitions of "difficult patient" and attitudes/responses (including empathising) towards them	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Chi square
Santamaria-Garcia et al., 2017 ⁴⁶	Journal article	to (a) assess different dimensions of empathy for pain in mental health workers relative to general-physicians and non-medical workers; and (b) evaluate their relationship with relevant factors, such as moral profile, age, gender, years of experience, and workplace type	Quantitative	--	--	Non-randomised exposure: Non-randomised trial	Self-report (questionnaire), Behavioural task	Chi square, Analyses of variance, Regression
*Scott, 2011 ¹⁴⁴	Dissertation	to investigate the factors affecting empathy	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Correlation analysis, CFA/PCA
Shanafelt et al., 2005 ⁷⁷	Journal article	to measure resident well-being and explored its relationship with empathy	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Wilcoxon Rank Sum Tests
Shariat, Eshtad & Ansari, 2010 ⁴⁷	Journal article	to investigate the psychometrics of the Persian JSE and factors affecting scores	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, T-tests, Regression, CFA/PCA
Silvester et al., 2007 ¹²⁰	Journal article	to assess if physician perceived control would affect empathy ratings via physician communication style	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire), Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders)	Frequencies/descriptives, Correlation analysis, SEM

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Stanton et al., 2011 ⁹⁷	Journal article	to investigate differences in emotional intelligence between psychiatrists and surgeons	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, Non-parametric tests
Stein, 1986 ¹⁷⁷	Journal article	to comment on how "real illness" vs "fake illness" are regarded by doctors in their personal explanatory models and how this may affect empathy	Qualitative	Case study	Case study	--	--	--
Stratta, Riding & Baker, 2016 ⁹⁸	Journal article	to understand whether UK Foundation doctors perceived the phenomena of ethical erosion and empathy decline during their initial period of clinical practice, and if so, why this occurred	Qualitative	Qualitative description/thematic analysis	Interviews	--	--	--
Street, Gordon & Haidet, 2007 ¹²¹	Journal article	to examine: (a) the relationships of physicians' patient-centered communication (informative, supportive, partnership-building) and affect (positive, contentious) on their perceptions of the patient, and (b) the degree to which communication and perceptions were affected by the physicians' characteristics, patients' demographic characteristics, physician-patient concordance, and the patient's communication.	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire), Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders)	Frequencies/descriptives, Regression, CFA/PCA
Suh et al., 2012 ⁸¹	Journal article	to evaluate the psychometrics of a Korean version of the Jefferson Scale of Physician Empathy (JSPE) among Korean physicians	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, T-tests, Analyses of variance, CFA/PCA

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Swendiman et al., 2019 ⁹⁰	Journal article	to identify attitudes, habits, and other factors that sustain humanism in academic surgical faculty, and compare these with attributes determined from a previous study of internal medicine faculty	Qualitative	Qualitative description/thematic analysis	Interviews	--	--	--
Uygun, Brown & Herbert, 2019 ¹³¹	Journal article	to explore family physicians' capacity for and experiences of compassion in practice	Qualitative	Phenomenology	Interviews	--	--	--
van Hoorn et al., 2019 ¹⁷³	Journal article	to investigate empathic opportunities and responses in a sample of patients visiting hand surgeons	Quantitative	--	--	Non-randomised exposure: Case-control study	Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders)	Frequencies/descriptives, Correlation analysis, T-tests
Walocha et al., 2013 ¹⁶⁵	Journal article	to determine whether a correlation existed between the level of empathy and burnout	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire), Behavioural task	Frequencies/descriptives, Correlation analysis, T-tests
Walocha, Tomaszewska & Mizia, 2013 ⁶⁰	Journal article	to assess the levels of empathy among Polish physicians and surgeons	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire), Behavioural task	Frequencies/descriptives, Correlation analysis, T-tests
Wasserman et al., 1983 ¹¹⁷	Journal article	to analyse how maternal concern affect empathy	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders)	Frequencies/descriptives, Correlation analysis, T-tests, Regression

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West et al., 2006⁹¹	Journal article	to determine the association of self-perceived medical errors with resident quality of life, burnout, depression, and empathy	Quantitative	--	--	Non-randomised exposure: Cohort study	Self-report (questionnaire)	Frequencies/descriptives, Regression, Wilcoxon-Mann-Whitney
West et al., 2007⁶⁹	Journal article	to explore residents' competency in medical knowledge and in empathy, one element of professionalism, and to evaluate the relationship between competencies in these domains.	Quantitative	--	--	Non-randomised exposure: Cohort study	Self-report (questionnaire), Academic knowledge assessment	Frequencies/descriptives, Correlation analysis, Wilcoxon signed rank test for paired data
Wohlgemuth, Auerbach & Parker, 2015¹³⁵	Journal article	to examine the dual roles of geriatric clinicians who are caregivers	Qualitative	Qualitative description/thematic analysis	Interviews	--	--	--
Wolfshohl et al., 2019⁴⁸	Journal article	to determine the association between empathy and burnout among United States emergency medicine (EM) physicians	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, Chi square, Analyses of variance
Woolf et al., 2007¹³²	Journal article	to investigate the relationship between doctors' and medical students' personal illness experiences, their examination results, preparedness for clinical practice, learning and professional attitudes and behaviour towards patients	Qualitative	Qualitative description/thematic analysis	Interviews	--	--	--
Yuguero et al., 2017¹²⁴	Journal article	to investigate nurses' and doctors' empathy and burnout	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Correlation analysis, Chi square, Analyses of variance

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Zandbelt et al., 2007⁶¹	Journal article	to examine variability in physicians' patient-centred behaviour in medical specialist encounters, and determine whether patient, visit, and physician characteristics influence this variability	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire), Assessed by coders (e.g. (video- or audiorecorded) interview assessed by coders)	Frequencies/descriptives, Regression, CFA/PCA
Zenasni et al., 2012⁸²	Journal article	(1) to develop a French version of the Jefferson Scale for Physician Empathy (JSPE) with appropriate psychometric properties; (2) to explore the relationships of clinical empathy with the sociodemographic characteristics of physicians, their training and aspects of their practice and (3) to examine associations between clinical empathy and burnout	Quantitative	--	--	Correlation/association study: Analytical cross-sectional	Self-report (questionnaire)	Frequencies/descriptives, Regression, CFA/PCA

eSupplement 8: Construct measurement scales

Construct measurement scale	Times used
JSPE or JSE	39
IRI	26
BEES	3
Empathic Communication Coding System (ECCS)	3
Roter's Interaction Analysis System (RIAS) coding	3
Bar-On Emotional Quotient Inventory (Bar-On EQ-i)	2
Epstein Emotional Empathy Scale	2
Modified Davis Observation Code	2
Reading the Mind in the Eyes test	2
Thematic Apperception Test (TAT) by Murray	2
ABIM definition (ABIM, 1988)	1
CED - clinical ethical dilemmas	1
Continuers consisted of five behaviors that have been organized by educators under the mnemonic NURSE: Name, Understand, Respect, Support, and Explore	1
Empathic behavior in residency training by a postgraduate-rating form (Hojat, Veloski, & Borenstein, 1986)	1
Empathy also anonymously reported by another physician	1
Empathy for pain task (EPT)	1
Fujimori M Akechi T Morita T Inagaki M Akizuki N Sakano Y et al. Preferences of cancer patients regarding the disclosure of bad news.	1
Global affect scales of the Roter Interaction Analysis System	1
Hogan's empathy scale	1
Moral Judgement	1
Multidimensional interaction analysis (MDIA) coding system	1
Other non-standardized: "Likert-scale items were used to assess residents' appraisals of empathic functioning"	1
Other non-standardized: "a capacity and motivation to take in patient/colleague perspective and sense associated feelings—the ability to generate a safe/understanding atmosphere"	1
Other non-standardized: attitudes concerning compassion and empathy with patients in relation to their own and family members' personal health care	1
Other non-standardized: Developed own 28-item to assess residents perceptions of efficacy and safety of using opioids to treat pain in non-cancer and cancer patient samples	1
Other non-standardized: Developed their own codebook to code empathic responses	1
Other non-standardized: Developed their own survey measuring attitudes and behaviors of physicians in coping with difficult patients and their relatives.	1

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Construct measurement scale	Times used
Other non-standardized: Did not state questionnaire just "questions related to feelings of empathy to psychiatric patients"	1
Other non-standardized: Feeling compassion/desire to help	1
Other non-standardized: Item "having an infant who required NICU admission has made me a more compassionate physician"	1
Other non-standardized: Own coding structure	1
Other non-standardized: Physicians' prosocial behaviors were the free consulting services offered by physicians in an online health care community, measured by the logged volume of free answers in a given month	1
Other non-standardized: via adjectives, but used before and validated	1
Patient Practitioner Orientation Scale (F-PPOS)	1
Patient-centred Behaviour Coding Instrument (Zandbelt et al. 2005)	1
Questionnaire based on the patient-physician communication questionnaire that was developed by Curtis et al. (2004) for chronic obstructive pulmonary disease patients in serious condition [validated in a pilot study]	1
Resource Exchange Analysis (REA)	1
Reynolds Empathy Scale (F-RES)	1
Scale of Attitude towards the Patient (SAtP)	1
Schwartz Center Compassionate Care Scale (SCCCS)	1
Self-harm knowledge, attitudes, and empathy	1
Sherbrooke Observation Scale of patient-centered care (SOS-PCC)	1
State empathy (Tsang & Stanfords 2007)	1
Suchman's definitions of empathic opportunities and oncologists' responses to them	1
The Scale of Public Attitudes about Suicide (SPAS) - empathy subscale (4)	1
Toronto Empathy Questionnaire	1
Verona Coding Definitions of Emotional Sequences (VR-CoDES)	1

eSupplement 9: A detailed portrait of studies' participants and settings

Country split	Number of studies
United States	64
United Kingdom (including England and Ireland)	16
Canada	7
The Netherlands	7
Poland	5
Spain (including Catalan)	5
China (including Taiwan)	4
Australia	3
France	3
Israel	3
Japan	3

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Country split	Number of studies
South Korea	3
Argentina	2
Denmark	2
Germany	2
Iran	2
Latin American countries (mixed)	2
Turkey	2
Brazil	1
Czech Republic	1
Greece	1
Hungary	1
India	1
Italy	1
Lebanon	1
Multi-country	1
Multi-country (Spanish speaking)	1
New Zealand	1
Nigeria	1
Pakistan	1
Portugal	1
Singapore	1
Slovenia	1
Switzerland	1
Tunisia	1

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eSupplement 10: A detailed portrait of studies' participants and settings

Author(s) and Year	Patient type	Physician gender (%female)	Physician ethnicity(% White)	Physician experience (% >10 years)	Single Institution study?	Care settings (primary/2ndary/3tiary)	Private/public	Urban/rural	Contextual settings - other	Institution size
Ahrweiler et al., 2014 ¹⁵³	General	24%	--	14.5 average	No	2ndary/3tiary	--	--	Inpatient	--
Alcorta-Garza et al., 2016 ⁹⁴	General	54%	Spanish-speaking - 50% Spain/50% Latin America	--	No	--	--	--	--	--
Anandarajah & Roseman, 2014 ¹³⁶	General	--	--	0%	No	--	--	--	--	--
Aomatsu et al., 2013 ¹⁴²	General	38%	Japanese population	0%	Yes	Primary	--	Urban	--	--
Avasarala, Whitehouse & Drake, 2015 ¹²²	General	35%	--	0%	Yes	Primary and secondary	Public	Urban	--	--
Baker et al., 2018 ¹⁵¹	Chronic pain	--	--	--	No	--	--	--	Hospital pain centres and chronic pain clinics	--
Bateman et al., 2017 ¹¹³	Children/infants	35%	88%	--	Yes	2ndary/3tiary	--	--	Paediatrics	Medium
Batley et al., 2016 ¹³⁸	General, Emergency	40%	Lebanese population	--	Yes	3tiary	--	--	ED	--
Battegay et al., 1991 ¹⁸²	HIV	--	--	--	Yes	--	--	--	AIDS outpatient clinic	--
Batton et al., 2011 ¹³³	General	--	81%	19%	No	--	--	--	--	--
Bayne et al., 2013 ³⁸	General	43%	90%	76%	Yes	mixed	--	Mixed	teaching hospital	--

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Author(s) and Year	Patient type	Physician gender (%female)	Physician ethnicity(% White)	Physician experience (% >10 years)	Single Institution study?	Care settings (primary/2ndary/3tiary)	Private/public	Urban/rural	Contextual settings - other	Institution size
Bellini, Baime & Shea, 2002 ⁶⁶	General	40%	--	0%	Yes	Mixed (in intern program; 45 in the categorical program, 8 in the primary care program, and 8 in the preliminary program)	Private	Urban	--	Large (776 beds)
Bellini & Shea, 2005 ⁶⁷	General	40%	--	0%	Yes	--	Private	Urban	--	Large
Bertakis, 2011 ¹⁰¹	General	46%	--	--	No	Primary/2ndary	--	--	--	--
Bertakis & Azari, 2012 ¹⁷⁸	General	46%	--	--	No	Primary/2ndary	--	--	--	--
Bessen et al., 2019 ¹⁵⁴	Oncology, Palliative/end-of-life	46%	--	54%	Yes	2ndary	Private	Rural	Academic hospital	Medium
Bishop et al., 2014 ¹⁶⁸	ICU patients	--	--	0%	--	3tiary	--	--	ICU	--
Borracci et al., 2015 ¹¹⁸	Cardiac patients	26%	Argentinian population	--	No	--	--	--	Cardiology	--
Brady, Bambury & O'Reilly, 2015 ⁷⁸	General	46%	--	--	Yes	2ndary/3tiary	--	--	Teaching	--
Branch et al., 2017 ¹⁴⁸	General	59%	--	--	No	--	--	--	medical schools, mostly teaching clinicians	--
Bratek et al., 2015 ⁴⁹	General	77%	--	--	Can't tell/unclear	--	--	--	--	--
Butalid, Bensing & Verhaak, 2014 ¹⁸⁶	General	26%	--	--	No	Primary	--	--	--	--

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Author(s) and Year	Patient type	Physician gender (%female)	Physician ethnicity(% White)	Physician experience (% >10 years)	Single Institution study?	Care settings (primary/2ndary/3tiary)	Private/public	Urban/rural	Contextual settings - other	Institution size
Bylund & Makoul, 2002 ¹¹⁴	General	20%	--	--	No	Primary	--	--	--	--
Bylund & Makoul, 2005 ¹⁸⁴	General	20%	--	--	No	Primary	--	--	--	--
Carmel & Glick, 1996 ⁵⁰	General	18%	Israeli	Only average years after medical school report M=17.9	Yes	--	--	Urban	--	Large
Chaitoff et al., 2017 ⁹⁹	General	33%	80.5%	15 y on average	Yes	--	--	--	Survey taken prior to communication course	--
Charles et al., 2018 ⁵¹	General	47%	--	Average 19.08 years in practice	No	Primary	--	Mixed	--	--
Chou, Kellom & Shea, 2014 ⁸⁹	General	56%	81%	10 mean years in practice	Yes	--	--	--	Teaching	--
Cicekci et al., 2017 ⁹⁵	ICU patients, Relatives/family	46%	Turkish population	--	No	3tiary	Mixed	--	ICU	--
Clara et al., 2006 ³⁹	General, Vascular illness	26%	--	53%	No	mixed	Public	Mixed	--	Mixed
Crowe & Brugha, 2018 ¹⁵⁶	General	58%	--	0%	No	--	--	--	--	--
Cyrus et al., 2017 ⁸³	General	56%	Iranian population	0%	Yes	Primary	--	--	--	--
Daidsen & Fosgerau, 2014 ¹⁰⁰	Mental health/illness, depression	48%	--	--	No	Primary/2ndary	Public	--	--	--

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Dehning et al., 2014 ¹¹⁵	General, Mental health/illness	25% for surgeons; 50% psychiatrists	--	--	Yes	--	--	--	Department of Psychiatry & Psychotherapy; Department of Surgery	--
Derksen et al., 2015 ⁸⁷	General	56%	--	16 years (mean experience)	No	Primary	Private	Mixed	solo/duo/group practice	--
Derksen et al., 2016 ¹⁴⁹	General	55%	--	16 years (mean experience)	No	Primary	Private	Mixed	solo/duo/group practice	--
Derksen et al., 2018 ¹⁴⁶	General	56%	--	16 years (mean experience)	No	Primary	Private	Mixed	solo, duo, group practice	--
Dhawan, Steinbach & Halpern, 2007 ¹⁰⁹	General, correctional facility patients	18%	----	69%	No	54% correctional facilities; 46% non-correctional primary care physicians	--	--	--	--
Di Lillo et al., 2009 ⁷⁹	General	26%	--	87%	No	2ndary/3tiary	--	--	Teaching	Large
Epstein & Borrelli, 2001 ¹²⁵	General	--	--	--	No	Primary	--	--	--	--
Epstein et al., 2007 ¹⁸⁵	Medically Unexplained Symptoms (worry, something serious)	23%	--	--	No	Primary	--	Mixed	24% solo practitioners	--

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Ferreira, Afons & Ramos, 2020 ⁸⁴	General	48%	--	--	No	2 of 8 primary; 2 of 8 university hospitals; 4 district hospitals	--	--	--	Medium and large
Foo et al., 2017 ¹¹²	General	44%	47%	--	No	Primary	--	--	--	--
Foreback et al., 2018 ⁶²	General	--	--	0%	No	--	--	--	--	--
Fox et al., 2009 ¹²⁸	General	41%	94%	--	No	Primary	Public	--	GPs who experienced significant illness	--
Fulop et al., 2011 ¹⁴⁰	General	76%	--	0%	No	--	--	--	--	--
Gateshill, Kucharska-Pietura & Wattis, 2011 ¹¹⁰	Mental health/illness	--	--	--	No	Primary and secondary	--	--	--	--
Gilligan et al., 2019 ¹⁶⁰	General	38%	--	--	No	Primary	--	--	--	--
Gleichgerrcht & Decety, 2013 ⁵²	General	47%	Latin-American population	Average of 11.9	No	--	--	--	www.intramed.net	--
Gottenborg et al., 2018 ¹³⁹	General	100%	--	30% (over 7 years)	No	--	--	--	--	--
Greenberg et al., 2015 ⁷⁰	Children/infants	82%	88%	0%	Yes	--	--	--	teaching	--
Haider, Riaz & Gill, 2020 ¹²⁷	General	--	Pakistani population	--	Yes	--	--	--	--	--
Handford et al., 2013 ⁴⁰	General	45%	--	Mean duration of clinical	Yes	--	--	--	--	--

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				practice 22 years						
Hayuni et al., 2019 ¹⁶¹	Oncology	59%	Israeli population	--	No	Secondary	--	--	--	--
Hojat et al., 2002a ⁹⁶	General	25%	--	--	Yes	Mixed	--	Urban	--	Large
Hojat et al., 2002b ⁹²	General	26%	--	--	Yes	Mixed	--	Urban	--	
Hojat et al., 2005 ¹⁴¹	General	42%		0%	No	--	--	--	--	--
Hong et al., 2011 ⁶³	Mental health/illness	42%	Korean population	0%	No	--	--	--	Psychiatric	--
Jaye & Wilson, 2003 ¹²⁹	General	35%	--	100%	No	Primary	--	Mixed		
Jiao et al., 2014 ⁵³	Suicide ideation/self-harm	56%	Chinese population	mean duration 14 years	No	2ndary/3tirary	--	--	Mental health hospitals/centred /rehubs	--
Jin et al., 2020 ¹⁰⁶	General	60%	Chinese population	0%	Yes	--	--	--	--	--
Jing, Jin & Liu, 2019 ⁸⁵	General	--	Chinese population	--	No	Not reported, mix from 3,851 hospitals	--	--	--	--
Johnson Shen et al., 2019 ¹⁷⁶	Lung cancer patients	--	--	--	Yes	Secondary	--	--	Cancer centre	Large
Julia-Sanchis et al., 2019 ⁴¹	General, Children/infants, Emergency	63%	--	1-39 years (% not reported)	No	--	--	--	ED	--
Kataoka et al., 2012 ⁴²	General	100%	Japanese population	--	Yes	--	--	--	teaching	--
Katsari et al., 2020 ⁴³	General	53%	--	6%	Yes	--	--	--	--	--

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Kealy et al., 2016 ¹⁶²	General	64%	--	0%	No	--	--	--	--	--
Kemper et al., 2020 ¹⁵⁸	Children/infants	71-73%	70-74%	0%	No	--	--	--	residency programmes	--
Kennifer et al., 2009 ¹⁷⁵	Oncology	18%	81%	--	No	Secondary	--	--	--	--
Kerasidou & Kingori, 2019 ¹⁷¹	Emergency	--	--	--	No	Primary	--	Mix of urban and rural	--	Mix
Kerasidou, 2019 ¹⁶⁹	General, Emergency	--	--	different seniority levels	No	A&E (2ndary)	Public (NHS)	Urban and rural	A&E (ED), two teaching and one regional hospitals	--
Khajavi & Hekmat, 1971 ⁷¹	Mental health/illness	--	--	--	No	Primary	--	--	--	--
Kirmayer, 2008 ¹²⁶	Mental health/illness	0%	--	0%	Yes	Secondary	--	--	--	--
Kliszcz et al., 2006 ¹¹⁶	General, Children/infants	81%	--	0%	--	--	--	--	--	--
Kobayasi et al., 2018 ¹¹⁹	General	28%	Brazilian population - NR	0%	Yes	2ndary/3tiary	Public	Urban	Internal medicine rotations	Large
Komisar & McFarland, 2017 ¹²³	Palliative/end-of-life	52%		0%	Yes	Tertiary		Urban	End of Life Hematology/Oncology Ward	Large
Kondo et al., 2013 ⁵⁴	Oncology	17%	Japanese population - NR	50%	--	2ndary/3tiary	--	--	Oncology	--
Kozeny & Tisanska, 2013 ⁵⁵	General	55%	--	--	No	Mixed	Mixed (47% private; 53% public)	Mixed	--	Mixed

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Krenek & Zalewski, 1993 ¹³⁴	Mental health/illness	15%	--	--	No	--	--	--	--	--
Lases et al., 2019 ¹⁷²	General	45%	--	0%	No	--	--	--	academic & non-academic	--
Lebowitz & Ahn, 2014 ¹⁸⁹	Mental health/illness	56.8%, 71.4%, 68.9%	77.3%, 84.8%, 84%	Median year of licensing 1999-2000	No	--	--	--	mental health	--
Lee et al., 2018 ⁷²	General	55%	Chinese sample	0%	No	Mixed	--	Mixed	3 general hospitals, 5 speciality centres, 9 community clinics	Mixed
Lelorain et al., 2013 ⁵⁶	General	49%	--	average reported 22.8 years	No	Primary	--	--	--	--
Lin, Hsu & Chong, 2008 ¹⁵⁷	Emergency	0%	Taiwanese population	9-17 years	No	2ndary	--	--	ED	Medium-large
Lown, Shin & Jones, 2019 ⁵⁷	General	19%	--	32%	No	Primary and secondary	--	--	--	Likely mixed
*Lyness, 1993 ¹⁴⁷	Children/infants	68%	--	0%	Yes	Primary	--	Urban	Pediatrics	--
Mahoney, Sladek & Neild, 2016 ¹⁰⁷	General	--	--	> 8 years 94.4%, 98.7%	No	Mixed	47.7% public	Mostly urban (94.9%)	Majority teaching	--
Mangione et al., 2002 ⁷³	General	--	--	0%	Yes	--	--	--	--	--
McFarland & Roth, 2017 ¹⁰⁵	Oncology	52%	--	0%	Yes	3tiary	Private	Urban	Teaching hospital, hematology/oncology ward	Large

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McFarland, Malone & Roth, 2017 ¹⁰⁴	Oncology	52%	--	0%	Yes	3tiary	Private	Urban	Teaching hospital, hematology/oncology ward	Large
McManus et al., 2011 ¹⁶⁶	General		--	--	No	--	--	--	--	--
Meeuwesen et al., 2006 ¹⁷⁴	General	29%	--	--	No	Primary	--	Urban	--	--
Mills, Wand & Fraser, 2018 ¹⁵⁵	Palliative/end-of-life	63%	--	83% (also includes the nurses)	No	Mixed	--	Mixed	Palliative	Mixed
Moralle et al., 2016 ¹¹¹	General	--	--	0%	Yes	--	--	Urban	--	--
Moriarty et al., 2020 ⁸⁰	Suicide ideation/self-harm, Young adults (12 to 25 years old)	54%	--	--	No	--	--	--	--	--
Muggleton, Guy & Howard, 2015 ¹⁸⁸	Palliative/end-of-life, Disgusting symptoms	100%	--	100% (for physician)	Yes	3tiary	Public	--	Palliative	--
Muslin & Schlessinger, 1971 ¹⁴³	Mental health/illness	--	--	0%	Yes	--	--	--	--	--
Osim et al., 2019 ⁸⁶	General	42%	Nigerian population	--	Yes	Primary and Secondary	Public (assume by government-owned)	Urban	--	Large

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Paasche-Orlow & Roter, 2003 ¹⁰³	General	10%	85%	--	No	Primary	--	Urban	--	--
Pardeshi et al., 2017 ⁸⁸	TB	45%	Indian population	0%	Yes	--	--	--	--	--
Park et al., 2016 ⁶⁴	General	33%	Korean population	0%	No	--	--	--	Teaching	--
Park et al., 2018 ¹⁸¹	HIV	79%	68%	--	Yes	Secondary	--	Urban	--	--
*Passalacqua, 2011 ¹⁶³	General	32%	--	0%	Yes	--	--	--	--	--
Paul-Savoie et al., 2018 ⁴⁴	Chronic pain	69%	--	average of 19.74 years of clinical experience (no %)	Can't tell/unclear	Mixed	--	--	Chronic pain	--
Pawlikowski, Sak & Marczewski, 2012 ¹³⁷	General	51%	--	--	No	--	Public	--	--	--
Peng, Clarkin & Doja, 2018 ¹⁴⁵	General	--	--	0%	--	--	--	--	Premed101 (Canadian) and Student Doctor Network (American) forums.	--
Pensek & Selic, 2018 ¹³⁰	General	82%	--	11.2 years average	No	Primary	Public	63% urban; 37% rural	--	--
*Petrahai & Nwangwu, 2003 ⁷⁴	General	23%	87%	0%	Yes	Primary	Public	Urban	--	Large
Picard et al., 2016 ⁹³	General	50%	--	0%	No	2ndary	--	--	General Medicine	--

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Pinder, 1992 ¹⁵²	Parkinsons Disease	--	--	--	--	Primary	--	--	--	--
Pollak et al., 2007 ⁵⁸	Oncology	50%	74%	Mean years since fellowship 14.7	No	3tiary	--	--	Oncology	--
Pollak et al., 2010 ¹⁷⁹	Oncology	19%	79%	mean years since fellowship 15.6	No	3tiary	--	--	Oncology	--
Polonsky et al., 2014 ¹⁸³	General	34%	NR - multicountry	--	No	Primary and secondary	--	--	--	--
Porthe et al., 2018 ¹⁵⁹	Immigrants	46%	Catalan population	--	No	Primary/2ndaty	--	Mixed	--	--
*Psyhojos, 2017 ¹⁰⁸	General	0%	--	75% attending	No	--	--	--	The authors bought a database of emails	--
Putrino et al., 2018 ⁵⁹	General	62%	Argentinian - NR	24 out of 64 physicians and psychologists	No	--	Mix (physicians from public hospitals and students either from a public or private university)	Urban	--	--

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Rawal, Strahlendorf & Nimmon, 2020 ⁶⁵	Children/infants	70%	--	0%	Yes	--	--	Urban	--	Large
Reed et al., 2018 ⁷⁵	Children/infants	63%	78%	0%	Yes	2ndary/3tiary	--	--	Children hospital	Large
Rider et al., 2018 ¹⁷⁰	General	59%	--	--	No	Primary	--	--	--	--
Roberts et al., 2011 ⁴⁵	General	45%	69%	--	Yes	Mixed	--	--	Teaching hospital	--
Rosen et al., 2006 ⁶⁸	General	51%	--	0%	Yes	--	--	--	Teaching hospital	--
*Ross & Indart, 2017 ¹⁵⁰	General	61%	46%	0%	Yes	Primary	--	Urban	--	Large
Roth, Burgess & Mahowald, 2007 ¹⁸⁷	Chronic pain	--	--	0%	Yes	Primary	--	--	--	--
Roze des Ordon et al., 2020 ¹⁶⁷	Palliative/end-of-life, ICU	--	--	--	--	--	--	--	--	--
Rubinstein & Bentwich, 2017 ¹⁸⁰	patient who are in direct (military) conflict with the host (Palestinians/Syrians)	20%	Israeli - NR	100%	No	2ndary/3tiary	--	--	Military conflict	--
Saguem et al., 2020 ⁷⁶	Mental health/illness	Tunisian population	71%	--	No	--	--	--	In/outpatient, ED	--
Salyers et al., 2015 ¹⁶⁴	General, Veterans	69%	77%	--	Yes	--	--	--	Veterans Affairs (VA) medical center	--

PREDICTORS OF PHYSICIAN COMPASSION: A SYSTEMATIC REVIEW

Author(s) and Year	Patient type	Physician gender (%female)	Physician ethnicity(% White)	Physician experience (% >10 years)	Single Institution study?	Care settings (primary/2ndary/3tiary)	Private/public	Urban/rural	Contextual settings - other	Institution size
Sandikci et al., 2017 ¹⁰²	"Difficult patient"	52%	Turkish population	25%	No	Mixed	--	--	--	--
Santamaria-Garcia et al., 2017 ⁴⁶	General, Pain	51%	Latin-American populations	--	No	Primary/2ndary	--	--	Professionals who accessed Intramed (www.intramed.net)	--
*Scott, 2011 ¹⁴⁴	General	59%	33%	--	No	Primary	--	--	--	--
Shanafelt et al., 2005 ⁷⁷	General	30%	--	0%	No	--	--	--	Teaching	Large
Shariat, Eshtad & Ansari, 2010 ⁴⁷	General	53%	Iranian population	--	No	Primary	--	--	GPs approached during the Annual Meeting of the Iranian National Medical Council	--
Silvester et al., 2007 ¹²⁰	General	47%	55%	0%	No	Primary	Public	--	NHS	--
Stanton et al., 2011 ⁹⁷	General	30%	--	--	No	--	--	--	--	--
Stein, 1986 ¹⁷⁷	Veterans	--	--	--	Yes	--	--	--	--	--
Stratta, Riding & Baker, 2016 ⁹⁸	General	67%	--	0% (foundation year)	Yes	2ndary/3tiary	Public	Urban	--	Large
Street, Gordon & Haidet, 2007 ¹²¹	General	40%	31%	--	No	Primary	Public and private	Urban	--	--
Suh et al., 2012 ⁸¹	General	45%	Korean population	--	Yes	2ndary	--	--	Teaching	--
Swendiman et al., 2019 ⁹⁰	General	30%	80%	16 mean	Yes	--	--	--	Teaching	--

PREDICTORS OF PHYSICIAN COMPASSION: A SYSTEMATIC REVIEW

Author(s) and Year	Patient type	Physician gender (%female)	Physician ethnicity(% White)	Physician experience (% >10 years)	Single Institution study?	Care settings (primary/2ndary/3tiary)	Private/public	Urban/rural	Contextual settings - other	Institution size
Uygur, Brown & Herbert, 2019 ¹³¹	General, Palliative/end-of-life, Emergency	59%	--	41%	No	Mixed, mainly primary	--	Both	3 academic (13.6%), 9 teaching (40.9%) = 54.5%	--
van Hoorn et al., 2019 ¹⁷³	Hand surgery patients	--	--	--	Yes	Secondary	--	Urban	--	--
Walocha et al., 2013 ¹⁶⁵	General	35%	--	--	No	--	--	--	Hospitals, outpatient clinics or university departments	--
Walocha, Tomaszewska & Mizia, 2013 ⁶⁰	General	27%	--	--	--	--	--	--	Hospital wards, outpatient departments, didactic departments	--
Wasserman et al., 1983 ¹¹⁷	Children/infants	44%	--	0%	Yes	Primary	--	Urban	--	--
West et al., 2006 ⁹¹	General	36%	--	0%	Yes	--	--	--	Internal Medicine	--
West et al., 2007 ⁶⁹	General	35%	--	0%	Yes	--	--	--	Teaching	--
Wohlgemuth, Auerbach & Parker, 2015 ¹³⁵	Elderly	81%	100%	--	Yes	3tiary	--	Urban	Geriatric	--
Wolfshohl et al., 2019 ⁴⁸	General, Emergency	29%	78%	23.5% > 5 years	Yes	--	--	--	ED	--
Woolf et al., 2007 ¹³²	General	50%	--	38%	Yes	--	--	Urban	Teaching hospital	--
Yuguero et al., 2017 ¹²⁴	General	73%	Catalan population	48 median age	No	Primary	--	Mixed	--	--

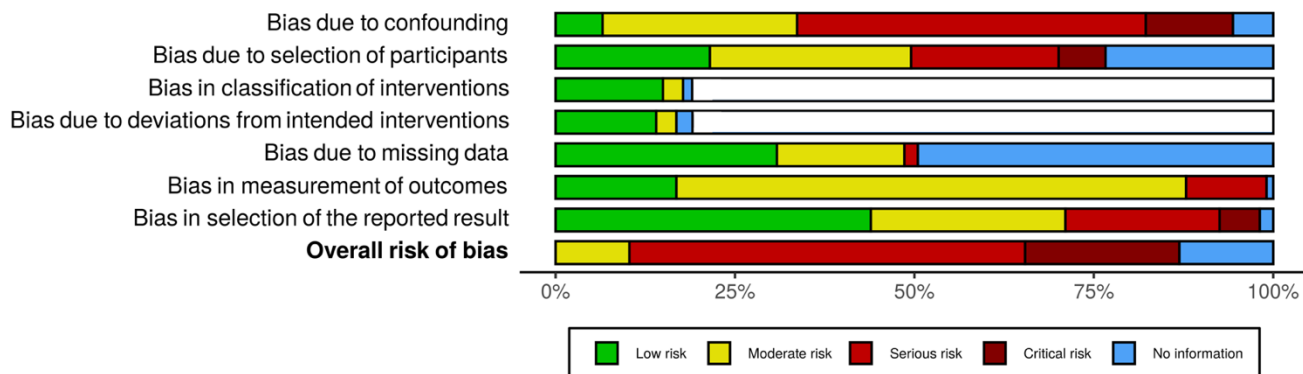
PREDICTORS OF PHYSICIAN COMPASSION: A SYSTEMATIC REVIEW

Author(s) and Year	Patient type	Physician gender (%female)	Physician ethnicity(% White)	Physician experience (% >10 years)	Single Institution study?	Care settings (primary/2ndary/3tiary)	Private/public	Urban/rural	Contextual settings - other	Institution size
Zandbelt et al., 2007 ⁶¹	General	47%	--	8.6 years average (50% staff/50% residents)	Yes	2ndary	--	Urban	--	Large
Zenasni et al., 2012 ⁸²	General	49%	--	Unknown - ages 27-75 y.o.	No	Primary	--	Mixed	GPs	--

PREDICTORS OF PHYSICIAN COMPASSION: A SYSTEMATIC REVIEW

eSupplement 11: Risk of Bias – Quantitative studies – ROBINS-I

A) All studies



B) Independent studies

	Risk of bias domains							Overall
	D1	D2	D3	D4	D5	D6	D7	
Alcorta-Garza et al., 2016	⊗	-			-	-	+	⊗
Avasarala, Whitehouse & Drake, 2015	⊗	⊗			+	-	+	⊗
Batton et al., 2011	⊕	-			?	-	+	⊕
Bellini & Shea, 2005	⊗	+	+	+	?	-	-	⊗
Bellini, Baime & Shea, 2002	⊗	+	+	+	?	-	+	⊗
Bertakis & Azari, 2012	⊗	+	+	+	-	+	⊗	⊗
Bertakis, 2011	⊗	+	+	+	-	+	⊗	⊗
Borracci et al., 2015	⊗	-			?	-	+	⊗
Brady, Bambury & O'Reilly, 2015	⊕	?			?	-	⊕	⊕
Bratek et al., 2015	⊗	?			?	-	⊗	⊗
Butalid, Bensing & Verhaak, 2014	-	+	+	+	-	-	-	-
Bylund & Makoul, 2002	⊗	+			+	-	-	⊗
Bylund & Makoul, 2005	⊗	?			+	-	⊕	⊕
Carmel & Glick, 1996	-	-			?	⊗	-	⊗
Chaitoff et al., 2017	-	⊗			⊗	-	⊗	⊗
Charles et al., 2018	-	-			+	-	+	-
Cicekci et al., 2017	⊗	?			?	-	+	⊗
Clara et al., 2006	-	+			-	+	+	-
Cyrus et al., 2017	⊗	⊕			-	-	+	⊕
Dehning et al., 2014	-	+			+	+	+	-
Dhawan, Steinbach & Halpern, 2007	⊗	⊕			?	-	-	⊕
Di Lillo et al., 2009	-	⊗			+	-	+	⊗
Epstein et al., 2007	⊗	⊗			+	⊗	+	⊗
Ferreira, Afons & Ramos, 2020	-	?			+	-	+	?
Foo et al., 2017	⊗	-			?	+	?	⊗
Foreback et al., 2018	⊗	⊗			?	-	⊗	⊗
Fulop et al., 2011	⊕	?			?	-	⊗	⊕
Gateshill, Kucharska-Pietura & Wattis, 2011	⊗	?			+	-	+	⊗

PREDICTORS OF PHYSICIAN COMPASSION: A SYSTEMATIC REVIEW

Gleichgerrcht & Decety, 2013	-	?			?	-	+	?
Greenberg et al., 2015	!	X	+	+	?	-	+	!
Handford et al., 2013	+	?			?	+	+	?
Hayuni et al., 2019	X	-			-	-	+	X
Hojat et al., 2002a	X	-			?	-	-	X
Hojat et al., 2002b	X	-			+	-	-	-
Hojat et al., 2005	+	-	+	+	?	X	-	X
Hong et al., 2011	X	X			+	-	+	X
Jiao et al., 2014	-	+			?	-	+	?
Jin et al., 2020	X	+			+	-	-	X
Jing, Jin & Liu, 2019	X	-	+	?	+	+	-	X
Johnson Shen et al., 2019	!	-			?	+	+	!
Julia-Sanchis et al., 2019	-	?			+	-	+	?
Kataoka et al., 2012	X	X			?	-	+	X
Katsari et al., 2020	X	?			?	-	+	X
Kealy et al., 2016	-	-			+	-	+	-
Kemper et al., 2020	X	-	+	+	-	-	+	X
Kennifer et al., 2009	X	-			+	X	X	X
Khajavi & Hekmat, 1971	?	?			?	-	-	?
Kluszcz et al., 2006	X	?			?	-	-	X
Kobayasi et al., 2018	+	+			?	-	+	?
Komisar & McFarland , 2017	-	-			?	-	X	X
Kondo et al., 2013	-	?			+	+	+	?
Kozeny & Tisanska, 2013	-	+			?	-	-	?
Krenek & Zalewski, 1993	X	!			-	-	-	!
Lases et al., 2019	-	X			-	-	-	X
Lebowitz & Ahn, 2014	X	!	+	+	?	-	+	!
Lee et al., 2018	+	X			?	-	-	X
Lelorain et al., 2013	?	-			-	-	+	?
Lown, Shin & Jones, 2019	X	+			?	-	X	X
Mahoney, Sladek & Neild, 2016	X	!			?	-	X	!
Mangione et al., 2002	X	+			+	-	X	X
McFarland & Roth, 2017	!	-	-	-	-	-	+	!
McFarland, Malone & Roth, 2017	X	-	-	+	-	-	-	X
McManus et al., 2011	!	-			-	-	+	!
Meeuwesen et al., 2006	X	X			?	+	?	X
Moralle et al., 2016	?	X			?	-	-	X
Moriarty et al., 2020	-	+			-	-	+	-
Osim et al., 2019	-	+			?	-	+	?
Paasche-Orlow & Roter, 2003	X	X			+	+	-	X
Pardeshi et al., 2017	X	+			?	-	X	X
Park et al., 2016	-	X			?	-	+	X
Park et al., 2018	X	?			?	+	+	X
Passalacqua, 2011	-	?			?	X	-	X
Paul-Savoie et al., 2018	X	?	-	+	+	X	X	X

PREDICTORS OF PHYSICIAN COMPASSION: A SYSTEMATIC REVIEW

Pawlikowski, Sak & Marczewski, 2012	⬇️	⚠️			?	-	-	⬇️
Pensek & Selic, 2018	⚠️	⬇️			+	-	+	⬇️
Petrahai & Nwangwu, 2003	?	+			?	-	⬇️	⬇️
Pollak et al., 2007	⚠️	⬇️			+	+	⬇️	⬇️
Pollak et al., 2010	⬇️	⬇️			+	⬇️	⬇️	⬇️
Polonsky et al., 2014	⬇️	⚠️			?	-	-	⬇️
Psyhojos, 2017	?	⬇️			+	-	+	⬇️
Putrino et al., 2018	⬇️	?			+	+	+	⬇️
Reed et al., 2018	⬇️	-	+	+	-	-	-	⬇️
Roberts et al., 2011	⚠️	⚠️			+	⬇️	+	⬇️
Rosen et al., 2006	⬇️	+	+	+	?	-	+	⬇️
Ross & Indart, 2017	⬇️	⬇️			?	⬇️	-	⬇️
Roth, Burgess & Mahowald, 2007	⬇️	-			?	-	-	⬇️
Saguem et al., 2020	⬇️	⚠️			+	-	⬇️	⬇️
Salyers et al., 2015	⬇️	⬇️			?	⬇️	⬇️	⬇️
Sandikci et al., 2017	⬇️	⬇️			?	⬇️	⬇️	⬇️
Santamaria-Garcia et al., 2017	⚠️	?			?	?	⬇️	⬇️
Scott, 2011	⬇️	⬇️			?	-	⬇️	⬇️
Shanafelt et al., 2005	+	-			+	-	+	-
Shariat, Eshtad & Ansari, 2010	⬇️	-			+	-	⬇️	⬇️
Silvester et al., 2007	⬇️	?	+	-	?	-	-	⬇️
Stanton et al., 2011	?	-			?	-	+	?
Street, Gordon & Haidet, 2007	⚠️	?			⬇️	⬇️	-	⬇️
Suh et al., 2012	⬇️	+			+	-	+	⬇️
van Hoorn et al., 2019	+	?	+	-	+	+	+	?
Walocha et al., 2013	⬇️	?			?	+	⬇️	⬇️
Walocha, Tomaszewska & Mizia, 2013	⚠️	?			?	+	⬇️	⬇️
Wasserman et al., 1983	+	?			+	-	-	?
West et al., 2006	⚠️	+	+	+	-	-	+	-
West et al., 2007	⬇️	⬇️	+	+	?	-	⬇️	⬇️
Wolfshohl et al., 2019	⬇️	+			+	-	⬇️	⬇️
Yuguero et al., 2017	⬇️	⬇️			?	-	⬇️	⬇️
Zandbelt et al., 2007	⚠️	+			-	+	+	-
Zenasni et al., 2012	⚠️	⚠️			-	-	-	-

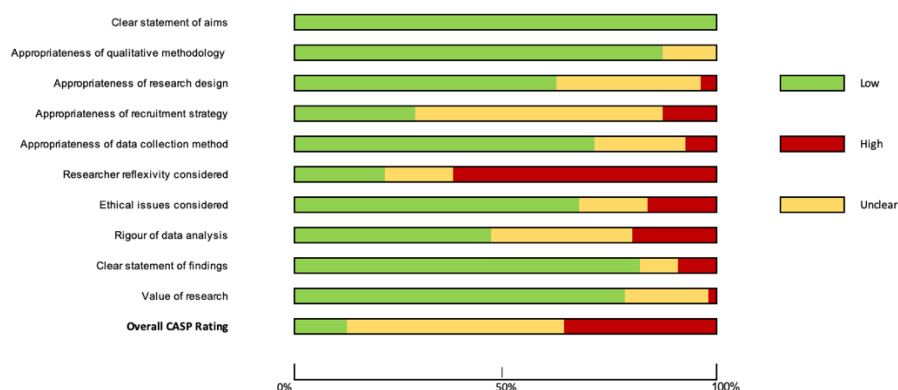
Domains:
D1: Bias due to confounding.
D2: Bias due to selection of participants.
D3: Bias in classification of interventions.
D4: Bias due to deviations from intended interventions.
D5: Bias due to missing data.
D6: Bias in measurement of outcomes.
D7: Bias in selection of the reported result.

Judgement
⬇️ Critical
⬇️ Serious
⚠️ Moderate
+ Low
? No information

PREDICTORS OF PHYSICIAN COMPASSION: A SYSTEMATIC REVIEW

eSupplement 12: Risk of Bias – Qualitative studies (CASP)

A) All studies



A) Independent studies (N=53)

Study	Criteria										Overall Assessment
	1	2	3	4	5	6	7	8	9	10	
Ahrweiler et al., 2014	Y	Y	Y	N	Y	Y	U	Y	Y	Valuable	Unclear
Anandarajah & Roseman, 2014	Y	Y	Y	Y	Y	Y	Y	Y	Y	Valuable	Low
Aomatsu et al., 2013	Y	Y	Y	U	Y	U	Y	U	Y	Valuable	Unclear
Baker et al., 2018	Y	Y	Y	Y	Y	Y	Y	Y	Y	Valuable	Low
Bateman et al., 2017	Y	Y	Y	U	Y	N	Y	U	Y	Valuable	Unclear
Batley et al., 2016	Y	Y	Y	U	Y	Y	Y	Y	Y	Valuable	Low
Battegay et al., 1991	Y	Y	U	U	U	N	N	U	Y	Valuable	High
* Batton et al., 2011	Y	Y	U	Y	U	N	Y	N	U	Unclear	High
Bayne et al., 2013	Y	Y	Y	U	Y	N	Y	Y	Y	Valuable	Unclear
Bessen et al., 2019	Y	Y	U	U	Y	N	U	U	Y	Valuable	High
Bishop et al., 2014	Y	Y	Y	U	U	U	N	Y	Y	Valuable	Unclear
* Brady, Bambury & O'Reilly, 2015	Y	U	U	U	U	U	N	N	N	Unclear	High
Branch et al., 2017	Y	Y	Y	N	Y	N	Y	Y	Y	Valuable	Unclear
Chou, Kellom & Shea, 2014	Y	Y	N	Y	Y	N	Y	Y	Y	Valuable	Unclear
Crowe & Brugha, 2018	Y	Y	Y	U	Y	N	Y	Y	U	Valuable	Unclear
Daidsen & Fosgerau, 2014	Y	Y	Y	N	Y	U	U	Y	Y	Valuable	Unclear
Derksen et al., 2015	Y	Y	Y	Y	Y	Y	N	U	Y	Valuable	Unclear
Derksen et al., 2016	Y	Y	Y	Y	Y	N	Y	U	Y	Unclear	Unclear
Derksen et al., 2017	Y	Y	Y	U	U	U	Y	U	Y	Valuable	Unclear
Epstein & Borrelli, 2001	Y	Y	U	U	Y	N	N	N	N	Valuable	High
* Epstein et al., 2007	Y	Y	U	U	Y	N	Y	Y	Y	Unclear	High
Fox et al., 2009	Y	Y	Y	Y	Y	Y	Y	Y	Y	Valuable	Low
Gilligan et al., 2019	Y	Y	Y	U	U	N	Y	Y	Y	Valuable	Unclear

PREDICTORS OF PHYSICIAN COMPASSION: A SYSTEMATIC REVIEW

Study	Criteria										Overall Assessment
	Authors	1	2	3	4	5	6	7	8	9	
Gottenborg et al., 2018	Y	Y	U	Y	Y	N	Y	Y	Y	Valuable	Unclear
Haider, Riaz & Gill, 2020	Y	Y	Y	U	Y	Y	U	Y	Y	Valuable	Unclear
Jaye & Wilson, 2003	Y	Y	U	Y	Y	N	N	Y	Y	Valuable	Unclear
Kerasidou & Kingori, 2019	Y	Y	Y	U	Y	N	Y	U	Y	Valuable	Unclear
Kerasidou, 2019	Y	Y	U	U	U	N	Y	U	Y	Valuable	High
Kirmayer, 2008	Y	U	U	N	N	N	U	N	Y	Unclear	High
* Kobayasi et al., 2018	Y	Y	Y	U	Y	N	Y	Y	Y	Unclear	Unclear
Lin, Hsu & Chong, 2008	Y	Y	Y	U	Y	Y	Y	N	Y	Valuable	Unclear
Lyness, 1993	Y	Y	Y	U	Y	N	N	U	Y	Valuable	High
Mahoney, Sladek & Neild, 2016	Y	Y	Y	U	Y	N	Y	N	Y	Valuable	Unclear
Mills, Wand & Fraser, 2018	Y	Y	Y	U	Y	U	Y	Y	Y	Valuable	Unclear
Mugleton, Guy & Howard, 2015	Y	Y	Y	N	Y	N	Y	N	U	Valuable	High
Muslin & Schlessinger, 1971	Y	U	U	U	N	N	N	U	U	Unclear	High
Peng, Clarkin & Doja, 2018	Y	Y	Y	Y	Y	N	Y	Y	Y	Valuable	Unclear
Picard et al., 2016	Y	Y	Y	U	Y	U	U	Y	Y	Valuable	Unclear
Pinder, 1992	Y	Y	U	U	U	N	U	U	Y	Valuable	High
Porthe et al., 2018	Y	Y	U	Y	Y	N	Y	U	Y	Valuable	Unclear
Rawal, Strahlendorf & Nimmon, 2020	Y	U	Y	Y	Y	Y	Y	Y	Y	Valuable	Low
Rider et al., 2018	Y	Y	U	U	U	U	Y	U	Y	Valuable	High
* Roberts et al., 2011	Y	Y	Y	Y	Y	Y	Y	N	Y	Valuable	Unclear
* Ross & Indart, 2017	Y	U	U	U	Y	U	Y	N	N	Unclear	High
Roze des Ordons et al., 2020	Y	Y	Y	U	Y	Y	Y	Y	Y	Valuable	Low
Rubinstein & Bentwich, 2017	Y	Y	U	Y	Y	N	U	U	N	Unclear	High
* Salyers et al., 2015	Y	U	U	U	U	N	U	N	N	Unclear	High
Stein, 1986	Y	U	U	N	N	N	N	N	U	Unclear	High
Stratta, Riding & Baker, 2016	Y	Y	U	N	N	N	Y	Y	Y	Valuable	High
Swendiman et al., 2019	Y	Y	N	Y	Y	N	Y	Y	Y	Valuable	Unclear
Uygur, Brown & Herbert, 2019	Y	Y	Y	Y	Y	Y	Y	Y	Y	Valuable	Low
Wohlgemuth, Auerbach & Parker, 2015	Y	Y	Y	U	U	N	Y	Y	Y	Valuable	Unclear
Woolf et al., 2007	Y	Y	Y	U	U	N	Y	U	Y	Valuable	High

CASP criteria for qualitative studies: 1. Was there a clear statement of the aims of the research? 2. Is a qualitative methodology appropriate? 3. Was the research design appropriate to address the aims of the research? 4. Was the recruitment strategy appropriate to the aims of the research? 5. Was the data collected in a way that addressed the research issue? 6. Has the relationship between researcher and participants been adequately considered? 7. Have ethical issues been taken into consideration? 8. Was the data analysis sufficiently rigorous? 9. Is there a clear statement of findings? 10. How valuable is the research? Y = Yes, N = No, U = Unclear

PREDICTORS OF PHYSICIAN COMPASSION: A SYSTEMATIC REVIEW

eSupplement 13: GRADE-CERQual Assessment

Domain description	Summary of review finding	GRADE-CREQual Assessment				CERQual assessment
		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
PHYSICIAN	Socio-demographic factors (N=75, quantitative=57, qualitative=14, mixed methods = 4)					
	<p>Gender (N=50, quantitative=46, qualitative*=1, mixed methods^=3): females seem to be more likely to be compassionate/empathetic; although the evidence is weak as there is similar number of studies showing no gender effect at all</p>	<p>Moderate concerns: Serious concerns due to lack of controls for confounding effects of experience, non-probability selection with small response rates and instances of selective reporting. However, the results from different quality of studies are similar.</p>	<p>Moderate concerns: High factor coherence, although the effect is less coherent with similar amount of studies showing either positive effect of females gender or no gender effect at all.</p>	<p>No or minor concerns: Sufficient samples, geographic diversity of data, diverse specialities, patient types; some studies have less than 25% women in their sample but that does not seem to affect the result.</p>	<p>No or minor concerns: 38 studies assess physicians at different seniority levels and 18 - residents, the results are similar. Most of the studies cover empathy (JSPE, IRI). Results of studies related to either compassionate care (N=6) or patient-centred care (N=2) are similar.</p>	Moderate confidence
	<p>Age (N=29, all quantitative): the evidence regarding the impact of age on ECRCs is conflicting and inconclusive, higher quality studies indicate either positive older age effect or no effect</p>	<p>Serious concerns: 17 out of 29 studies have serious risk of bias due to confounding, selective reporting and bias in selection of participants. Studies indicating the possibility of positive age effect, and no age effect are of higher quality</p>	<p>Serious concerns: High factor coherence, low effect coherence.</p>	<p>No or minor concerns: Mostly quantitative data - sufficient, diverse samples</p>	<p>Moderate concerns: Only 4 studies on patient-centred/ compassionate care, but the results are similar</p>	Low confidence

PREDICTORS OF PHYSICIAN COMPASSION: A SYSTEMATIC REVIEW

Domain description	Summary of review finding	GRADE-CREQual Assessment				CERQual assessment
		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
	<p>Ethnicity/race/culture (N=13, quantitative=10, qualitative*=3): ethnicity/race does not seem to be a factor clearly affecting physician ECRCs; however cultural understanding (or even possibly how the scales are read and completed) may be indicative of the perceived differences</p>	<p>Serious concerns - all studies are of high risk of bias across all domains</p>	<p>Serious concerns: Low coherence - race/ethnicity effect would depend on geographical location and diversity, cultural understanding of constructs might have an effect</p>	<p>No or minor concerns: quantitative data, sufficient samples</p>	<p>Moderate concerns: 11/13 studies - empathy, mostly relevant to the US</p>	<p>Low confidence</p>
	<p>Religion, spirituality, and spiritual practice (e.g., meditation, reflection, prayer) (N=5: quantitative=2, qualitative*=3): as indicated mostly by qualitative studies - spirituality may positively associate with ECRCs; there is insufficient evidence with regards to religion</p>	<p>No or minor concerns - only one study relevant to religion with critical risk of bias due to confounding</p>	<p>No or minor concerns: coherent factors and results</p>	<p>Moderate concerns: only a small number of studies, and mostly qualitative, but can be characterised by geographic diversity</p>	<p>No or minor concerns: relevant to compassion - represents empathy, compassion and humanistic care</p>	<p>Moderate confidence</p>
	<p>Marital status (N=12, all quantitative): being married does not seem to associate with better or worse levels of empathy</p>	<p>Moderate concerns: high risk of bias for the most of the studies due to limited confounders controls, and bias in selection of participants, however there higher quality studies indicative of</p>	<p>No or minor concerns: coherent factors and results</p>	<p>No or minor concerns: diverse geographical sample (Africa, Middle East, Asia, Southern Europe and 1 study from the US), sufficient samples</p>	<p>Serious concerns: only relevant for empathy</p>	<p>Low confidence</p>

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Domain description	Summary of review finding	GRADE-CERQual Assessment				CERQual assessment
		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
		the final results of no effect of marital status				
	Children (N=14, quantitative=11, qualitative*=3): it is inconclusive whether having children influences ECRCs, it is unlikely that having children can affect ECRCs negatively (except during residency)	Moderate concerns: equal number of high and moderate risk of bias, without contradicting results. 5 serious and 1 critical risk of bias studies due to confounding/selection of participants.	Serious concerns: High factor coherence, low effect coherence; limited coherence between quantitative and qualitative studies	No or minor concerns	Serious concerns: for empathy - mixed results, for compassionate care - non-significant	Low confidence
	Upbringing (N=3: quantitative=1; qualitative*=2) upbringing may influence how compassionate the physician is, however, the direction will most likely depend on the type of upbringing	No or minor concerns: the studies have low-to-moderate risk of bias	Moderate concerns: difficult to tell due to factor being too broad	Serious concerns: Limited number of studies, but diverse sample of physicians geographically and by gender, although ethnicity only reported by 1 study (88% white); low number of studies	No or minor concerns: 2 compassion, 1 empathy	Low confidence
	Siblings (N=2; both quantitative): there is insufficient evidence to make conclusions about sibling's effect on ECRCs	Serious concerns - one study did not test for confounders and another had a smaller sample without	Serious concerns: there is little coherence in assessing how and in which way	Serious concerns: one study focuses on psychiatric trainees and another on	Serious concerns: both on empathy	Very low confidence

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Domain description	Summary of review finding	GRADE-CREQual Assessment				CERQual assessment
		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
		mentioning how representative it may be	having siblings can influence compassion	residents in Tunisia and Korea respectively		
	Living situation (N=4, all quantitative): there is insufficient evidence to make conclusions about living situation effect on ECRCs	Serious concerns - risk of selection of participants bias exists	Serious concerns: there is little coherence in factors related to living situation	Moderate concerns: small number of studies, but diverse geographical representation	No or minor concerns: 3 on compassionate care, 1 on empathy	Low confidence
	Past illness (of self or relative/child/colleague) and caregiving experience (N=13: quantitative=4, qualitative*=6, mixed-methods^=3): it is likely that personal illness experience, relatives or own children illness experience, and caregiving experience associates with greater ECRCs; however, detachment can also happen to avoid being upset - countertransference	Moderate concerns - although half of the studies have serious risk of bias, half of the studies have low-to-moderate risk and the results are similar. High risk of bias mostly arises from the lack of controls for confounders, 2 studies have high risk of bias due to selection of participants and 2 due to selective reporting	Moderate concerns: the illness experience factors are coherent, although often own/other's illness are not separated (pulled together). Only two factors - colleagues being infected at work and own experience with psychotherapy - are somewhat different.	Moderate concerns: The amount of studies is modest; most of higher quality evidence is qualitative but the data is sufficiently rich	No or minor concerns: 5 studies on compassion or compassionate care, 8 studies on empathy, similar outcomes	Moderate confidence
	Quality of life (N=45, quantitative=22, qualitative=20, mixed-methods=3)					
	Overall quality of life (N=2: quantitative)	Serious concerns	Serious concerns: the definition of the factor is too broad	Serious concerns: only two studies is inadequate to make conclusions	Serious concerns: relevant to empathy	Very low confidence

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Domain description	Summary of review finding	GRADE-CERQual Assessment				CERQual assessment
		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
	<p>Private life and relationships (N=8: quantitative=1, qualitative*=7): it is likely that good personal relationships and social support associate with ECRCs positively, while problems in personal life - negatively</p>	<p>No or minor concerns - only one study showed serious risk of bias as there were no confounding controls, all other studies showed low-to-moderate risk of bias</p>	<p>No or minor concerns: the studies are coherent and can be classified according to personal issues, and relationships and social support</p>	<p>Moderate concerns: Seven out of eight studies are qualitative which points at potential factors. The quantitative study has high risk of bias, and the results are difficult to interpret. There are 3 studies by Derksen et al (2015, 2016, 2017) that rely on the same sample. Therefore, the adequacy of data has serious concerns</p>	<p>Moderate concerns: The results are relevant as they outline compassion and related constructs in a broad sense (e.g. empathy, compassion, humanistic care, cynicism)</p>	<p>Moderate confidence</p>
	<p>Work-related quality of life (N=8: quantitative=3, qualitative*=5): satisfaction with work and work-life balance/integration may associate with increased ECRCs; however, there might be different aspects of satisfaction work which might be at play that will affect ECRCs differently.</p>	<p>Moderate concerns - only one study showed serious risk of bias in the way the outcomes was measured; the results would not change if the study was excluded</p>	<p>Moderate concerns: The studies are coherent but we discovered that the factors might be too broad</p>	<p>No or minor concerns: There are quantitative and qualitative studies that align. Geographic, construct, and specialization diversity of samples.</p>	<p>No or minor concerns</p>	<p>Moderate confidence</p>

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Domain description	Summary of review finding	GRADE-CERQual Assessment				CERQual assessment
		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
	<p>Leisure activities (N=6: quantitative=2, qualitative*= 4) such as spending time with friends and family, time alone, taking holidays, travelling, and exercise; exposure to art, music, nature, literature, and other cultures. Having more leisure activities may be associated with greater ECRCs.</p>	<p>No or minor concerns: although there is one study with a critical confounding bias (confounding inherently non-controlable), all the other studies pointing at leisure activity as a positive factor are low-to-moderate risk of bias</p>	<p>Moderate concerns: The scope of leisure activity might be too broad.</p>	<p>Moderate concerns: All studies indicating that leisure activities might be a positive factor are qualitative</p>	<p>No or minor concerns: Relevant to compassion and related constructs</p>	<p>Moderate confidence</p>
	<p>Self-care (N=4, quantitative=1, qualitative*=3): self-care might be helpful in maintaining ECRCs, but the evidence is scarce, and self-care is not well-defined</p>	<p>No or minor concerns - only one study showed serious risk of bias as there were no confounding controls, all other studies showed low-to-moderate risk of bias</p>	<p>Moderate concerns: Self-care is insufficiently defined</p>	<p>Moderate concerns: Limited number of studies, majority of studies are qualitative</p>	<p>Moderate concerns: Only in two studies compassion or related constructs are primary outcomes, one study is spirituality-focused so might conceptualise self-care differently</p>	<p>Moderate confidence</p>
	<p>Current physical health (N=15: quantitative=4, qualitative*=9, mixed methods^=2): feeling exhausted and tired might associate with lower levels of ECRCs</p>	<p>Moderate concerns for negative factors and serious concerns for positive and non-significant factors</p>	<p>Moderate concerns: The definition of general physical health is very broad. The results regarding tiredness and exhaustion, and sleep, seem to be the most coherent, although the letter has</p>	<p>Moderate concerns: Negative factors, although the most robust, are only from qualitative studies. The samples are small. Geographically diverse, good representation of specialisations, covering both residents and physicians</p>	<p>Moderate concerns: mostly relevant for empathy</p>	<p>Moderate confidence</p>

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Domain description	Summary of review finding	GRADE-CREQual Assessment				CERQual assessment
		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
			serious risk of bias concerns.			
	Current mental health (N=2, all quantitative): there is insufficient evidence whether one's mental health associates with ECRC	Serious concerns: There is a moderate risk of bias concern for mental wellbeing study and serious concerns for anxiety study due to the measurement of outcomes	Serious concerns: Limited coherence	Serious concerns: Limited number of studies	No or minor concerns: Relevant	Low confidence
	Financial (N=2, quantitative=1, qualitative*=1) there is insufficient evidence whether one's financial circumstances associate with ECRCs	No or minor concerns	Serious concerns: Limited coherence	Serious concerns: Limited number of studies	No or minor concerns: Relevant	Very low confidence

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Domain description	Summary of review finding	GRADE-CREQual Assessment				CERQual assessment
		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
	<p>Burnout and burnout subscales (N=23, quantitative=17, qualitative*=5, mixed methods^=1): burnout negatively affects ECRCs, the evidence with relation to subscales is conflicting</p>	<p>Moderate concerns for burnout, serious concerns for subscales: Only 6 studies had low or moderate risk of bias and for 3 studies it was difficult to tell. High risk of bias came mostly from confounding and selective reporting, and selection of participants and measurement bias. Due to low number of studies with low-moderate risk of bias we can only speak about burnout in general but not the burnout subscales</p>	<p>No or minor concerns - the measurements are coherent, however qualitative studies might conceptualise burnout differently. Also, the results related to burnout subscales are less coherent and we can not draw conclusion regarding burnout subscales</p>	<p>No or minor concerns: The evidence shows good diversity of samples and rich data.</p>	<p>Moderate concerns: 17 empathy, 5 compassion, 1 humanistic care, similar results</p>	<p>Moderate confidence</p>
	<p>Compassion fatigue (N=5: quantitative=1, qualitative*=4): there is insufficient evidence to conclude what role does compassion fatigue plays in ECRCs, it is also not clear whether compassion fatigue arises from the use of compassion or from something else (e.g., listening to problems, stress)</p>	<p>Moderate concerns - only one study showed serious risk of bias due to confounding</p>	<p>Serious concerns: The conceptualisation of compassion fatigue is unclear</p>	<p>Moderate concerns: Qualitative evidence with small sample sized except for one study, the qualitative studies have rich data</p>	<p>No or minor concerns: Relevant to compassion and related constructs</p>	<p>Low confidence</p>

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Domain description	Summary of review finding	GRADE-CREQual Assessment				CERQual assessment
		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
	<p>Stress (N=7: quantitative=2, qualitative*=5): qualitative data suggests that stress may associate negatively with ECRCs</p>	<p>Moderate concerns - biased studies do not affect the conclusions</p>	<p>No or minor concerns - the measurements are coherent, however qualitative studies might conceptualise stress differently.</p>	<p>Moderate concerns: with an exception of 1 study (Kemper et al., 2020) the samples are small</p>	<p>No or minor concerns: Relevant to compassion and related constructs</p>	<p>Moderate confidence</p>
	<p>Dispositional features (N=63, quantitative=29, qualitative=33, mixed methods=2)</p>					
	<p>Personality/traits (N=30: quantitative=22, qualitative*=8): it is likely that pro-social traits and ability to deal with and recognize one's emotions positively associate with ECRCs, whereas higher emotionality and idealism associate with ECRCs negatively</p>	<p>Moderate concerns - the larger part of evidence presents with a high risk of bias, mostly in the domain of confounding bias, but also selective reporting, and selection of participants. However, the studies with low or moderate risk of bias (7) or studies where there is insufficient information to understand risk of bias (2) show similar results as the studies with high risk of bias.</p>	<p>Serious concerns: The factors comprising this evidence are incoherent with the exceptions of empathic personality (3 studies), perspective taking ability (3 studies), resilience (3 studies), self-esteem (2 studies) and ability to stand in patient shoes (2 studies).</p>	<p>No or minor concerns: The evidence shows good diversity of samples and rich data.</p>	<p>Moderate concerns: mostly empathy orientated but also includes compassionate care, patient-centred care, humanistic care and cynicism.</p>	<p>Low confidence</p>

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Domain description	Summary of review finding	GRADE-CREQual Assessment				CERQual assessment
		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
	Values (N=10: all qualitative*): having empathy and compassion as a value may associate with increased ECRCs	No or minor concerns	Moderate concerns - mostly coherent evidence	Moderate concerns: Only qualitative studies - makes it difficult to generalize. The studies are predominantly of highly developed Western countries.	Moderate concerns: Relevant mostly to empathy, but also compassion and related constructs	Moderate confidence
	Attitudes (N=11: quantitative=4, qualitative*=7): positive or non-judgmental attitudes and respect might associate with greater ECRCs, prejudice and negative judgement might associate with lower ECRCs	No or minor concerns, the studies with high risk of bias (3) do not contradict the results. Risk of bias arises from selection of participant, measurement, and lack of reflexivity bias.	No or minor concerns: The evidence is mostly coherent.	Moderate concerns - predominantly qualitative data, with small samples, although the populations of physicians are diverse.	Moderate concerns: Mostly relevant for empathy, but also features compassion, patient-centred behaviour, humanistic care and cynicism.	Moderate confidence

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Domain description	Summary of review finding	GRADE-CREQual Assessment				CERQual assessment
		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
	<p>Beliefs/motivations/understanding (N=18: quantitative=2, qualitative*=14, mixed methods^=2): positive beliefs about the importance of compassion/empathy in medical care (professional responsibility, outcomes), and motivation to maintain good standards of care and to get more job satisfaction from practicing compassion may positively associate with ECRCs; on a contrary, beliefs that compassion/empathy may negatively affect objectivity, mental health, or does not substitute an "action" may hinder ECRCs. The quality of evidence regarding negative contribution of negative beliefs is poorer.</p>	<p>No or minor concerns: for positive beliefs and motivations, serious concerns for negative beliefs and motivations</p>	<p>No or minor concerns: The results are mostly coherent</p>	<p>Moderate concerns: The evidence is mostly qualitative and mostly from the developed Western world.</p>	<p>No or minor concerns: Relevant to compassion and related constructs</p>	<p>Moderate confidence</p>

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Domain description	Summary of review finding	GRADE-CREQual Assessment				CERQual assessment
		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
	<p>Feelings/emotions (N=16: quantitative=5, qualitative*=1): ECRC may be hindered by fear of overidentification, feelings of uncertainty and associated with it anxiety, and feelings of isolation</p>	<p>Moderate concerns: For studies with serious risk of bias we noticed the presence of confounding, selective reporting and selection of participant bias for quantitative, and lack of consideration of relationships between researcher and the participants bias. The risk of bias does not influence the evidence</p>	<p>Moderate concerns: There is better coherence for the emotions and feelings that may affect compassion negatively</p>	<p>Moderate concerns: The high quality evidence is mostly qualitative with small samples, although the populations of physicians are diverse.</p>	<p>No or minor concerns: Relevant to compassion and related constructs</p>	<p>Moderate confidence</p>

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Domain description	Summary of review finding	GRADE-CERQual Assessment				CERQual assessment
		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
	<p>Coping mechanisms and facilitative behaviors (N=31: quantitative=5, qualitative*=25, mixed methods^=1): it is evident that reflective practices such as personal or group reflection and mindfulness, and exploring emotions are likely to positively associate with ECRCs, additionally practicing compassion will likely increase future compassion. Doubting or criticizing oneself, on a contrary, will likely associate with ECRC negatively; lack of positive coping strategies and defense mechanisms such as detachment, avoidance, hiding emotions will likely result in lower ECRC</p>	<p>Moderate concerns - although there are studies with serious risk of bias (due to selective reporting, selection of participants and confounding bias for quantitative, and relationships between researchers and participants, recruitment, and data collection methods for qualitative studies), more than half of the studies had low-to-moderate risk of bias concerns and the results were similar</p>	<p>Moderate concerns: The results are moderately coherent</p>	<p>Moderate concerns: The high quality evidence is mostly qualitative with small samples, although the populations of physicians are diverse and the number of studies is satisfactory</p>	<p>Moderate concerns: 21 studies on empathy or derivatives, 5 studies on compassion or compassionate care, 6 studies on humanistic care, person-centred care, or cynicism</p>	<p>Moderate confidence</p>
<p>Professional factors (N=86, quantitative=72, qualitative=11, mixed methods=3)</p>						

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Domain description	Summary of review finding	GRADE-CERQual Assessment				CERQual assessment
		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
	<p>Specialties/satisfaction with career (N=39, quantitative=33, qualitative*=3, mixed methods^=3): it is possible that physicians in patient-centered/relational specialties are more compassionate/empathetic than in specialties that are technology-orientated, although the evidence with regards to particular specialties is mixed, and there is a high number of studies showing that specialty is not a significant factor.</p>	<p>Serious concerns: 26/33 studies have serious or critical risk of bias mostly due to confounding bias, selection of participants bias, and to a lesser extend selective reporting and bias in measurement of outcomes</p>	<p>Serious concerns: Although the factors are coherent, the results are not</p>	<p>No or minor concerns: Large and diverse samples</p>	<p>Moderate concerns: Of most relevance to empathy (22 studies), but the results are similar for compassion and related constructs (16 studies)</p>	<p>Low confidence</p>

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		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
	<p>Professional stage and experience (N=64, quantitative=53, qualitative*=8, mixed methods^=3): experience is likely to associate positively with ECRCs; although the evidence is weak as there is similar number of studies showing no experience effect at all; it is not clear whether ECRC increases or decreases during residency</p>	<p>Moderate concerns - although more than a half of the studies have high risk of bias (mostly confounding, selective reporting, and selection of participants), the results are consistent, with higher quality studies present to a higher extent for positive factors, and factors with no effect</p>	<p>Serious concerns: The coherence in how experience is conceptualised can be problematic - ranging from having clinical experience, self-report of the extensiveness of the experience, years of practice, years since graduation etc. Professional status/seniority are also not well defined.</p>	<p>No or minor concerns: Large and diverse samples</p>	<p>Moderate concerns: Most of the studies (48) are focused on empathy, empathetic concern, or empathic opportunity responses</p>	<p>Low confidence</p>
	<p>Training/competency (N=22: quantitative=17, qualitative*=5, mixed methods^=1): professional training and competency are likely to positively associate with ECRC, while lack of professional competency and training would produce an opposite result</p>	<p>Moderate concerns: For a number of studies, there is a serious risk of bias in confounding, selection of participants, and selective reporting domains, but it is not relevant for the conclusions we draw.</p>	<p>Serious concerns: There is a lack of coherence in what is understood by competence and what type of training is conducive of compassion</p>	<p>No or minor concerns: Large and diverse samples</p>	<p>No or minor concerns: Relevant to compassion and related constructs - results are similar across the studies</p>	<p>Low confidence</p>

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Domain description	Summary of review finding	GRADE-CERQual Assessment				CERQual assessment
		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
	Extra-professional activity (N=11: quantitative=8, qualitative*=2, mixed methods^=1): having an extra-professional activity is possibly helpful for ECRCs	No or minor concerns - the majority of the studies are of low-moderate risk of bias, with exception of 3 studies that do not change the results	Serious concerns: There could be more coherence is studying extra-professional activities	No or minor concerns: Large and diverse samples	No or minor concerns: Relevant to compassion and related constructs - results are similar across the studies	Low confidence
	Medical errors/litigation (N=1 quantitative): insufficient evidence	No or minor concerns	NA	Serious concerns: 184 internal medicine residents, US, 35.9% females	Serious concerns: Empathy - IRI	Low confidence
ENVIRONMENTAL	Healthcare settings (N=16, quantitative=13, qualitative=2, mixed methods=1)					
	It is likely that broader settings of practice have little impact on ECRC	Serious concerns - most studies have high confounding, selection of participants, and selective reporting bias	Moderate coherence	No or minor concerns: Large and diverse samples	Moderate concerns: Mostly relevant to empathy with 1 study mentioning compassion and 1 cynicism	Low confidence
	Organizational settings (N=45, quantitative=15, qualitative=29)					
(articles=57, quantitative=25, qualitative=30, mixed methods=2)	General working conditions rating (N=2, quantitative=1, mixed methods^=1): limited evidence to make conclusion	Serious concerns: Serious risk of bias due to confounding, selective reporting (Mahoney, Sladek & Neild, 2016^) and selection of participants bias (Mahoney, Sladek & Neild, 2016^)	Moderate concerns: Coherenct but too broad	Serious concerns: Insufficient number of studies	Serious concerns: Empathy only	Very low confidence

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		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
	<p>Organizational structure (N=5, all qualitative*): it is possible that hierarchical environments are not conducive of ECRCs, although the evidence is small; we cannot make conclusions about the practice size as observations in two studies are based on the same sample</p>	<p>No or minor concerns: only one study had high risk of bias because it did not provide enough information on multiple domains</p>	<p>No or minor concerns: Coherent for hierarchical structures</p>	<p>No or minor concerns: Small number of qualitative studies only; but hierarchical structures related studies are using different qualitative designs so are triangulated</p>	<p>No or minor concerns: Relevant to compassion and related constructs</p>	<p>High confidence</p>
	<p>Organizational resources (N=11: quantitative=2, qualitative*=9): organizational resources, especially continuous education and counseling, good leadership, human resources support, and physical resources, are facilitative of ECRCs</p>	<p>No or minor concerns: one quantitative study had high risk of bias on confounding domain, two qualitative studies had high risk of bias due to limited information (1) or due to high bias in recruitment, data collection, and considering relationships between researchers and participants (1). The high risk of bias studies are irrelevant to the results.</p>	<p>No or minor concerns: The studies are coherent and understand what is meant by resources very similarly</p>	<p>No or minor concerns: There is adequate qualitative data, on the domain of continuous education and counseling. Quantitative data confirms qualitative. The samples are mostly based in the developed Western countries.</p>	<p>No or minor concerns: Relevant to compassion and related constructs</p>	<p>High confidence</p>

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		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
	<p>Operational environment (N=36: quantitative=13, qualitative*=23): time constraints, bureaucracy, lack of continuity and austerity policies associate with lower ECRCs, efficient organizational practices, such as good triage, seem to increase ECRCs; the evidence regarding the amount of work or economic profit is inconclusive</p>	<p>No or minor concerns - mostly good quality evidence</p>	<p>No or minor concerns: Mostly coherent</p>	<p>No or minor concerns: Adequate amount of data and samples diversity</p>	<p>No or minor concerns: Relevant to compassion and related constructs</p>	<p>High confidence</p>
	<p>Proximal (clinical) environment (N=12: quantitative=3, qualitative*=9): stressful clinical environment (busyness, interruptions) is not conducive of ECRCs</p>	<p>No or minor concerns - mostly good quality evidence</p>	<p>No or minor concerns: The evidence consist of many separate factors that comprise stressful clinical environment</p>	<p>Moderate concerns: Mostly qualitative evidence, but adequate amount of data and diversity</p>	<p>No or minor concerns: Relevant to compassion and related constructs</p>	<p>Moderate confidence</p>

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		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
	Collegial climate (N=19, quantitative=6, qualitative=13)					
	Positive role models and collegial support associate with greater ECRCs, lack of support and unprofessional superiors will hinder ECRCs	Moderate concerns: No or minor concerns for qualitative studies, serious concerns for quantitative studies due to confounding bias and bias in measurement of outcomes	Moderate concerns: Qualitative and quantitative results differ with regards to teamwork/relationships with colleagues (positive/no effect); however, qualitative results are of superior quality.	Moderate concerns: Adequate amount of data, primarily developed Western countries	No or minor concerns: Relevant to compassion and related constructs	Moderate confidence
	Organizational culture and values (N=21, qualitative=20, mixed methods=1)					
	Supportive organizational culture is likely to affect ECRCs positively, efficiency-driven, disease-centered, evidence-based/guideline driven healthcare with emphasis on business is likely to hinder ECRCs. Additionally, hidden curriculum and emphasizing intelligence and excellence values in medical education are not conducive of compassionate care	No or minor concerns	No or minor concerns: The coherence of results is evident, although the factors are very diverse.	Moderate concerns: The evidence is mostly qualitative, but sufficient (rich data, diverse population).	No or minor concerns: Relevant to compassion and related constructs	Moderate confidence

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		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
PATIENT AND FAMILY	Relational factors (N=19, quantitative=9, qualitative=10)					
	<p>Connection/interaction (N=13: quantitative=6, qualitative*=7): a presence of personal "click" and easy, open communication are likely to positively associate with ECRC; communication difficulties are likely to negatively associate with ECRC</p>	<p>No or minor concerns for qualitative studies, serious concerns for quantitative studies mostly due to confounding bias and bias in measurement of outcomes</p>	<p>No or minor concerns: The results are mostly coherent</p>	<p>No or minor concerns: Adequate amount of data, primarily developed Western countries</p>	<p>No or minor concerns: Relevant to compassion and related constructs</p>	<p>High confidence</p>
	<p>(articles=37, quantitative=19, qualitative=17, mixed methods=2)</p> <p>Patient-doctor similarity (N=8: quantitative=4, qualitative*=4): there is conflicting evidence of doctor-patient perceived similarity effect</p>	<p>Serious concerns due to confounding, selective reporting and lack of consideration about relationships between researcher and participants</p>	<p>Serious concerns: While the factors are coherent, the results are incoherent</p>	<p>Serious concerns: The evidence base is limited</p>	<p>No or minor concerns: Relevant to compassion and related constructs</p>	<p>Low confidence</p>

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		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
	Patient factors (N=30, quantitative=17, qualitative=13)					
	<p>Patient socio-demographic factors (N=14: quantitative=10, qualitative*=4): there is a possibility of positive bias in providing compassionate care towards higher class (education/income) patients, or vulnerable populations (highly disadvantaged, elderly, children); there is a possibility of negative bias in providing compassionate care towards minorities (i.e. immigrants and people with language barrier) and Black/African-American patients; patients' gender, age and marital status show no effect on compassion</p>	<p>Moderate concerns: quantitative evidence is prone to high risk of bias due to confounding and selective reporting; however confounding mostly concerns physician's attributes, thus should not preclude us from making conclusions regarding patient-factors</p>	<p>Moderate concerns - mostly coherent evidence</p>	<p>No or minor concerns: Adequate amount of data, primarily developed Western countries</p>	<p>Moderate concerns: Mostly relevant to empathy and patient-centred care</p>	<p>Moderate confidence</p>

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Domain description	Summary of review finding	GRADE-CERQual Assessment				CERQual assessment
		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
	<p>Patient behavior/emotions (N=19, quantitative=8, qualitative*=11): cooperative, thankful patients are more likely to receive compassionate care, while uncooperative patients with problematic behavior (e.g. anger, aggression, entitlement), patients who cross moral boundaries (i.e. drug dealers, abusers), or patients who lack understanding and do not express emotions (worse communicators) are less likely to receive compassionate care; patients preferences, self-efficacy, or distress possibly have little effect</p>	<p>Moderate concerns - although there are studies with serious risk of bias (5) (due to confounding, measurement of outcomes, and selective reporting) - the higher proportion of studies are of low and moderate bias and the studies with serious risk of bias do not contradict the results</p>	<p>Moderate concerns: There is coherence at higher level of observations, but the types of the behaviours that negatively affect compassion are very diverse</p>	<p>Moderate concerns: Adequate amount of data and samples diversity, however the samples are small</p>	<p>Moderate concerns: Mostly relevant to empathy, but also features compassion (3), person- or patient-centred care (2) and cynicism (1)</p>	<p>Moderate confidence</p>

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Domain description	Summary of review finding	GRADE-CREQual Assessment				CERQual assessment
		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
	<p>Doctor's perception of patients' motives (N=7: quantitative=4, qualitative*=3): physician's negative perceptions of patient's motives and personality are likely to undermine ECRCs</p>	<p>Moderate concerns - all quantitative studies are of high risk of bias due to confounding, selection of participants and measurement. However, higher quality qualitative studies agree with the lower quality quantitative studies.</p>	<p>Moderate concerns: There is coherence at higher level of observations, but the types of the perceptions that negatively affect compassion are more diverse</p>	<p>Moderate concerns: The number of high quality studies is limited</p>	<p>Serious concerns: Mostly relevant for empathy</p>	<p>Low confidence</p>
	<p>Patient family (N=2: qualitative* and quantitative): there is insufficient amount of evidence to make conclusions about the family influence, but it appears similar to that of patients' behavior</p>	<p>Moderate concerns: No or minor concerns for qualitative and serious concerns for quantitative study</p>	<p>Serious concerns: Difficult to tell due to low amount of evidence</p>	<p>Serious concerns: Only 2 studies</p>	<p>Serious concerns: Relevant to empathy and cynicism</p>	<p>Low confidence</p>
	<p>Situational factors (N=8, quantitative=6, qualitative=1, mixed methods=1)</p>					
	<p>The evidence in relation to situational factors is of low quality, and scarce - insufficient to make conclusions about the effect</p>	<p>Serious concerns - only one study with moderate risk of bias</p>	<p>Serious concerns: Lack of coherence</p>	<p>Serious concerns: The data is adequate</p>	<p>Serious concerns: Would be relevant to empathy mostly</p>	<p>Very low confidence</p>

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Domain description	Summary of review finding	GRADE-CREQual Assessment				CERQual assessment
		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
CLINICAL (articles = 23, quantitative = 13, qualitative = 10)	Clinical factors (N=23, quantitative=13, qualitative=10)					
	Pain (N=5, quantitative=4, qualitative*=1): there is too little evidence to make conclusions, however, type and performance of pain might be important for ECRCs	Serious concerns - only one study with low risk of bias	Serious concerns: Lack of coherence	Serious concerns: 3 studies are in a context of chronic pain and two studies use the data from the same sample. Only relevant to North America (US, Canada)	Moderate concerns: Mostly relevant for patient-centred care	Very low confidence
	Injury/illness type (N=12, quantitative=7, qualitative=5): it is difficult to make conclusions - the evidence is incoherent; broadly illness with more complex or psychosomatic symptomatology, or illness that is stigmatized seems to predict lower ECRCs	Serious concerns: More than a half of studies have a serious risk of bias due to confounding bias, bias in selection of participants, and not considering the relationship between researcher and participants	Serious concerns: Lack of coherence	No or minor concerns: The data is adequate	Moderate concerns: Mostly relevant to empathy, but also caring behaviour (1) and patient-centred care (1)	Low confidence

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Domain description	Summary of review finding	GRADE-CERQual Assessment				CERQual assessment
		METHODOLOGICAL LIMITATIONS	COHERENCE	DATA ADEQUACY	RELEVANCE	
	Acuity/severity (N=5: quantitative=2, qualitative*=3): non-acute patients who are getting better are less likely to receive ECRCs	No or minor concerns: one quantitative study had high risk of bias on confounding domain due to measurements of outcomes	Moderate concerns: The evidence is more coherent on the aspect of acuity, but not on the aspect of severity	Moderate concerns: Small samples, limited number of studies	No or minor concerns: Relevant to compassion and compassion-related constructs	Moderate confidence
	Terminal illness (N=3, all qualitative*): the limited evidence does not allow to make conclusions	Moderate concerns due to not considering the relationship between researcher and participants	Moderate concerns: The factors are moderately coherent	Serious concerns: Small samples, very limited number of studies	No or minor concerns: Relevant to compassion	Low confidence
	Comorbidities (N=8: quantitative=6, qualitative*=2): due to low quality of evidence it is hard to make conclusions; preliminary mental illness co-morbidity and substance use may potentially affect ECRCs negatively	Serious confounding and selective reporting risk of bias	Moderate concerns: The factors are moderately coherent	No or minor concerns: The data is adequate	Moderate concerns: Relevant to empathy and patient-centred care	Low confidence
	Frequent presenters (N=3, quantitative=2, qualitative*=1) the evidence is small and inconclusive; there is a possibility that frequent presentation may affect ECRCs negatively	Moderate concerns - one study showed serious risk of bias on multiple domains	Moderate concerns: The factors are coherent, but the effects are incoherent	Serious concerns: limited number of studies	Moderate concerns: Relevant to empathy, cynicism, and patient-centred care	Low confidence

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eSupplement 14: Excluded Studies

A) Primary searches

Study (authors)	title	journal	volume	issue	REASONS FOR EXCLUSION
Reynolds et al., 2019	Fighting the flinch: experimentally induced compassion makes a difference in health care providers	British journal of health psychology	24	4	<50% SAMPLE; NO SEPARATE ANALYSIS
Dev et al., 2019	Variation in the barriers to compassion across healthcare training and disciplines: a cross-sectional study of doctors, nurses, and medical students	International journal of nursing studies	90		<50% SAMPLE; NO SEPARATE ANALYSIS
Williams, Kinnear & Victor, 2016	'It's the little things that count': healthcare professionals' views on delivering dignified care: a qualitative study	Journal of advanced nursing	72	4	<50% SAMPLE; NO SEPARATE ANALYSIS
Sturzu et al., 2019	Empathy and burnout - a cross-sectional study among mental healthcare providers in France	Journal of medicine and life	12	1	<50% SAMPLE; NO SEPARATE ANALYSIS
Deng et al., 2019	The current status and the influencing factors of humanistic care ability among a group of medical professionals in Western China	Technology and health care : official journal of the European Society for Engineering and Medicine	27	2	<50% SAMPLE; NO SEPARATE ANALYSIS
Singh et al., 2018	Healthcare providers' perspectives on perceived barriers and facilitators of compassion: Results from a grounded theory study	Journal of clinical nursing	27	9	<50% SAMPLE; NO SEPARATE ANALYSIS
Mills, Wand & Fraser, 2018	Examining self-care, self-compassion and compassion for others: a cross-sectional survey of palliative care nurses and doctors	International journal of palliative nursing	24	1	<50% SAMPLE; NO SEPARATE ANALYSIS
Yuguero et al., 2017	Descriptive study of association between quality of care and empathy and burnout in primary care	BMC medical ethics	18	1	<50% SAMPLE; NO SEPARATE ANALYSIS
Tierney et al., 2017	Enabling the flow of compassionate care: a grounded theory study	BMC health services research	17	1	<50% SAMPLE; NO SEPARATE ANALYSIS
Martin et al., 2015	Clinicians' recognition and management of emotions during difficult healthcare conversations	Patient education and counseling	98	10	<50% SAMPLE; NO SEPARATE ANALYSIS

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Study (authors)	title	journal	volume	issue	REASONS FOR EXCLUSION
Chapman & Martin, 2014	Perceptions of Australian emergency staff towards patients presenting with deliberate self-poisoning: a qualitative perspective	International emergency nursing	22	3	<50% SAMPLE; NO SEPARATE ANALYSIS
Brown et al., 2014	Practical compassions: repertoires of practice and compassion talk in acute mental healthcare	Sociology of health & illness	36	3	<50% SAMPLE; NO SEPARATE ANALYSIS
Dewar & Nolan, 2013	Caring about caring: developing a model to implement compassionate relationship centred care in an older people care setting	International journal of nursing studies	50	9	<50% SAMPLE; NO SEPARATE ANALYSIS
Goodridge et al., 2008	Caring for critically ill patients with advanced COPD at the end of life: a qualitative study	Intensive & critical care nursing	24	3	<50% SAMPLE; NO SEPARATE ANALYSIS
Almerud et al., 2008	Caught in an artificial split: a phenomenological study of being a caregiver in the technologically intense environment	Intensive & critical care nursing	24	2	<50% SAMPLE; NO SEPARATE ANALYSIS
McLaughlin et al., 2006	Illicit drug users in Northern Ireland: perceptions and experiences of health and social care professionals	Journal of psychiatric and mental health nursing	13	6	<50% SAMPLE; NO SEPARATE ANALYSIS
Nicolaidis, Curry & Gerrity, 2005	Health care workers' expectations and empathy toward patients in abusive relationships	The Journal of the American Board of Family Practice	18	3	<50% SAMPLE; NO SEPARATE ANALYSIS
DiLalla et al., 2004	Effect of gender, age, and relevant course work on attitudes toward empathy, patient spirituality, and physician wellness	Teaching and learning in medicine	16	2	<50% SAMPLE; NO SEPARATE ANALYSIS
Bensimon, Wiss & Banker, 2019	Impact of camp discovery volunteerism on provider burnout and empathy	Journal of the American Academy of Dermatology			<50% SAMPLE; NO SEPARATE ANALYSIS
Bodner et al., 2015	The attitudes of psychiatric hospital staff toward hospitalization and treatment of patients with borderline personality disorder	BMC Psychiatry	15	1	<50% SAMPLE; NO SEPARATE ANALYSIS
Beste et al., 2015	Primary care providers report challenges to cirrhosis management and specialty care coordination	Digestive Diseases and Sciences	60	9	<50% SAMPLE; NO SEPARATE ANALYSIS
Bogiatzaki et al., 2019	Empathy and burnout of healthcare professionals in public hospitals of Greece	International Journal of Caring Sciences	12	2	<50% SAMPLE; NO SEPARATE ANALYSIS
Eechoud et al., 2017	Perspectives of oncology health workers in Flanders on caring for patients of non-Western descent	European Journal of Cancer Care	26	6	<50% SAMPLE; NO SEPARATE ANALYSIS

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Study (authors)	title	journal	volume	issue	REASONS FOR EXCLUSION
Flynn, 2016	Who cares? A critical discussion of the value of caring from a patient and healthcare professional perspective	International Journal of Orthopaedic & Trauma Nursing	20		<50% SAMPLE; NO SEPARATE ANALYSIS
Austin, 2013	The relationship between work stressors and clinical empathy for hospital based physicians and nurses	Dissertation Abstracts International: Section B: The Sciences and Engineering	74	5	<50% SAMPLE; NO SEPARATE ANALYSIS
Lin, 2012	Empathy and avoidance in treating patients living with HIV/AIDS (PLWHA) among service providers in China	AIDS Care	24	11	<50% SAMPLE; NO SEPARATE ANALYSIS
Garrett, 1999	Stress, coping, empathy, secondary traumatic stress and burnout in healthcare providers working with HIV-infected individuals. (health care providers, immune deficiency)	Dissertation Abstracts International Section A: Humanities and Social Sciences	60	4	<50% SAMPLE; NO SEPARATE ANALYSIS
Fouad Kamel, 2013	The relationship between emotional awareness and empathetic response among psychiatric hospital staff	Life Science Journal	10	3	<50% SAMPLE; NO SEPARATE ANALYSIS
Francis et al., 2005	When smokers are resistant to change: Experimental analysis of the effect of patient resistance on practitioner behaviour	Addiction	100	8	<50% SAMPLE; NO SEPARATE ANALYSIS
Beardsmore & McSherry, 2017	Healthcare workers' perceptions of organisational culture and the impact on the delivery of compassionate quality care	J Res Nurs	22	1	<50% SAMPLE; NO SEPARATE ANALYSIS
Yuguero et al., 2017	Empathy and burnout of emergency professionals of a health region: a cross-sectional study.	Medicine			<50% SAMPLE; NO SEPARATE ANALYSIS
Crawford et al., 2013	The language of compassion in acute mental health care.	Qualitative Health Research	23		<50% SAMPLE; NO SEPARATE ANALYSIS
Tišanská & Kožený, 2012	Measuring empathetic sensitivity of Czech physicians				INSUFFICIENT INFORMATION: REQUESTED FROM AUTHOR/NO RESPONSE
Lindy, Green & Patrick, 1980	The internship: some disquieting findings	The American journal of psychiatry	137	1	INTERVENTION

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Study (authors)	title	journal	volume	issue	REASONS FOR EXCLUSION
O'Carroll, 2017	A review of a GP registrar-run mobile health clinic for homeless people	Irish Journal of Medical Science	186	3	INTERVENTION
Bareman et al., 1993	Dissatisfied patients: Improving general practitioners' initial reactions	Medical Education	27	4	INTERVENTION
Newbronner et al., 2017	Creating better doctors: Exploring the value of learning medicine in primary care	Education for Primary Care	28	4	INTERVENTION
Eurelings-Bontekoe, 1991	The relationship between personal characteristics of general practitioners and their sensitivity to psychosocial problems: A secondary analysis of World Health Organization (WHO) data	De relatie tussen persoonlijke kenmerken van huisartsen en hun sensitiviteit voor psychosociale problematiek. Een secundaire analyse van WHO-data.	19	5	LANG: DUTCH
Shariat & Kaykhavoni, 2010	Empathy in medical residents at Iran University of Medical Sciences	Iranian Journal of Psychiatry and Clinical Psychology	16	3	LANG: FARSI
Marcus-Bolohan, 1991	Empathy and detachment in the doctor-patient relationship	Empathie et detachment dans la relation medecin-patient.	35	1	LANG: FRENCH
Brocher, 1985	Self and physician: the humaneness in medicine	Selbst und Arzt. Das Humane in der Medizin.	30	1	LANG: GERMAN
Jablonkai, 1989	Being personal and impersonal in healing work	Szemelyesseg es szemelytelenseg a gyógyító munkában.	45	5	LANG: HUNGARIAN
Bonino & Giordanengo, 1993	Sharing, but not too much: a research about health workers	L'empatia: condividere, ma non troppo. Una ricerca sugli operatori sanitari.	17	3	LANG: ITALIAN
Szkup-Jablonska et al., 2013	Cultural competence assessment among health care workers	Family Medicine and Primary Care Review	15	3	LANG: POLISH
Vecchi, 2016	Empathy, burnout and... professional competence. Some reflections	Empatia, burnout... y competencia profesional. Algunas reflexiones.	114	5	LANG: SPANISH

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Study (authors)	title	journal	volume	issue	REASONS FOR EXCLUSION
San-Martin et al., 2017	Empathy, inter-professional collaboration, and lifelong medical learning in Spanish and Latin-American physicians-in-training who start their postgraduate training in hospitals in Spain. Preliminary outcomes	Atencion Primaria	49	1	LANG: SPANISH
Delgado-Bolton et al., 2016	Medical empathy of physicians-in-training who are enrolled in professional training programs. A comparative intercultural study in Spain	Atencion Primaria	48	9	LANG: SPANISH
Huarcaya-Victoria et al., 2019	Evaluation of the levels of medical empathy in medical residents of a general hospital in Peru	Educacion Medica	20		LANG: SPANISH
MacInnis et al., 2020	Regarding obesity as a disease is associated with lower weight bias among physicians: A cross-sectional survey study	Stigma and Health	5	1	MEDIATOR
Zhang, 2019	How difficult doctor-patient relationships impair physicians, work engagement: the roles of prosocial motivation and problem-solving pondering	Psychological Reports			MEDIATOR
Roze des Ordon et al., 2019	A pattern language of compassion in intensive care and palliative care contexts	BMC palliative care	18	1	NO FACTORS
Nelson & Hozak, 2018	Predictors of caring in the context of relationship-based care	Creative nursing	24	2	NO FACTORS
Robieux et al., 2018	Let's talk about empathy!	Patient education and counseling	101	1	NO FACTORS
Borgstrom & Walter, 2015	Choice and compassion at the end of life: a critical analysis of recent English policy discourse	Social science & medicine (1982)	136		NO FACTORS
Back & Arnold, 2014	"Yes it's sad, but what should I do?" Moving from empathy to action in discussing goals of care	Journal of palliative medicine	17	2	NO FACTORS
Wasserman & McNamee, 2010	Promoting compassionate care with the older people: a relational imperative	International journal of older people nursing	5	4	NO FACTORS
Hojat, 2009	Ten approaches for enhancing empathy in health and human services cultures	Journal of health and human services administration	31	4	NO FACTORS
Williams et al., 2008	Supporting bereaved parents: practical steps in providing compassionate perinatal and neonatal end-of-life care. A North American perspective	Seminars in fetal & neonatal medicine	13	5	NO FACTORS

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Study (authors)	title	journal	volume	issue	REASONS FOR EXCLUSION
Halpern, 2007	Empathy and patient-physician conflicts	Journal of general internal medicine	22	5	NO FACTORS
Stevenson, 2002	Compassion and patient centred care	Australian family physician	31	12	NO FACTORS
MacLeod, 2001	On reflection: doctors learning to care for people who are dying	Social science & medicine (1982)	52	11	NO FACTORS
Hanneman, 1999	Empathy: a challenge for critical care	American journal of critical care : an official publication, American Association of Critical-Care Nurses	8	6	NO FACTORS
Rosenow, 1999	The challenge of becoming a distinguished clinician	Mayo Clinic proceedings	74	6	NO FACTORS
Yarnold et al., 1993	Androgyny predicts empathy for trainees in medicine	Perceptual and motor skills	77	2	NO FACTORS
Zhang, 2020	How doctors do things with empathy in online medical consultations in china: a discourse-analytic approach	Health communication			NO FACTORS
Decety, 2020	Empathy in medicine	Annales Medico-Psychologiques	178	2	NO FACTORS
Javid et al., 2019	Caring for women with unanticipated vasa praevia: a qualitative study with Australian midwives and doctors	Journal of Paediatrics and Child Health	55		NO FACTORS
Hart et al., 2018	What's behind the white coat: potential mechanisms of physician-attributable variation in critical care	American Journal of Respiratory and Critical Care Medicine	197		NO FACTORS
Shahid & Stirling, 2016	Pediatric and med-peds residents emotional intelligence sub-scores vary by training year	Academic Pediatrics	16	6	NO FACTORS
Sokol, 2013	Patients we don't like: doctors should not let their moral evaluations of patients affect their treatment	BMJ (Online)	346	7913	NO FACTORS
Ring, 2005	The somatising effect of clinical consultation: What patients and doctors say and do not say when patients present medically unexplained physical symptoms	Social Science and Medicine	61	7	NO FACTORS

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Study (authors)	title	journal	volume	issue	REASONS FOR EXCLUSION
Rousseau, 2004	Empathy and compassion: where have they gone?	American Journal of Hospice & Palliative Medicine	21	5	NO FACTORS
Rajput, 2018	Physician empathy levels at Liaquat University Hospital, Hyderabad	Indo American Journal of Pharmaceutical Sciences	5	6	NO FACTORS
Eubank, 2014	Lessons in compassion and courage start "from the roots"				NO FACTORS
Fields et al., 2004	Comparisons of nurses and physicians on an operational measure of empathy	Evaluation & the Health Professions	27	1	NO FACTORS
Linn et al., 1987	Measuring physicians' humanistic attitudes, values, and behaviors	Medical Care			NO FACTORS
Thomas et al., 2019	Predictors of empathic compassion: do spirituality, religion, and calling matter?	Southern medical journal	112	6	NO FULL TEXT
Riess, 2016	Empathy matters: study shows that teaching empathy can improve patient satisfaction	Iowa medicine : journal of the Iowa Medical Society	106	1	NO FULL TEXT
Merritt, 2003	The challenge of clinical empathy	The Journal of clinical ethics	14	4	NO FULL TEXT
McVay, 2002	Medicine and spirituality: a simple path to restore compassion in medicine	South Dakota journal of medicine			NO FULL TEXT
May, 1993	Institutions and the transformation of personal values. Are the traditional values of caring and service in jeopardy?	Clinical laboratory management review : official publication of the Clinical Laboratory Management Association	7	3	NO FULL TEXT
Bossano, 2007	Empathy and effectiveness: how I developed a deeper understanding and practice in managing depression as a general practitioner	Work Based Learning in Primary Care	5	2	NO FULL TEXT
Balan & Balan, 2018	Personality disorders: an empathic approach	Big book of emergency department psychiatry: A guide to patient centered operational improvement.	245-253		NO FULL TEXT
Rooney, 1991	Correlates of physician empathy and knowledge of cancer pain management	Dissertation Abstracts International	51	8	NO FULL TEXT

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Study (authors)	title	journal	volume	issue	REASONS FOR EXCLUSION
Rosenheim, 1973	Empathy, identification, altruism, and role similarity in the hospitalized opiate addict and hospital staff	Dissertation Abstracts International	34	6	NO FULL TEXT
Sharikh et al., 2020	The impact of electronic medical records' functions on the quality of health services	British Journal of Health Care Management	26	2	NO FULL TEXT
Schattner & Schattner, 2011	Empathy in the patient-physician relationship: Its meaning, impact on patient psychology, satisfaction, compliance, the quality of care and how can empathy in clinical encounters be promoted	Psychology of Empathy			NO FULL TEXT
Pellman, 1980	Clinicians and women patients: clinicians' warmth, empathy, and genuineness, attitudes toward women, and demographic characteristics in relation to their clinical judgments of women			8022578	NO FULL TEXT
Scibetta, 1980	An exploration of verbal responses and the communication of empathy during videotaped doctor-patient interviews: a descriptive study	Dissertation Abstracts International	41	1	NO FULL TEXT
Heitman, 1992	The influence of values and culture in responses to suffering	NLN publications			NO FULL TEXT
Petit, 2004	The Compassion Meter: an important diagnostic instrument.	New Zealand Family Practice			NO FULL TEXT
McFarland, 2019	Less direct patient care delivered by medical trainees by the end of a hematology-oncology ward rotation: association with empathy and related factors	Psycho-oncology	28	6	NOT A CENTRAL CONSTRUCT
Brandt et al., 2018	Determinants of successful ehealth coaching for consumer lifestyle changes: qualitative interview study among health care professionals	Journal of medical Internet research	20	7	NOT A CENTRAL CONSTRUCT
Morice-Ramat, Goronflot & Guihard, 2018	Are alexithymia and empathy predicting factors of the resilience of medical residents in France?	International journal of medical education	9		NOT A CENTRAL CONSTRUCT
Sansone, 2016	Connection and empathy: enhancing pre- and perinatal health care professionals' interpersonal skills	Midwifery today with international midwife		120	NOT A CENTRAL CONSTRUCT
McBride, 2016	Family physician support for a family with a mentally ill member	Annals of family medicine	14	5	NOT A CENTRAL CONSTRUCT

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Study (authors)	title	journal	volume	issue	REASONS FOR EXCLUSION
Oster et al., 2016	Kikiskawawasow - prenatal healthcare provider perceptions of effective care for First Nations women: an ethnographic community-based participatory research study	BMC pregnancy and childbirth	16	1	NOT A CENTRAL CONSTRUCT
Wiklund et al., 2015	Staff experiences of caring for patients with extended-spectrum beta-lactamase-producing bacteria: a qualitative study	American journal of infection control	43	12	NOT A CENTRAL CONSTRUCT
Fernando & Consedine, 2014	Development and initial psychometric properties of the Barriers to Physician Compassion questionnaire	Postgraduate medical journal	90	1065	NOT A CENTRAL CONSTRUCT
Stone, 2014	Blame, shame and hopelessness: medically unexplained symptoms and the 'heartsink' experience	Australian family physician	43	4	NOT A CENTRAL CONSTRUCT
French, 2013	Substance abuse in pregnancy: compassionate and competent care for the patient in labor	Clinical obstetrics and gynecology	56	1	NOT A CENTRAL CONSTRUCT
Hill, 2013	Perinatal addiction: providing compassionate and competent care	Clinical obstetrics and gynecology	56	1	NOT A CENTRAL CONSTRUCT
Austin, 2012	Moral distress and the contemporary plight of health professionals	HEC forum : an interdisciplinary journal on hospitals' ethical and legal issues	24	1	NOT A CENTRAL CONSTRUCT
Holler & Scalzo, 2012	"I've heard some things that scare me". Responding with empathy to parents' fears of vaccinations	Missouri medicine	109	1	NOT A CENTRAL CONSTRUCT
Protiere et al., 2010	Prescribers' attitudes toward elderly breast cancer patients. Discrimination or empathy?	Critical reviews in oncology/hematology	75	2	NOT A CENTRAL CONSTRUCT
Klitzman, 2006	Improving education on doctor-patient relationships and communication: lessons from doctors who become patients	Academic medicine : journal of the Association of American Medical Colleges	81	5	NOT A CENTRAL CONSTRUCT
Graber & Mitcham, 2004	Compassionate clinicians: take patient care beyond the ordinary	Holistic nursing practice	18	2	NOT A CENTRAL CONSTRUCT
Halpern, 2003	Practicing medicine in the real world: challenges to empathy and respect for patients	The Journal of clinical ethics	14	4	NOT A CENTRAL CONSTRUCT

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Study (authors)	title	journal	volume	issue	REASONS FOR EXCLUSION
Gallagher, 1999	The era of managed care: the struggle of cost containment and compassionate, effective care of persons with HIV/AIDS	The Nursing clinics of North America	34	1	NOT A CENTRAL CONSTRUCT
Dreisinger & Soorma, 2020	Confronting subconscious bias: ethics in the pediatric emergency department	Pediatric Emergency Care	36	2	NOT A CENTRAL CONSTRUCT
Mohiuddin, 2019	Patient-provider relationship: compliance with care	Research Journal of Medical Sciences	13	2	NOT A CENTRAL CONSTRUCT
Fearon et al., 2019	Pediatric residents' perceived barriers to opioid use in sickle cell disease pain management	Pediatric Blood and Cancer	66	2	NOT A CENTRAL CONSTRUCT
Elliott, Bennett & Wolfson-Stofko, 2109	Life after opioid-involved overdose: survivor narratives and their implications for ER/ED interventions	Addiction (Abingdon, England)	114	8	NOT A CENTRAL CONSTRUCT
Conway-Hicks & de Groot, 2019	Living in two worlds: becoming and being a doctor among those who identify with "not from an advantaged background"	Current Problems in Pediatric and Adolescent Health Care	49	4	NOT A CENTRAL CONSTRUCT
Naseem, 2018	"Breaking breast cancer news" with ethnic minority: A UK experience	Journal of Multidisciplinary Healthcare	11		NOT A CENTRAL CONSTRUCT
Marini, 2015	Re-tooling critical care to become a better intensivist: something old and something new	Critical Care	19		NOT A CENTRAL CONSTRUCT
Sigsbee & Bernat, 2014	Physician burnout: A neurologic crisis	Neurology	83	24	NOT A CENTRAL CONSTRUCT
Griffiths et al., 2014	Preparation to care for confused older patients in general hospitals: a study of UK health professionals	Age and Ageing	43	4	NOT A CENTRAL CONSTRUCT
Anonymous	Medicine and mental illness: How can the obstacles sick doctors face be overcome?	Psychiatrist	36	3	NOT A CENTRAL CONSTRUCT
Wohlgemuth, Auerbach & Parker, 2010	Geriatrics health care providers as family caregivers	Journal of the American Geriatrics Society	58		NOT A CENTRAL CONSTRUCT
Consoli et al., 2010	Physicians' degree of motivation regarding their perception of hypertension, and blood pressure control	Journal of Hypertension	28	6	NOT A CENTRAL CONSTRUCT
Strous, Ulman & Kotler, 2006	The hateful patient revisited: Relevance for 21st century medicine	European Journal of Internal Medicine	17	6	NOT A CENTRAL CONSTRUCT
Hankir & Zaman, 2013	The 'melodies of manic-depressive illness' a case study of bipolar disorder: Jung's archetype 'the	Bipolar Disorders	15		NOT A CENTRAL CONSTRUCT

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Study (authors)	title	journal	volume	issue	REASONS FOR EXCLUSION
	wounder healer', autobiographical narrative and psychopathology and bipolar disorder amongst the medical profession				
Fiscella & Epstein, 2008	So much to do, so little time: care for the socially disadvantaged and the 15-minute visit	Archives of Internal Medicine	168	17	NOT A CENTRAL CONSTRUCT
Stubbe, 2017	Optimizing empathy: physician self-care as a crucial component of trauma-informed treatment	Focus: The Journal of Lifelong Learning in Psychiatry	15	4	NOT A CENTRAL CONSTRUCT
Krupa, 2011	When doctors and patients have the same disease	Am Med News	54	29	NOT A CENTRAL CONSTRUCT
Zhou & Fischer, 2018	Mimicking non-verbal emotional expressions and empathy development in simulated consultations: An experimental feasibility study	Patient education and counseling	101	2	PATIENT PERCEPTIONS
Brook, 2010	A physician's experience as a cancer of the neck patient	Surgical oncology	19	4	PATIENT PERCEPTIONS
Freedman, 2003	Prescriptions for health providers: from cancer patients	Cancer nursing	26	4	PATIENT PERCEPTIONS
Simoes, 2019	Communication and health: doctor-patient relationship in patients with multimorbidity, an exploratory study	Family Medicine and Primary Care Review	21	4	PATIENT PERCEPTIONS
Zilliachus et al., 2011	Telegenetics for hereditary breast/ovarian cancer	Familial Cancer	10		PATIENT PERCEPTIONS
Adams, & Knott, 2013	A mixed-method analysis examining the effect of bedside computing on physician and nurse compassion in three hospital domains: medical-surgical, stroke, and maternity				PATIENT PERCEPTIONS
Fraenkel, 1986	The ins and outs of medical encounters: an interactional analysis of empathy, patient satisfaction, and information exchange (doctor-patient, nonverbal communication)			8615281	PATIENT PERCEPTIONS
Yuguro et al., 2017	Occupational burnout and empathy influence blood pressure control in primary care physicians	BMC family practice	18	1	PREDICTOR
Schafer et al., 2016	Health care providers' judgments in chronic pain: the influence of gender and trustworthiness	Pain	157	8	PREDICTOR

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Study (authors)	title	journal	volume	issue	REASONS FOR EXCLUSION
Mercer & Howie, 2006	CQI-2--a new measure of holistic interpersonal care in primary care consultations	The British journal of general practice : the journal of the Royal College of General Practitioners	56	525	PREDICTOR
Cohen et al., 1996	Interest in different types of patients. What factors influence new-to-practice family physicians?	Canadian family physician Medecin de famille canadien	42		PREDICTOR
Jensen et al., 2020	Reward and empathy in the treating clinician: the neural correlates of successful doctor-patient interactions	Translational Psychiatry	10	1	PREDICTOR
Pedersen et al., 2019	Patient-physician relationship and use of gut feeling in cancer diagnosis in primary care: a cross-sectional survey of patients and their general practitioners	BMJ Open	9	7	PREDICTOR
Down et al., 2019	Physician experiences when discussing the need for additional oral medication with type 2 diabetes patients: Insights from the cross-national IntroDia study	Diabetes Research and Clinical Practice	148		PREDICTOR
Lopez-Garcia et al., 2018	User violence and psychological well-being in primary health-care professionals	The European Journal of Psychology Applied to Legal Context	10	2	PREDICTOR
Soler-Gonzalez et al., 2017	Human connections and their roles in the occupational well-being of healthcare professionals: A study on loneliness and empathy	Frontiers in Psychology			PREDICTOR
Shanafelt et al., 2002	Burnout and self reported patient-care in an internal medicine residency program.	Annals of Internal Medicine			PREDICTOR
Ratanawongsa et al., 2016	Changes in clinician-patient communication with safety net EHR implementation	Journal of General Internal Medicine	31	2	WRONG CONSTRUCT: AFFECTIVE TONE
Kusalaruk, Saipanish & Hiranyatheb, 2015	Attitudes of psychiatrists toward obsessive-compulsive disorder patients	Neuropsychiatric Disease and Treatment	11		WRONG CONSTRUCT: ANNOYANCE, ADMIRATION, PITY
Robinson, 1998	People with HIV/AIDS: who cares?	Journal of advanced nursing	28	4	WRONG CONSTRUCT: ATTITUDES TOWARDS CARING

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Study (authors)	title	journal	volume	issue	REASONS FOR EXCLUSION
Avny & Alon, 2016	Practicing death	Patient Education and Counseling	99	7	WRONG CONSTRUCT: AUTHENTICITY
Fernando & Consedine, 2017	Barriers to medical compassion as a function of experience and specialization: psychiatry, pediatrics, internal medicine, surgery, and general practice	Journal of pain and symptom management	53	6	WRONG CONSTRUCT: BARRIERS TO COMPASSION
Allen & Oberle, 1996	Augmentation mammoplasty: a complex choice	Health care for women international	17	1	WRONG CONSTRUCT: BEAUTY
Epstein, 2014	Realizing Engel's biopsychosocial vision: resilience, compassion, and quality of care	International journal of psychiatry in medicine	47	4	WRONG CONSTRUCT: BIOPSYCHOSOCIAL CARE
Pergert et al., 2008	Bridging obstacles to transcultural caring relationships-Tools discovered through interviews with staff in pediatric oncology care	European Journal of Oncology Nursing	12	1	WRONG CONSTRUCT: BRIDGING
Shanafelt, 2009	Enhancing meaning in work: a prescription for preventing physician burnout and promoting patient-centered care	JAMA	302	12	WRONG CONSTRUCT: BURNOUT
Barnsley et al., 1999	Physician characteristics and the physician-patient relationship. Impact of sex, year of graduation, and specialty	Canadian family physician Medecin de famille canadien	45		WRONG CONSTRUCT: COMMUNICATION
Holmes et al., 2020	Personality predictors of communication skills among orthopedic surgery residents	Journal of Surgical Education	77	1	WRONG CONSTRUCT: COMMUNICATION
Back, Deignan & Potter, 2014	Compassion, compassion fatigue, and burnout: key insights for oncology professionals	American Society of Clinical Oncology educational book. American Society of Clinical Oncology. Annual Meeting			WRONG CONSTRUCT: COMPASSION FATIGUE
Dasan et al., 2015	Prevalence, causes and consequences of compassion satisfaction and compassion fatigue in emergency care: a mixed-methods study of UK NHS Consultants	Emergency medicine journal : EMJ	32	8	WRONG CONSTRUCT: COMPASSION SATISFACTION
Sanchez-Reilly et al., 2013	Caring for oneself to care for others: physicians and their self-care	The journal of supportive oncology	11	2	WRONG CONSTRUCT: COMPASSION SATISFACTION

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Abrishami, 2018	The need for cultural competency in health care	Radiologic Technology	89	5	WRONG CONSTRUCT: CULTURAL COMPETENCE
Berk, 2009	Derogatory and cynical humour in clinical teaching and the workplace: the need for professionalism.	Medical Education			WRONG CONSTRUCT: CYNICAL HUMOR
Arunogiri, Frei & Lubman, 2015	Persistent noncancer pain in patients with addiction: reflecting on the challenges	Medicine Today	16	6	WRONG CONSTRUCT: D-P RELATIONSHIPS
Breen & Greenberg, 2010	Difficult physician-patient encounters	Intern Med J	40	10	WRONG CONSTRUCT: DIFFICULT ENCOUNTERS
Breen & Greenberg, 2010	Ethics in medicine - A clinical perspective: Difficult physician-patient encounters	Internal Medicine Journal	40	10	WRONG CONSTRUCT: DIFFICULT PATIENT ENCOUNTERS
Park et al., 2019	Racial disparities in clinician responses to patients' emotional concerns	Journal of General Internal Medicine	34	2	WRONG CONSTRUCT: EMOTIONAL EXPRESSIONS
Libert et al., 2006	Does psychological characteristic influence physicians' communication styles? Impact of physicians' locus of control on interviews with a cancer patient and a relative	Supportive Care in Cancer	14	3	WRONG CONSTRUCT: EMPATHY+REASSURANCE
Riley et al., 2014	Traditional/restrictive vs patient-centered intensive care unit visitation: perceptions of patients' family members, physicians, and nurses	American journal of critical care : an official publication, American Association of Critical-Care Nurses	23	4	WRONG CONSTRUCT: MEDICAL CARING
Price, 2013	Caring and technology in an intensive care unit: an ethnographic study	Nursing in critical care	18	6	WRONG CONSTRUCT: MEDICAL CARING
Warren et al., 2013	Treatment providers with a personal history of eating pathology: a qualitative examination of common experiences	Eating disorders	21	4	WRONG CONSTRUCT: MEDICAL CARING
Clowse et al., 2019	Provider perceptions on the management of lupus during pregnancy: barriers to improved care	Lupus Science and Medicine	6		WRONG CONSTRUCT: MEDICAL CARING
Trimbur, Quill & Norton, 2013	Perspectives on suffering in the primary care setting	Journal of General Internal Medicine	28		WRONG CONSTRUCT: MEDICAL CARING

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Fazzone, 1991	Caring for abused and neglected children on inpatient child psychiatric units: a cross-sectional ethnography				WRONG CONSTRUCT: MEDICAL CARING
Epstein, 1999	Mindful practice	Journal of the American Medical Association	282	9	WRONG CONSTRUCT: MINDFULNESS
Trotter, 2002	Virtue, foible, and practice--medicine's arduous moral triad	Bioethics forum	18	1	WRONG CONSTRUCT: MORAL FOIBLES
Hawes & Willegal, 2017	Responsible compassionate care: meeting the needs of patients with a history of intravenous drug abuse	JAVA - Journal of the Association for Vascular Access	22	1	WRONG CONSTRUCT: PATIENT MANAGEMENT
Lochman & Dain, 1982	Behavioral context of perceived physician empathy	Family Practice Research Journal	2	1	WRONG CONSTRUCT: PERCEIVED EMPATHY
Hunter-Adams & Battersby, 2020	Health care providers' perspectives of diet-related non-communicable disease in South Africa	BMC public health	20	1	WRONG CONSTRUCT: PERCEPTIONS OF PATIENTS
Bras et al., 2012	Psychiatrists' empathy, beliefs and attitudes towards veterans suffering from combat-related posttraumatic stress disorder	Psychiatria Danubina	24	3	WRONG CONSTRUCT: SEPARATE COMPASSION ITEMS ANALYSIS
Revenson, 1989	Compassionate stereotyping of elderly patients by physicians: revising the social contact hypothesis	Psychology and aging	4	2	WRONG CONSTRUCT: STEREOTYPING
Betsch et al., 2017	What's in a name? Health care providers' perceptions of pediatric pain patients based on diagnostic labels	The Clinical journal of pain	33	8	WRONG CONSTRUCT: SYMPATHY
Herr, Hanna & Restauri, 2018	Cultivating physician character in diagnostic radiology through virtuous caring and collaborative professionalism	Academic radiology	25	11	WRONG CONSTRUCT: VIRTUOUSNESS
Kumar, 2017	My child, my patient	Pediatric critical care medicine	18	8	WRONG PUBLICATION TYPE
Austen, 2016	Increasing emotional support for healthcare workers can rebalance clinical detachment and empathy	The British journal of general practice	66	648	WRONG PUBLICATION TYPE
Maxwell, 2017	Compassionate care: constitution, culture or coping?	BMJ Quality & Safety	26	12	WRONG PUBLICATION TYPE

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Fernando et al., 2016	Enhancing compassion in general practice: it's not all about the doctor	The British journal of general practice : the journal of the Royal College of General Practitioners	66	648	WRONG PUBLICATION TYPE
Newdick & Danbury, 2015	Culture, compassion and clinical neglect: probity in the NHS after Mid Staffordshire	Journal of medical ethics	41	12	WRONG PUBLICATION TYPE
Ratzan, 2014	"Lives there who loves his pain?": empathy, creativity, and the physician's obligation	The Hastings Center report	44	1	WRONG PUBLICATION TYPE
Frampton, Guastello & Lepore, 2013	Compassion as the foundation of patient-centered care: the importance of compassion in action	Journal of comparative effectiveness research	2	5	WRONG PUBLICATION TYPE
Cargill, 2011	Compassion in the storm. a doctor breaks down barriers one patient at a time	Positively aware : the monthly journal of the Test Positive Aware Network	23	4	WRONG PUBLICATION TYPE
American College of, Obstetricians and Gynecologists Committee on Ethics	Committee Opinion No. 480: Empathy in women's health care	Obstetrics and gynecology	117	3	WRONG PUBLICATION TYPE
Crandall & Marion, 2009	Commentary: Identifying attitudes towards empathy: an essential feature of professionalism	Academic medicine : journal of the Association of American Medical Colleges	84	9	WRONG PUBLICATION TYPE
Higginson, 2009	Perspective: limiting resident work hours is a moral concern	Academic medicine : journal of the Association of American Medical Colleges	84	3	WRONG PUBLICATION TYPE
Taylor, 1997	Compassion: its neglect and importance	The British journal of general practice : the journal of the Royal College of General Practitioners	47	421	WRONG PUBLICATION TYPE
Carnevale, 1993	Can critical care be delivered humanely?	Leadership in health services = Leadership dans les services de sante	2	2	WRONG PUBLICATION TYPE

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Liben, 2011	Empathy, compassion, and the goals of medicine	Whole person care: A new paradigm for the 21st century.	59-67		WRONG PUBLICATION TYPE
Gallagher, 2006	Empathy: A Timeless Skill for the Pain Medicine Toolbox	Pain Medicine	7	3	WRONG PUBLICATION TYPE
Huggard, 2003	Compassion fatigue: How much can I give?	Medical Education	37	2	WRONG PUBLICATION TYPE
Stoller, 1984	Psychiatry's mind-brain dialectic, or the Mona Lisa has no eyebrows	The American Journal of Psychiatry	141	4	WRONG PUBLICATION TYPE
Howick & Rees, 2017	Overthrowing barriers to empathy in healthcare: empathy in the age of the Internet	Journal of the Royal Society of Medicine	110	9	WRONG PUBLICATION TYPE
Coulehan, 2012	To suffer with: The poetry of compassion	Perspectives on Human Suffering	227-244		WRONG PUBLICATION TYPE
Khanuja et al., 2011	Empathy and sympathy in the medical profession: Should we stop the desertion?	Pravara Medical Review	6	3	WRONG PUBLICATION TYPE
Gabriel, 2015	Beyond compassion: replacing a blame culture with proper emotional support and management comment on "why and how is compassion necessary to provide good quality healthcare?"	International Journal of Health Policy and Management	4	9	WRONG PUBLICATION TYPE
Bivins, Tierney & Seers, 2017	Compassionate care: not easy, not free, not only nurses	BMJ Quality & Safety	26	12	WRONG PUBLICATION TYPE
Smyth, 2015	Support is vital for staff to deliver compassionate care	Cancer Nursing Practice	14	9	WRONG PUBLICATION TYPE
Shaw, 2017	Review: Healthcare workers' perceptions of organisational culture and the impact on the delivery of compassionate quality care	J Res Nurs	22	1	WRONG PUBLICATION TYPE
Dougherty & Purtilo, 1995.	Physicians' duty of compassion	Cambridge Quarterly of Healthcare Ethics	4	4	WRONG PUBLICATION TYPE
Ekstrom, 2018	Compassion in medicine	The moral psychology of compassion.	113-128		WRONG PUBLICATION TYPE
Egener, 2014	Empathy	Behavioral medicine: A guide for clinical practice., 4th ed.	13-20		WRONG PUBLICATION TYPE

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Newton, 2013	Walking a fine line: Is it possible to remain an empathic physician and have a hardened heart?	Frontiers in Human Neuroscience			WRONG PUBLICATION TYPE: BOOK
Collins, 2002	A doctor's reflections on empathy	Dimensions of empathic therapy.			WRONG PUBLICATION TYPE: BOOK
Egener, 1997	Empathy	Behavioral medicine in primary care: A practical guide.			WRONG PUBLICATION TYPE: BOOK
Spiro, 1996	Empathy: an introduction	Empathy and the practice of medicine: Beyond pills and the scalpel.			WRONG PUBLICATION TYPE: BOOK
Sonnenberg, 1996	The problems of listening	Emotional aftermath of the Persian Gulf War: Veterans, families, communities, and nations.			WRONG PUBLICATION TYPE: BOOK
Reiser, 1996	Science, pedagogy, and the transformation of empathy in medicine	Empathy and the practice of medicine: Beyond pills and the scalpel.			WRONG PUBLICATION TYPE: BOOK
Peschel & Peschel, 1996	Selective empathy	Empathy and the practice of medicine: Beyond pills and the scalpel.			WRONG PUBLICATION TYPE: BOOK
Mathiasen & Alpert, J1996	Lessons in empathy: literature, art, and medicine	Empathy and the practice of medicine: Beyond pills and the scalpel.			WRONG PUBLICATION TYPE: BOOK
Glick, 1996	The empathic physician: nature and nurture	Empathy and the practice of medicine: Beyond pills and the scalpel.			WRONG PUBLICATION TYPE: BOOK
Rosenstein, 2018	Improving patient care by helping physicians adjust to the stress and pressures of today's health care environment: the importance of compassionate care relationships	Advances in Health and Disease			WRONG PUBLICATION TYPE: BOOK
Kerasidou & Horn, 2018	Empathy in healthcare: the limits and scope of empathy in public and private systems	Marketisation, Ethics and Healthcare: Policy, Practice and Moral Formation			WRONG PUBLICATION TYPE: BOOK

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Shea, Wynyard & Lionis, 2014	Providing compassionate healthcare: challenges in policy and practice	Providing Compassionate Healthcare: Challenges in Policy and Practice	WRONG PUBLICATION TYPE: BOOK		
Pembroke, 2011	Psychology of empathy in a medical context	Psychology of Empathy	WRONG PUBLICATION TYPE: BOOK		
Hojat, 2007	Empathy in patient care: antecedents, development, measurement, and outcomes	Empathy in Patient Care: Antecedents, Development, Measurement, and Outcomes	WRONG PUBLICATION TYPE: BOOK		
Chen, 2007	Departing lessons (book excerpt: Final Exam)	Am Med News	WRONG PUBLICATION TYPE: BOOK		
Muraszko, 1987	Neurosurgical residency training: lessons in humanism	Acute, chronic, and terminal care in neurosurgery.	WRONG PUBLICATION TYPE: BOOK		
Rubin, 2013	Professional conduct and misconduct	Handbook of clinical neurology	118		WRONG PUBLICATION TYPE: BOOK CHAPTER
Graber & Mitcham, 2008	Compassionate clinicians: exemplary care in hospital settings	The science of compassionate love: Theory, research, and applications.	WRONG PUBLICATION TYPE: BOOK CHAPTER		
Anandarajah et al., 2009	Resident physicians' thoughts regarding compassion and spirituality in the doctor-patient relationship: a brief report	Rhode Island medical journal (2013)	WRONG PUBLICATION TYPE: BOOK CHAPTER		
Dossett, 2011	Professionalism and factors associated with burnout, empathy, and resilience among early career physicians: results of the heart alumni survey	Journal of General Internal Medicine	26		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Uhelski, Panda & Qayyum, 2019	Relationship between burnout, spirituality, and empathy among physicians	Journal of General Internal Medicine	34	2	
Mc Farland & Komisar, 2019	Is empathy associated with a derived sense of meaning among resident physicians working with patients nearing the end of life on a hematology-oncology ward?	Journal of Clinical Oncology	34	26	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT

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Lazar & Bolle, 2019	"Transparent Pain": How society deals with fibromyalgia beliefs, opinions and views of health professionals on patients with chronic pain	Clinical and Experimental Rheumatology	37	1	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Kasam, 2019	Emotional intelligence and empathy among medical undergraduates, interns, postgraduates and medical practitioners	Indian Journal of Psychiatry	61	9	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Kandratsenia, 2019	Social stigma towards people with mental disorders among the psychiatrists, general practitioners and young doctors(interns)	European Neuropsychopharmacology	29		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Alcorta-Garza, 2019	Detection of the burnout syndrome, empathy, and psychosocial profile of the health team of the oncology service, UANL University Center Against Cancer (CUCC)	Journal of Clinical Oncology	37		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Stepien, 2018	Vulnerability and compassion: sources of joy in medicine	Pediatrics	142	1	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Sinclair et al., 2018	Compassion in the margins: the perspectives, experiences, challenges and facilitators of compassion according to long term care patients, their family members and their healthcare providers	Palliative Medicine	32	1	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Sinclair et al., 2018	Compassion without borders: Palliative care providers' perspectives on challenges and facilitators to compassion	Palliative Medicine	32	1	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Rawal, Nimmon & Strahlendorf, 2018	Exploring empathy in pediatrics residents at an urban children's hospital in Canada	Paediatrics and Child Health (Canada)	23		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Plews-Ogan, 2018	Compassion and connectedness as motivational drivers in the care of children with medical complexity	Developmental Medicine and Child Neurology	60		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Maina, 2018	A systematic review of implicit racial bias in healthcare	Pediatrics	141	1	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT

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Lauden et al., 2018	Burnout and who's who in pediatric global health: A look at national trends	American Journal of Tropical Medicine and Hygiene	99	4	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Kim, 2018	The power of vulnerability	Australian and New Zealand Journal of Psychiatry	52	1	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Gurcan, 2018	Aggressions to psychiatric trainees by patients in Europe: assessing the prevalence and policy	European Psychiatry	48		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Batra et al., 2018	Burnout in pediatric residents: findings from a national longitudinal survey	Academic Pediatrics	18	5	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Ashkenasi, Melnick & Parwani, 2018	The association between physician empathy and admission rates	Academic Emergency Medicine	25		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Sousa et al., 2017	Divergent perceptions of gender interactions in a medical teaching environment	Obstetrics and Gynecology	130		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Marchand & Dieter, 2017	Compassion, resiliency, and hope: nurturing our innate qualities through contemplative practices	Journal of Pain and Symptom Management	53	2	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Jonas, 2017	Bridging together: teamwork in caring for the family touched by CHD	Cardiology in the Young	27	10	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Holmes & Wang, 2017	Association between physician empathy and patient real-time satisfaction	Annals of Emergency Medicine	70	4	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Cicekci & Kara, 2017	The communication between the patients' relatives and the physicians in intensive care units with respect to brain death	Transplant International	30		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Batra et al., 2017	Burnout in pediatric residents: a national survey to inform future interventions	Academic Pediatrics	17	5	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT

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Van Mol, Nijkamp & Kompanje, 2016	Work engagement among healthcare professionals in the intensive care unit	Critical Care	20		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Tierney et al., 2016	Delivering compassionate diabetic care: the feedback loop and its maintenance in an unaccommodating environment	Diabetic Medicine	33		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Smith et al., 2016	Measures of resident burnout, empathy, and emotional intelligence as a function of years in post-graduate training	Annals of Emergency Medicine	68	4	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Smith et al., 2016	Burnout, empathy, and emotional intelligence amongst incoming residents of various specialties: are the differences born or made?	Annals of Emergency Medicine	68	4	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Sinclair et al., 2016	Digging in the dirt: findings and lessons learned from a comprehensive scoping review of compassion within clinical care	Palliative Medicine	30	6	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Sharma, 2016	Understanding residents' perspective on telemedicine	Journal of the American Academy of Child and Adolescent Psychiatry	55	10	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Poi, Khoo and Hum, 2016	Seeking equilibrium: Intra-role conflict in palliative care	Annals of the Academy of Medicine Singapore	45	9	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
McRae et al., 2016	Erosion of empathy in primary care trainees	Value in Health	19	3	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Hutchinson & Landau, 2016	Home visits: Population health one patient at a time	Journal of General Internal Medicine	31	2	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Fernando & Consedine, 2016	Are psychiatrists really compassionate?	Australian and New Zealand Journal of Psychiatry	50		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Tsyvkin, Riessman & Mathew, 2015	Distrust and conflict in sickle cell disease: Intersecting narratives of patients and physicians	Blood	126	23	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT

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Opie & Parkes, 2015	Empathy: Can it be enhanced by learning from the interactions between healthcare professionals with a disability and their patients?	Physiotherapy (United Kingdom)	101		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Meli et al., 2015	The spectre of death in the physician-patient relationship. The psychiatrist's point of view	European Psychiatry	30		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Chiarchiaro et al., 2015	Conflict management strategies in the ICU differ between palliative care and non-palliative care clinicians	American Journal of Respiratory and Critical Care Medicine	191		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Capehorn et al., 2015	Challenges faced by UK physicians when discussing the Type 2 diabetes diagnosis with patients: Insights from a cross-national study (IntroDiaTM)	Diabetic Medicine	32		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Capehorn et al., 2015	Physicians' challenges when discussing the need for additional oral medication with type 2 diabetes (T2D) patients: Insights from a cross-national study (IntroDiaTM)	Diabetes	64		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Basappa Krishnamurthy, 2015	Insomnia affects empathy in health care workers	Sleep	38		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Seino et al., 2014	Japanese physicians' challenges when discussing the type 2 diabetes diagnosis with patients: Insights from a cross-national study (IntroDiaTM)	Diabetes Research and Clinical Practice	106		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Patel et al., 2014	Medical/Dental resident's burnout - The present plight and the dark future	Indian Journal of Psychiatry	56		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
McFarland, Kirkwood & Maki, 2014	Stress and empathy among internal medicine trainees on an inpatient hematology-oncology ward	Journal of Clinical Oncology	32	31	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Kumar et al., 2014	Creative practitioners	Australian and New Zealand Journal of Psychiatry	48		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Hirayama et al., 2014	Evaluation of empathy for medical students, postgraduates and preceptors based on the scores of JSE questionnaire Japanese Version	Medical Education, Supplement	48		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT

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Study (authors)	title	journal	volume	issue	REASONS FOR EXCLUSION
Belton et al., 2014	Physicians' challenges when discussing the type 2 diabetes (T2D) diagnosis with patients: insights from a cross-national study (IntroDiaTM)	Canadian Journal of Diabetes	38		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Bellamy, Lambert & Girgis, 2014	You can lead a horse to water, but you can't make it drink: does a needs assessment tool increase discussion of psychosocial concerns of people with advanced cancer?	Asia-Pacific Journal of Clinical Oncology	10		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Aronson & Larson, 2014	The human side of healthcare	Journal of Pain and Symptom Management	47	2	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Krause, McLeod & Sedran, 2013	Caring for disadvantaged populations in the emergency department	Canadian Journal of Emergency Medicine	15		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Jocic, Krajnovic & Tadic, 2013	Self- assesment of health professionals' communication skills with patients	Value in Health	16	7	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Maytal & Jackson, 2012	Difficult interactions in end-of-life care	Journal of Pain and Symptom Management	43	2	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Fulop et al., 2012	Over-involvement and burnout among psychiatry residents in Hungary	European Psychiatry	27		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Peltzer-Jones et al., 2011	Frequent emergency department users elicit negative feelings from emergency department physicians	Academic Emergency Medicine	18	5	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Lelorain et al., 2011	The ability of oncologists to infer the emotional distress and needs of their advanced cancer patients	Psycho-Oncology	20		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Campbell et al., 2011	"I feel like I'm not a doctor": physicians' perceptions of opioid management	Journal of General Internal Medicine	26		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Dodds et al., 2014	A longitudinal study of well-being, burnout and emotional intelligence in family medicine residents	Journal of Alternative & Complementary Medicine	20	5	WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT

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Fonville et al., 2010	Exploring the use of technology in healthcare spaces and its impact on empathic communication	1st ACM International Health Informatics Symposium, IHI'10			WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Muggleton, Guy & Howard, 2014	Empathy against disgust: an interpretive phenomenological analysis of healthcare professionals' experiences of caring for palliative patients with disgusting symptoms	BMJ support. palliat. care	4		WRONG PUBLICATION TYPE: CONFERENCE ABSTRACT
Roy, 2015	Insomnia Leads to Less Empathy in Healthcare Workers				WRONG PUBLICATION TYPE: NEWS ARTICLE
Ling, Petrakis & Olver, 2020	The Use of Common Humanity Scenarios to Promote Compassion in Healthcare Workers.				WRONG SAMPLE
Svoll & Lindseth, 2016	The issue of being touched	Medicine, health care, and philosophy	19	2	WRONG SAMPLE: CARE PROVIDER
Dattilo, 2007	The role of attachment style on clinician self-efficacy and empathy	Dissertation Abstracts International: Section B: The Sciences and Engineering	67	9	WRONG SAMPLE: COUNSELLORS
Sox et al., 2019	Burnout and empathy during the first quarter of pediatric internship	Academic Pediatrics	19	6	WRONG SAMPLE: INTERNS
Holden, 1984	Compassion in medicine	Science (New York, N.Y.)	223	4637	WRONG SAMPLE: MEDICAL SCHOOLS
Spiro, 2009	Commentary: The practice of empathy	Academic medicine : journal of the Association of American Medical Colleges	84	9	WRONG SAMPLE: MEDICAL STUDENTS
Maina, 2018	A decade of studying implicit racial/ethnic bias in healthcare providers using the implicit association test	Social Science and Medicine	199		WRONG SAMPLE: MEDICAL STUDENTS
Testerman et al., 1996	The natural history of cynicism in physicians.	Academic Medicine			WRONG SAMPLE: MEDICAL STUDENTS
Christiansen, 2015	Delivering compassionate care: the enablers and barriers	British journal of nursing (Mark Allen Publishing)	24	16	WRONG SAMPLE: MOSTLY NON-PHYSICIANS

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Study (authors)	title	journal	volume	issue	REASONS FOR EXCLUSION
Henshall, 2018	The relationship between perceived organisational threat and compassion for others: Implications for the NHS	Clinical psychology & psychotherapy	25	2	WRONG SAMPLE: NO PHYSICIANS
Kneafsey, 2016	A qualitative study of key stakeholders' perspectives on compassion in healthcare and the development of a framework for compassionate interpersonal relations	Journal of clinical nursing	25	1	WRONG SAMPLE: NO PHYSICIANS
Bray, 2014	The role of professional education in developing compassionate practitioners: a mixed methods study exploring the perceptions of health professionals and pre-registration students	Nurse education today	34	3	WRONG SAMPLE: NO PHYSICIANS
Diekfuss, De Larwelle & McFadden, 2018	Diagnosis makes a difference: Perceptions of older persons with dementia symptoms	Experimental aging research	44	2	WRONG SAMPLE: NON MEDICAL STUDENTS
Singh, King-Shier & Sinclair, 2018	The colours and contours of compassion: a systematic review of the perspectives of compassion among ethnically diverse patients and healthcare providers	PloS one	13	5	WRONG SAMPLE: NURSING
O'Driscoll et al., 2018	Compassion in practice-Evaluating the awareness, involvement and perceived impact of a national nursing and midwifery strategy amongst healthcare professionals in NHS Trusts in England	Journal of clinical nursing	27	5	WRONG SAMPLE: NURSING
Dewar & Mackay, 2010	Appreciating and developing compassionate care in an acute hospital setting caring for older people	International journal of older people nursing	5	4	WRONG SAMPLE: NURSING
Shiparski, Laurie	Evoking the essence of caring: experiences from a Peruvian adventure relevant for leaders in healthcare today	Nursing administration quarterly	32	1	WRONG SAMPLE: NURSING
Van Boekel et al., 2008	Stigma among health professionals towards patients with substance use disorders and its consequences for healthcare delivery: systematic review	Drug and Alcohol Dependence	131	1	WRONG SAMPLE: NURSING
Bradley, 1995	Affective responses of health-care providers to self-mutilating adolescent behaviors	Dissertation Abstracts International: Section B: The Sciences and Engineering	55	12	WRONG SAMPLE: NURSING

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Study (authors)	title	journal	volume	issue	REASONS FOR EXCLUSION
Myhrvold, 2006	The different other--towards an including ethics of care	Nursing philosophy : an international journal for healthcare professionals	7	3	WRONG SAMPLE: NURSING
Bogojevic, 2013	Empathy in treating forensic patient	European Psychiatry	28		WRONG SAMPLE: PSYCHOTHERAPISTS
Norton, 1997	In the prison of severe personality disorder	Journal of Forensic Psychiatry	8	2	WRONG SAMPLE: PSYCHOTHERAPISTS
Sella, 2007	Countertransference and empathy: The perceptions and experiences of polyglot immigrant clinicians, who, working with monolingual or bilingual immigrant children, are practicing in a language that is not their mother tongue	Dissertation Abstracts International Section A: Humanities and Social Sciences	67	8	WRONG SAMPLE: PSYCHOTHERAPISTS
Jones, 2014	When one size does not fit all: a commentary	Narrative inquiry in bioethics	4	2	WRONG SAMPLE: SOCIAL WORKERS
Stanley & Sethuramalingam, 2015	Empathy in psychosocial intervention: A theoretical overview	International Journal of Psychosocial Rehabilitation	20	1	WRONG SAMPLE: SOCIAL WORKERS
Kessler et al., 2018	How empathic are vegan medical professionals compared to others? Leads from a paper-pencil-survey	European journal of clinical nutrition	72	5	WRONG SAMPLE: UNCLEAR
Hsu et al., 2011	Providing support to patients in emotional encounters: a new perspective on missed empathic opportunities	Journal of General Internal Medicine	26		WRONG SAMPLE: UNCLEAR
Bryan, 2006	"Aequanimitas" Redux: William Osler on detached concern versus humanistic empathy	Perspectives in biology and medicine	49	3	WRONG SAMPLE: WILLIAM OSLER
Martingano & Martingano, 2017	Measuring multidimensional empathy: theoretical and practical considerations for osteopathic medical researchers	The Journal of the American Osteopathic Association	117	11	WRONG TARGET
Billings ME, Lazarus ME, Wenrich M, et al.	The effect of the hidden curriculum on resident burnout and cynicism	Journal of Graduate Medical Education			WRONG TARGET
Phillips & Dalgarno, 2017	Professionalism, professionalization, expertise and compassion: a qualitative study of medical residents	BMC medical education			WRONG TARGET
Kerasidou et al., 2020	The need for empathetic healthcare systems.	Journal of Medical Ethics			WRONG TARGET: HEALTHCARE SYSTEMS

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Study (authors)	title	journal	volume	issue	REASONS FOR EXCLUSION
Simmons et al., 1992	Residents' use of humanistic skills and content of resident discussions in a support group	American Journal of the Medical Sciences	303	4	WRONG TARGET: PEERS

B) Reference searches

STUDY	REASONS FOR EXCLUSION
Yuguero, O., Forné, C., Esquerda, M., Pifarré, J., Abadías, M. J., & Viñas, J. (2017). Empathy and burnout of emergency professionals of a health region: A cross-sectional study. <i>Medicine</i> , 96(37).	<50% SAMPLE; NO SEPARATE ANALYSIS
Cerit, K., Karataş, T., & Ekici, D. (2020). Behaviours of healthcare professionals towards difficult patients: A structural equation modelling study. <i>Nursing Ethics</i> , 27(2), 554-566.	<50% SAMPLE; NO SEPARATE ANALYSIS
Cataldo KP, Peeden K, Geesey ME, Dickerson L. Association between K Balint training and physician empathy and work satisfaction. <i>Fam Med</i> 2005; 37: 328–31.	INTERVENTION
Riess H, Kelley JM, Bailey RW, Dunn EJ, Phillips M. Empathy training for resident physicians: a randomized controlled trial of a neuroscience-informed curriculum. <i>J. Gen. Intern. Med.</i> 27(10), 1280–1286 (2012).	INTERVENTION
Meyer, L. G. (2020). Teaching Doctors to Respond with Empathy: A Pilot Study (Doctoral dissertation, Arizona State University).	INTERVENTION
Berry, K. R. (2019). Storytelling and How it Aids Empathy for Providers of the Trauma Patient Population.	INTERVENTION
Roseman, J. L. (2014). Reflections on the Sidney Project™: can we talk? Can we give voice to the taboo topics that are usually not embraced in residency medical education?. <i>Journal of pain and symptom management</i> , 48(3), 478-482.	INTERVENTION
Shariat SV, Keikhaveni A. (in press). Empathy in residents of clinical specialties of Iran University of Medical Sciences. <i>Iran J Psychiatry Clin Psychol</i> 16(3).	LANG: FARSI
Kataoka HU. Series: for attending physicians: professionalism; empathy in medicine. <i>Nihon Naika Gakkai Zasshi</i> 2012;101:2103–7.	LANG: JAPANESE
Aita, V., McIlvain, H., Backer, E., McVea, K., & Crabtree, B. (2005). Patient-centered care and communication in primary care practice: What is involved? <i>Patient Education and Counseling</i> , 58(3), 296–304.	NO FACTORS
Park, J., Saha, S., Han, D., Jindal, M., Korthuis, T., Moore, R., & Beach, M. C. (2020). Are clinicians' self-reported empathic concern and perspective-taking traits associated with their response to patient emotions?: <i>Communication Studies</i> . <i>Patient Education and Counseling</i> .	NO FACTORS
Linn LS, DiMatteo MR, Cope DW, Robbins A. Measuring physicians' humanistic attitudes, values, and behaviors. <i>Med Care</i> . 1987;25:504 –515.	NO FACTORS
Haslam N. Humanizing medical practice: the role of empathy. <i>Med. J. Aust.</i> 187(7), 381–382 (2007).	NO FACTORS
Frampton SB, Guastello S, Brady C et al. Patient-Centered Care Improvement Guide. Planetree/Picker Institute, CT, USA (2008).nCompendium of practical guidance, actionable tools and resources to facilitate implementation of patient-centered care.	NO FACTORS
Glick S. M. The component elements of physician compassion. <i>Pharos Alpha Omega Alpha</i> 48, 9, 1985.	NO FACTORS

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STUDY	REASONS FOR EXCLUSION
P. Irving and D. Dickson, "Empathy: towards a conceptual framework for health professionals," <i>International Journal of Health Care Quality Assurance</i> , vol. 17, no. 4, pp. 212–220, 2004.	NO FACTORS
Spreng RN , McKinnon MC , Mar RA , Levine B . The Toronto empathy questionnaire: Scale development and initial validation of a factor-analytic solution to multiple empathy measures . <i>J Pers Assess</i> . 2009 ; 91 : 62 – 71.	NO FACTORS
Sinclair S, Hack TF, Raffin-Bouchal S, McClement S, Stajduhar K, Singh P, Hagen NA, Sinnarajah A, Chochinov HM. What are healthcare providers' understandings and experiences of compassion? The healthcare compassion model: a grounded theory study of healthcare providers in Canada <i>BMJ Open</i> 2018;8:e019701.	NO FACTORS
Cole-King A, Gilbert P. Compassionate care: the theory and the reality. <i>J Holistic Healthcare</i> 2011; 8:29–36.	NO FACTORS
Ellis S: The patient-centred care model: holistic/multiprofessional/reflective. <i>Br J Nurs</i> 8: 296-301, 1999.	NO FACTORS
Bellet PS, Maloney M. The importance of empathy as an interviewing skill in medicine. <i>JAMA</i> 1991;266:1831–2	NO FACTORS
Dougherty CJ, Purtilo R. Physicians' duty of compassion. <i>Can Q Healthc Ethics</i> 1995;4:426–33.	NO FACTORS
Stevenson AC. Compassion and patient centred care. <i>Aust Fam Physician</i> 2002;31:1103–1106.	NO FACTORS
Thomasa DC, Kushner T. A dialogue on compassion and supererogation in medicine. <i>Camb Q Healthc Ethics</i> 1995;4:415– 425	NO FACTORS
Abbott Moore L. Empathy: a clinician's perspective. <i>Asha Leader</i> . 2006;11(10):16–17.	NO FACTORS
Brock C, Salinsky JV. Empathy: an essential skill for understanding the physician-patient relationship in clinical practice. <i>Fam Med</i> 1993;25:245–8.	NO FACTORS
Constand, M. K., MacDermid, J. C., Dal Bello-Haas, V., & Law, M. (2014). Scoping review of patient-centered care approaches in healthcare. <i>BMC health services research</i> , 14(1), 271.	NO FACTORS
Kalavana, T. V. (2016). Responding to emotions. <i>Clinical Communication in Medicine</i> . London: John Wiley & Sons, 91-97.	NO FACTORS
Winer, J. A., Smilansky, J., & Newman, J. (1980). Competency based residency training, empathy, and interpretation. <i>Journal of Psychiatric Education</i> , 4(2), 131-140.	NO FACTORS
Kourakos, M. I., Vlachou, E. D., & Kelesi, M. N. (2018). Empathy in the health professions: an ally in the care of patients with chronic diseases. <i>International Journal of Health Sciences and Research</i> , 8(2), 233-240.	NO FACTORS
De Zulueta, P. C. (2015). Suffering, compassion and 'doing good medical ethics'. <i>Journal of medical ethics</i> , 41(1), 87-90.	NO FACTORS
Jeffrey, D. (2016). Empathy, sympathy and compassion in healthcare: Is there a problem? Is there a difference? Does it matter?. <i>Journal of the Royal Society of Medicine</i> , 109(12), 446-452.	NO FACTORS
Papadopoulos, I., & Ali, S. (2016). Measuring compassion in nurses and other healthcare professionals: An integrative review. <i>Nurse education in practice</i> , 16(1), 133-139.	NO FACTORS
Kang WS, Kim YH, Chang HI. An investigation on reliability and validity of the Korean Physician Empathy Rating Scale. <i>Korean J Psychopathol</i> 2006; 15: 11-8.	NO FULL TEXT
Ward BJ: The other side of the consulting desk. A GP's experience of being a cancer patient's daughter. <i>Aust Fam Physician</i> 2002, 31(6):573-4.	NO FULL TEXT

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STUDY	REASONS FOR EXCLUSION
Crawford P, Gilbert P, Gilbert J & Gale C (2011) The language of compassion. <i>Taiwan International English for Specific Purposes Journal</i> 3, 1–16.	NO FULL TEXT
Betcher DK (2010) Elephant in the room project: improving caring efficacy through effective and compassionate communication with palliative care patients. <i>Medsurg Nursing</i> 19, 101–105.	NO FULL TEXT
Middleton JA, Sen P, Middleton JR: Teaching humanistic behavior: humanities study in the internal medicine residency. <i>N J Med</i> 1993; 90:763–766	NO FULL TE
Shanafelt, T. D., Bradley, K. A., Wipf, J. E., & Back, A. L. (2002). Burnout and self reported patient-care in an internal medicine residency program. <i>Annals of Internal Medicine</i> , 136, 358-367.	NOT A CENTRAL CONSTRUCT
McGaghie WC, Mytko JJ, Brown WN, Cameron JR. Altruism and compassion in the health professions: a search for clarity and precision. <i>Med Teach</i> 2002; 24(4): 374–378	NOT A CENTRAL CONSTRUCT
Burack, J. H., Irby, D. M., Carline, J. D., Root, R. K., & Larson, E. B. (1999). Teaching compassion and respect: Attending physicians' responses to problematic behaviours. <i>Journal of General Internal Medicine</i> , 14(1), 49-55.	NOT A CENTRAL CONSTRUCT
Levinson W, Gorawara-Bhat R, Lamb J. A study of patient clues and physician responses in primary care and surgical settings. <i>JAMA</i> . 2000;284:1021–7.	NOT A CENTRAL CONSTRUCT
Salmon P, Dowrick CF, Ring A, Humphris GM. Voiced but unheard agendas: qualitative analysis of the psychosocial cues that patients with unexplained symptoms.	NOT A CENTRAL CONSTRUCT
Engel G. L. The clinical application of the biopsychosocial model. <i>Am. J. Psychiat.</i> 137, 535, 1980.	NOT A CENTRAL CONSTRUCT
Firth-Cozens, J. , & Greenhalgh, J. (1997). Doctors' perceptions of the links between stress and lowered clinical care. <i>Social Science Medicine</i> , 44, 1017-1022.	NOT A CENTRAL CONSTRUCT
Stevens LA. Muskin PR: Techniques for reversing the failure of empathy towards AIDS patients. <i>J Am Acad Psychoanal</i> 1987;15:539-551.	NOT A CENTRAL CONSTRUCT
Crawford P & Brown B (2011) Fast healthcare: brief communication, traps and opportunities. <i>Patient Education & Counseling</i> 82, 3–10.	NOT A CENTRAL CONSTRUCT
Laine C, Davidoff F: Patient-centered medicine. A professional evolution. <i>JAMA</i> 275: 152-156, 1996.	NOT A CENTRAL CONSTRUCT
Emmanuel, E, Brett, A. Managed competition and the patient-physician relationship. <i>New England Journal of Medicine</i> 1993;329:879–82.	NOT A CENTRAL CONSTRUCT
Callaghan, K. A., & Fanning, J. B. (2018). Managing bias in palliative care: professional hazards in goals of care discussions at the end of life. <i>American Journal of Hospice and Palliative Medicine</i> ®, 35(2), 355-363.	NOT A CENTRAL CONSTRUCT
Hanževački, M., Jakovina, T., Tomac, A., & Mercer, S. (2015). Reliability and validity of the Croatian version of consultation and relational empathy (CARE) measure in primary care setting. <i>Croatian medical journal</i> , 56(1), 50-56.	NOT A CENTRAL CONSTRUCT
Matthias, M. S., Parpart, A. L., Nyland, K. A., Huffman, M. A., Stubbs, D. L., Sargent, C., & Bair, M. J. (2010). The patient–provider relationship in chronic pain care: providers' perspectives. <i>Pain Medicine</i> , 11(11), 1688-1697.	NOT A CENTRAL CONSTRUCT

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STUDY	REASONS FOR EXCLUSION
D. B. Monsivais and J. C. Engebretson, "Cultural cues: review of qualitative evidence of patient-centered care in patients with nonmalignant chronic pain," <i>Rehabilitation Nursing</i> , vol. 36, no. 4, pp. 166–171, 2011.	PATIENT PERCEPTIONS
Floyd MR, Lang F, McCord RS, Keener M. Patients with worry: presentation of concerns and expectations for response. <i>Patient Educ Couns</i> . 2005;57:211–6. 17.	PATIENT PERCEPTIONS
Rodriguez, A. M., & Lown, B. A. (2018). Measuring compassionate care with the 12-item Schwartz Center Compassionate Care Scale. <i>PLoS One</i> , 14(9), e0220911.	PATIENT PERCEPTIONS
Mercer, S. W., Maxwell, M., Heaney, D., & Watt, G. (2004). The consultation and relational empathy (CARE) measure: development and preliminary validation and reliability of an empathy-based consultation process measure. <i>Family practice</i> , 21(6), 699-705.	PATIENT PERCEPTIONS
Sinclair S, McClement S, Raffin-Bouchal S, Hack TF, Hagen NA, McConnell S, Chochinov HM. Compassion in health care: an empirical model. <i>J Pain Symptom Manag</i> 2016;51:193–203.	PATIENT PERCEPTIONS
Lundy, J. M., Bikker, A., Higgins, M., Watt, G. C., Little, P., Humphries, G. M., & Mercer, S. W. (2015). General practitioners' patient-centredness and responses to patients' emotional cues and concerns: relationships with perceived empathy in areas of high and low socioeconomic deprivation. <i>Journal of Compassionate Health Care</i> , 2(1), 2.	PATIENT PERCEPTIONS
M. M. Alamo, R. R. Moral, and L. A. P. de Torres, "Evaluation of a patient-centred approach in generalized musculoskeletal chronic pain/fibromyalgia patients in primary care," <i>Patient Education and Counseling</i> , vol. 48, no. 1, pp. 23–31, 2002.	PREDICTOR
W.T. Branch Jr., R. Frankel, Not all stories of professional identity formation are equal: an analysis of formation narratives of highly humanistic physicians, <i>Patient Educ. Couns</i> . 99 (2016) 1394–1399.	WRONG CONSTRUCT
Curlin F A, Selligren SA, Lantos J D, Chin M H. Physicians' observations and interpretations of the influence of religion and spirituality on health. <i>Arch Intern Med</i> . 2007; 167(7): 649-54.	WRONG CONSTRUCT
Rosen, I. M., Bellini, L. M., & Shea, J. A. (2004). Sleep behaviors and attitudes among internal medicine housestaff in a U. S. university-based residency program. <i>Academic Medicine</i> , 79, 407-416.	WRONG CONSTRUCT
Charon, R. (2001). Narrative medicine: a model for empathy, reflection, profession, and trust. <i>Jama</i> , 286(15), 1897-1902.	WRONG CONSTRUCT
Alexander SC, Ladwig S, Norton SA, Gramling D, Davis JK, Metzger M, et al. Emotional distress and compassionate responses in palliative care decision-making consultations. <i>J Palliat Med</i> . 2014;17(5):579–84. doi:10.1089/jpm.2013.0551.	WRONG CONSTRUCT
Pembroke NF. Empathy, emotion, and ekstasis in the patient-physician relationship. <i>J Relig Health</i> 2007;46:287–298	WRONG CONSTRUCT
Epstein RM, Shields CG, Meldrum SC, et al. Physicians' responses to patients' medically unexplained symptoms. <i>Psychosom Med</i> . 2006;68:269–76.	WRONG CONSTRUCT: COMMUNICATION
Fiscella K, Meldrum S, Franks P, et al. Patient trust: is it related to patient-centered behavior of primary care physicians? <i>Med Care</i> . 2004;42:1049–55.	WRONG CONSTRUCT: COMMUNICATION
Cooper, L. A., Roter, D. L., Johnson, R. L., Ford, D. E., Steinwachs, D. M., & Powe, N. R. (2003). Patient-centered communication, ratings of care, and concordance of patient and physician race. <i>Annals of Internal Medicine</i> , 139(11), 907–915.	WRONG CONSTRUCT: COMMUNICATION
Street RL Jr, Liu L, Farber JG, Chen Y, Calvitti A, Zuest D, Gabuzda MT, Bell K, Gray B, Rick S, Ashfaq S, Agha Z. Provider interaction with the electronic health record: the effects on patient-centered communication in medical encounters. <i>Patient Educ Couns</i> 2014;96 (3):315–9.	WRONG CONSTRUCT: COMMUNICATION

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STUDY	REASONS FOR EXCLUSION
Adarkwah, C. C., Schwaffertz, A., Labenz, J., Becker, A., & Hirsch, O. (2018). Burnout and work satisfaction in general practitioners practicing in rural areas: results from the HaMEdSi study. <i>Psychology research and behavior management</i> , 11, 483.	WRONG CONSTRUCT: DEPERSONALISATION
Weed MA: A cure for the empathy gap? Experience and perspective of a chronically ill and disabled medical educator. <i>Arch Ophthalmol</i> 2012, 130(2):263–264.	WRONG PUBLICATION TYPE
Hojat M, Mangione S, Gonnella JS, et al. Empathy in medical education and patient care. <i>Acad Med</i> . 2001;76:669.	WRONG PUBLICATION TYPE
Dagnone JD. Commentary: The physician as person framework: how human nature impacts empathy, depression, burnout, and the practice of medicine. <i>Can Med Educ J</i> 2017;8(4).	WRONG PUBLICATION TYPE
McClure R. Greater Good Science Center. Sustaining Compassion in Health Care. (2013)	WRONG PUBLICATION TYPE
Smith P. Guest editorial: compassion and smiles: what's the evidence? <i>J. Res. Nursing</i> . 13, 367–370 (2008).	WRONG PUBLICATION TYPE
Conversano, C., Ciacchini, R., Orrù, G., Di Giuseppe, M., Gemignani, A., & Poli, A. (2020). Mindfulness, Compassion, and Self-Compassion Among Health Care Professionals: What's New? A Systematic Review. <i>Frontiers in Psychology</i> , 11, 1683.	WRONG PUBLICATION TYPE: REVIEW OF INTERVENTIONS
Tunis SR, Messner DA, Mohr P, Gliklich RE, Dubois RW. A translation table for patient-centered comparative research: guidance to improve the value of research for clinical and health policy decision- making. <i>J. Comp. Eff. Res.</i> 1(3), 259–262 (2012). 70 Planetree. Planetree Patient-Centered Hospital Designation® Criteria. Planetree, CT, USA	WRONG PUBLICATION TYPE
Greenland P: What If the Patient Were Your Mother? <i>Arch Intern Med</i> 2005, 165:607-608.	WRONG PUBLICATION TYPE
Jenni OG: On the other side of the tracks. <i>Lancet</i> 2000, 355:139-140.	WRONG PUBLICATION TYPE
Anfossi M, Numico G. Empathy in the doctor-patient relationship. <i>J Clin Oncol</i> , 2004; 22(11): 2258-59.	WRONG PUBLICATION TYPE
Bennett E, Hirsch JS. Physician Empathy in Correctional Facilities: Still in Need of Analysis. <i>Virtual Mentor</i> . 2008;10(2):96.	WRONG PUBLICATION TYPE
Killam, K. (2015.). Building Empathy in Healthcare. Retrieved June 12, 2016, from http://www.dailygood.org/story/930/building-empathy-in-healthcare-kasley-killam/ .	WRONG PUBLICATION TYPE
The Kings Fund. The point of care – enabling compassionate care in acute hospital settings. See www.kingsfund.org.uk/sites/default/files/field/field_publication_file/poc-enabling-compassionate-care-hospital-settings-apr09.pdf (last checked 6 April 2018).	WRONG PUBLICATION TYPE
Want a compassionate NHS? Then makes sure staff are happy. Article on The Guardian. See www.theguardian.com/healthcare-network/2015/aug/25/want-a-compassionate-nhs-then-make-sure-staff-are-happy (2015, last checked 6 April 2018).	WRONG PUBLICATION TYPE

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STUDY	REASONS FOR EXCLUSION
Building and strengthening leadership – leading with compassion. NHS survey document. See www.england.nhs.uk/wp-content/uploads/2014/12/london-nursing-accessible.pdf (2014, last checked 12 April 2018).	WRONG PUBLICATION TYPE
Nauert R (2011) Compassion Missing in American Health Care. PsychCentral. Available at: http://psychcentral.com/news/2011/09/09/compassion-missing-in-american-health-care/29295.html (accessed 31 August 2012).	WRONG PUBLICATION TYPE
Parliamentary and Health Service Ombudsman (2011) Care and Compassion? Report of the Health Service Ombudsman on Ten Investigations into NHS Care of Older People. The Stationery Office, London.	WRONG PUBLICATION TYPE
Firth-Cozens J & Cornwell J (2009) The Point of Care: Enabling Compassionate Care in Acute Hospital Settings. King’s Fund, London.	WRONG PUBLICATION TYPE
Cornwell J (2012) Developing a Culture of Compassionate Care. Available at: http://www.kingsfund.org.uk/blog/2012/10/developing-culture-compassionatecare (accessed 10 October 2012).	WRONG PUBLICATION TYPE
Macnaughton J: The dangerous practice of empathy. <i>Lancet</i> 2009;373:1940–1941.	WRONG PUBLICATION TYPE
Davis MA: A perspective on cultivating clinical empathy. <i>Complement Ther Clin Pract</i> 2009;15:76– 79	WRONG PUBLICATION TYPE
Smajdor A. Compassion is not the answer to failings in the NHS. <i>The Guardian</i> , 19 Sep 2013. http://www.theguardian.com/healthcare-network/2013/sep/19/compassion-failings-nhs	WRONG PUBLICATION TYPE
Barnes, D. (2017). Constrained compassion	WRONG PUBLICATION TYPE
Fotaki, M. (2015). What money cannot buy? compassion in healthcare: a response to the recent commentaries. <i>International journal of health policy and management</i> , 4(12), 873.	WRONG PUBLICATION TYPE
Lown BA, McIntosh S. Advancing compassionate, person- and family-centered care through interprofessional education for collaborative practice. Available at: http://www.theschwartzcenter.org/supporting-caregivers/educationalprograms/conferences/ and http://humanism-inmedicine.org/advancing-compassionate-patient-andperson-centered-care/ . [Accessed 20 May 2015.]	WRONG PUBLICATION TYPE
Miles A, Asbridge JE. On the need for transformational leadership in the delivery of person-centered clinical practice within 21st Century healthcare systems. <i>Eur J Pers Cent Healthc</i> . 2014;2:261-4.	WRONG PUBLICATION TYPE
Bresnahan, J. Compassionate response to human suffering: a neglected issue in health care reform. <i>Kansas Journal of Law and Public Policy</i> 1993;Fall:23–30.	WRONG PUBLICATION TYPE
Winter, G. (2018). Cultivating a compassionate healthcare workforce nationally. <i>British Journal of Healthcare Management</i> , 24(10), 474-475.	WRONG PUBLICATION TYPE
Haramati, A., Cotton, S., Padmore, J. S., Wald, H. S., & Weissinger, P. A. (2017). Strategies to promote resilience, empathy and well-being in the health professions: Insights from the 2015 CENTILE Conference. <i>Medical teacher</i> , 39(2), 118-119.	WRONG PUBLICATION TYPE
Kompanje, E. J., van Mol, M. M., & Weigel, J. (2017). Will we become more compassionate or empathic intensive care professionals by watching films and documentaries about suffering?. <i>Intensive Care Medicine</i> , 43(4), 560-561.	WRONG PUBLICATION TYPE

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STUDY	REASONS FOR EXCLUSION
Frampton SB, Charmel, PA. Putting Patients First: Designing and Practicing Patient-Centered Care (2nd Edition). Jossey-Bass, San Francisco, CA, USA (2008).	WRONG PUBLICATION TYPE: BOOK
Sarason S. B. Caring and Compassion in Clinical Practice. Jossey-Bass, San Francisco, CA, 1985.	WRONG PUBLICATION TYPE: BOOK
Gold AP: The “White Coat Ceremony” A Psychological Contract for Professionalism and Empathy in Medicine. Englewood Cliffs, NJ, Arnold P. Gold Foundation, 1995	WRONG PUBLICATION TYPE: BOOK
Halifax J: Understanding and cultivating compassion in clinical settings: the A.B.I.D.E. compassion model. In: Singer T and Mattias Buiz (eds): Compassion: Bridging Compassion and Science. 2013, pp. 206–226. Leipzig, Germany: Max Plank Institute Society,	WRONG PUBLICATION TYPE: BOOK
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