

Posa, S., Wasilewski, M. B., Mercer, S., Simpson, S., Robinson, L. P. and Simpson, R. (2022) Conceptualization, use and outcomes associated with empathy and compassion in physical medicine and rehabilitation: a scoping review. *International Journal of Rehabilitation Research*, 45(4), pp. 291-301. (doi: <u>10.1097/MRR.0000000000542</u>)

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1	Conceptualization, Use and Outcomes Associated with Empathy and Compassion in
2	Physical Medicine and Rehabilitation: A Scoping Review
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13	Declaration of Interest: None declared
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25 Abstract

26 The purpose of this review is to scope the literature on the conceptualization, use, and outcomes 27 associated with empathy and/or compassion in physical medicine and rehabilitation. Eligible 28 studies included quantitative, qualitative, or mixed methods research that presented primary data 29 on the conceptualization, use and outcomes associated with empathy and/or compassion in 30 physical medicine and rehabilitation. Relevant studies were identified through CINAHL, 31 Cochrane Library, EMBASE, MEDLINE and PEDRO. Twenty-four studies were included 32 (participant n=3,715); 13 quantitative, six mixed-methods, five qualitative. In qualitative 33 analysis, empathy and/or compassion were conceptualized as both intrinsic and exhibitory. 34 Where self- compassion was examined as an intervention for patients, improvements in anxiety, 35 depression, and quality of life were reported. Survey data suggested that when rehabilitation 36 health care providers were perceived to be more empathic, patients reported greater treatment 37 satisfaction, acceptance, adherence, and goal attainment. Individuals receiving and health care 38 providers who deliver rehabilitative care conceptualize empathy and compassion as valuable in 39 physical medicine and rehabilitation settings, with cognitive and behavioural elements described. 40 Health care provider empathy, and compassion-based interventions may influence outcomes 41 positively in this context. More research is needed to understand mechanisms of action of 42 empathy and compassion and effectiveness in physical medicine and rehabilitation settings.

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Keywords: Empathy; Compassion; Physical Medicine and Rehabilitation; Scoping review

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47 Background

Rehabilitation is a central component of sustainable global healthcare systems [1] that is 48 49 comprised of longitudinal, multifaceted, and personalized complex interventions [2]. Rehabilitation aims to promote optimal independent bio-psychosocial functioning by minimizing 50 51 the personal effects of disabling physical illness/ injury as well as enabling changes to one's 52 environment to enhance participation [3-4]. In rehabilitation, health care providers (HCPs) 53 typically work with those receiving care to co-create individualized treatment goals [5]. 54 Rehabilitation thus depends on effective communication and relational interaction between those 55 receiving care and HCPs delivering care. Despite having high quality evidence for effectiveness 56 in people with disabling conditions [6-10], the active components of effective rehabilitation 57 remain incompletely understood [11]. 58 Disabling illness or injury confers a significant juncture in a person's life, where adaptation to a 59 60 new functional baseline and emotional adjustment may be complex and challenging [12-13]. Although technical knowledge is widely viewed as a prerequisite for effective clinical practice, 61 62 pro-social aptitudes are also known to improve outcomes among those receiving care [14]. 63 Systematic review evidence indicates that what matters most to patients in their interactions with HCPs is the perceived quality of interpersonal care, including empathy [15]. HCPs also view 64 65 compassion as an important therapeutic tool for engaging individuals in a sensitive manner, 66 creating a healing alliance, and diminishing suffering [16]. 67

68 Empathy and compassion are widely regarded as important components of high-quality

69 healthcare [17]. Both are frequently taught in health care education, including behavioral

strategies such as: sitting (versus standing), noticing patients' non-verbal cues, picking up
opportunities to respond with compassion, using non-verbal communication therapeutically
(such as eye contact), and verbally acknowledging the patient narrative [18]. Although similar
and indeed overlapping in scope, empathy and compassion are believed to have some distinct
elements, operationalization in practice, and associated neural signatures [19].

75

Empathy is a complex, multidimensional construct, including affective and cognitive
components [20]. Empathy in a HCP is defined as the ability to perceive the patient's perspective
and feelings (including personal meaning), communicate this understanding to the patient, and
use it in a way that is therapeutic (i.e. to the individual's benefit)[21]. Evidence suggests that
empathy can be learned [22], varies by HCP [23], declines during medical school and residency
[24], is not routinely practiced [23], and has preliminary evidence of effectiveness in improving
physical [25] and mental health [26] outcomes.

83

Compassion has also been conceptualized as a complex construct, involving recognition of 84 suffering, understanding the universality of suffering, feeling empathy for the person(s) suffering 85 86 and resonating emotionally with their distress, tolerating these feelings (which may be 87 unpleasant) whilst remaining present to the person(s) suffering, and being motivated to alleviate 88 that suffering – a framework which can be applied to one's self or to another [27]. Greater self-89 compassion is strongly associated with reduced levels of anxiety, depression and stress [28], 90 common comorbidities in people with long term disabling conditions [29-32]. Furthermore, 91 compassion-based interventions can reduce HCP burnout and stress, whilst increasing self-

92	compassion and empathy [33]. However, the 'downstream' effects of these diverse strategies on
93	patient outcomes are less clear [34-35].
94	
95	No current or prior study was identified that examined the conceptualization, use, and outcomes
96	associated with empathy and/or compassion in PM&R settings. The aim of this review is to
97	scope the peer reviewed academic literature on the conceptualization, use, and outcomes
98	associated with empathy and compassion in PM&R.
99	
100	Methods
101	This review was registered on the Open Science Framework Register on July 23, 2021,
102	Registration DOI: 10.17605/OSF.IO/N29HP.
103	
104	Scoping Review
105	A scoping review framework is 'a way of mapping the key concepts that underpin a research
106	area' [36]. It is a rigorous, yet broad approach, ideal when little is known about a concept, to
107	create a map of available types of evidence, assess knowledge gaps, and clarify how concepts
108	and definitions are described in the literature. We used the Joanna Briggs Institute (JBI) manual
109	for evidence synthesis, as a guiding framework, [36] and referred to the Preferred Reporting
110	Items for Systematic Reviews and Meta-analyses extension for Scoping Reviews Checklist
111	(PRISMA-ScR) [37].
112	
113	Search Strategy
114	An initial search of the included databases was conducted, allowing analyses of text and index

terms used across identified articles. Secondly, identified terms were applied across all included

116 databases. Five major electronic databases were then searched (CINAHL, Cochrane Central

117 Register of Controlled Trials, EMBASE, MEDLINE and PEDRO), with medical subject

headings and key words relating to empathy, compassion, and rehabilitation. Our search

delimiters comprised human subjects, articles published in English, from database inception-

120 August 2021. Search strategies were developed by an academic librarian.

121

122 Source of Evidence Screening and Selection

123 Inclusion Criteria

124 Participants in this review included individuals receiving care, families, and HCPs of any age. The core concepts in this review are the conceptualization, use, and outcomes associated with 125 126 empathy and/or compassion, including as part of a planned or unplanned rehabilitation 127 intervention; studies had to explicitly mention 'rehab' or 'rehabilitation' to be included in this study. The context for this review is within PM&R settings, acute, inpatient or outpatient, as 128 129 opposed to rehabilitation otherwise defined as 'psychiatric', or relating to alcohol or substance 130 use. Otherwise, we did not exclude studies on the basis of rehabilitation setting, or participant 131 diagnoses.

132

133 Screening and Selection

Two reviewers independently screened titles and abstracts of bibliographic records derived from the searches. After removing duplicates using Covidence, two reviewers conducted title and abstract review. Pilot testing of source selectors was conducted by assessing a random sample of titles/abstracts, where our research team screened these using our eligibility criteria. Our

interrater agreement upon pilot screening was 'substantial', as measured by Cohen's Kappa,
$\kappa = 0.61.$
Data Extraction
Included studies were charted by two independent reviewers using the JBI manual data
extraction template. [36]

145 Analysis

146 Simple descriptive methods were used to chart the quantitative data, and a descriptive approach

147 with conventional content analysis was undertaken to describe qualitative data [38]. No

148 assessment of study quality was undertaken. This is not typically not done in scoping reviews,

149 which are designed instead to scope the literature on a topic rather than to synthesize and provide

a clinically meaningful answer [39].

151

152 **Results**

153 Our search in August 2021 generated 4,722 'hits'. Following de-duplication there were 3,937

154 records. After title and abstract screening, 94 full text studies were retrieved and reviewed, of

which 24 were included in the final review. Search results are detailed in Figure 1.

156

157 Characteristics of included studies

158 Thirteen quantitative studies were identified [40-52], besides six using mixed methods [53-58],

and five qualitative studies [59-63]. There were eight intervention studies [45,49,54-57,62-63],

160 one cohort [49], one conversational analysis (which quantified findings) [46], 11 surveys [40-

161 45,47-48,50-52], six studies featuring surveys alongside qualitative interviews or prompts[53-

162 58], three studies exclusively featuring qualitative interviews [59,62,63], and two using focus

163 groups [60-61]. Thirteen studies took place in Europe [42-45,48-49,53-56,59-61], five in North

164 America [50,52,58,62-63], three in Asia [40-41,46], two in Australia [51,57], and one in South

America [47]. Sample size ranged from 8-742, total participants n=3,715 (Table 1).

166

170

167 *Participant characteristics*

168 Ten studies reported findings from HCPs [44-45,48,51-52,56,58,61-63], 10 focused on

individuals receiving rehabilitative care [40-41,43,47,49,50,54-55,57,60], and four featured both

[42,46,53,59]. Two studies reported patient ethnicity [50,55], the majority being "white". Twenty

171 studies reported participant age, which ranged from 18 to greater than 75. Where reported

172 (omitted in two studies) [46,56] % female ranged from 13-100%. Socio-economic status (SES)

173 of rehabilitation outpatients was reported in one study from Korea (monthly income)[41]. Eleven

studies reported education status, most participants completing high school, or above [40-44,50-

175 51,54,57-58,61]. A range of diagnostic categories were reported for patients, including acquired

brain injury (ABI), cancer, musculoskeletal (MSK) disorders, spinal cord injury (SCI) and stroke

177 (Table 2).

178

179 Intervention characteristics

180 Among intervention studies for HCPs, four focused on education; one on neuro-disability

simulation exercises [56], another on motivational interviewing [45], one on Schwartz Rounds

182 [64], and one on an arts-based narrative intervention [62]. Regarding interventions for

183 individuals receiving care, one focused on Compassion Focused Therapy (CFT) [55], and one on

184 self-compassion training [57]. Other intervention studies also measuring perceived empathy as a 185 process marker included those utilizing physical exercise [54] and Botulinum Toxin injection therapy [49]. Brief descriptions of these interventions are outlined in Table 3. 186 187 188 *Conceptualization of empathy and compassion - definitions* 189 Compassion and/or empathy were conceptualized explicitly, a priori, in 11 studies (Table 4). A 190 priori definitions were linked to empathy and/or compassion as an HCP attitude, ability, or 191 behaviour towards patients, or as an attitude towards oneself, and are reflected in process 192 measures chosen in respective studies (Table 5). 193 194 Conceptualization of empathy and compassion 195 Nine studies using qualitative methods revealed how empathy and/or compassion were 196 conceptualized within PM&R settings by individuals receiving care and by HCPs (Table 6). 197 Specifically, empathy and/or compassion were regarded a cognitive process in terms of 'sensing 198 the state of the other' (n=2) [55,63], or as a behavioural process that is exhibited and delivered 199 (n=4) [53-54,59-60]. Some studies, however, conceptualized empathy and/or compassion in both 200 cognitive and behavioural ways [56,61-62]. 201 202 Two studies conceptualized empathy and/or compassion as a cognitive, internalized quality,

concerning awareness and understanding of another's experience. A mixed-methods study from
the UK found that CFT allowed ABI patients to use a "new approach" to experiencing empathy
and compassion toward themselves [55]. In Canada, HCPs in pediatric rehabilitation reported
that Schwartz Rounds made them feel a "deeper sense" of compassion, understanding and

207 appreciation towards their colleagues, after they expressed stories regarding the emotional208 burden of their respective roles [63].

209

210 Four studies used definitions of empathy and/or compassion that emphasized a behavioural 211 nature—qualities outwardly shown to others. In the UK, individuals undergoing cancer 212 rehabilitation reported instructors of a group-based physical exercise program were empathetic 213 as they did not put participants "under pressure", "push too hard", but rather, "organized a 214 regime that was suited to our needs" [54]. Also in the UK, individuals with an ABI expressed 215 that rehabilitation HCPs need training to specifically address their lack of empathy; a quality not 216 "shown" by perceived impatient attitudes and accusatory statements derived from a lack of 217 understanding of ABI symptoms [53]. Lastly, in the Netherlands, interviews with rehabilitation 218 nurses and individuals with chronic obstructive pulmonary disease (COPD) 'rheumatic diseases' 219 and other chronic conditions suggested that there are seven dimensions to compassion; 220 attentiveness, listening, confronting, involvement, helping, presence and understanding; 221 described in exhibitory terms (i.e. attentiveness shown through eye contact)[59]. 222 223 Three studies conceptualized empathy and/or compassion as both cognitive and behavioural. In 224 the UK, musculoskeletal physiotherapists defined empathy as an internalized state, 225 "Understanding what's going on in their [the patient] situation from their point of view" and the 226 ability to "put yourself in their [the patient'] shoes", stressing this as "an innate characteristic" 227 or "personality trait" [61]. In a similar manner, the delivery of empathy was deemed as 228 contextual, dependent upon clinician developmental history, beliefs, clinical experience, 229 occupational pressures, and 'maturity' [61]. In Canada, paediatric rehabilitation nurses

230 undertook an arts-based narrative training intervention to promote empathy (defined as an 231 introspective state of being - "think of yourself of being in their [the patient's] shoes") and, 232 besides indicating they would "listen better", reported also realizing empathy in exhibitory 233 terms, stating "What comes out of my mouth will be different" when talking to patients and 234 families [62]. In the UK, neurodisability simulation exercises were used to promote experiential 235 "understanding" among rehabilitation HCPs [56]. Here, HCPs reported that these exercises led to 236 enhanced awareness, understanding and empathy towards individuals with brain injuries: "I can 237 appreciate more deeply how and why patients with brain injury find this difficult to impossible 238 and I appreciate now why their behaviour is so erratic at times"[56], and following up that, as a 239 result, they would *actuate* their insights in concrete behavioural terms, with shorter treatment 240 sessions to facilitate concentration and seeking out aids for those with communication 241 impairments [56].

242

243 Use of empathy and/or compassion

244 In qualitative studies, both individuals receiving and those HCPs delivering rehabilitation 245 indicated strategic use of empathy and/or compassion (Table 7). In Spain, a qualitative study 246 found that patients with lower back pain undergoing "neuroreflexotherapy" (NRT) actively 247 sought empathic practitioners, "The doctor who gave me NRT helped me feel more confident, he 248 treats me really well and he took my pain away" [60]. In a study from the Netherlands, a 249 participant recounted how nurses demonstrated compassion via listening: "They listen to your 250 story all the time. Actually, there is not a nurse that does not listen" [59]. In a study from the 251 UK, one physiotherapist described how empathy could be strategically *shown* to individuals 252 receiving care, regarded as a skill, and even feigned: "But I think if you're gonna be effective in

253 this sort of job you've gotta at least learn how to at least pretend you're empathising"[61]. In 254 Korea, conversational analysis of rehabilitation physician interactions with individuals receiving 255 care reported that physicians demonstrated empathic communication in <3% of their utterances, 256 and 1.11% of the time was spent in empathic listening [46]. Physician eye contact was 257 significantly correlated with empathic listening [46]. In Germany, an observational study of 258 rehabilitation inpatients reported a decline in perceived physician empathy as admission 259 progressed [42]. In Turkey, a survey exploring SCI physiatrists' (n=69) experiences breaking 260 bad news to individuals receiving care, found <60% reported perceiving themselves to have 261 performed the most appropriate empathetic behaviours; surprisingly, more experienced 262 physiatrists reported feeling less competent[48]. In Australia, a survey examining rehabilitation 263 professionals' attitudes towards obesity, found females exhibited greater empathy levels, but 264 empathy was not a reliable predictor of 'anti-fat' bias or 'fat' phobia [51]. In Pakistan, a comparative cross-sectional survey of service quality delivered in PT clinics found that the 265 266 service quality dimension of empathy was rated as being greater in private settings, rather than 267 public clinics; in large public clinics, the largest perceived service quality gap was empathy [40]. 268

269 Outcomes associated with delivering empathy and/or compassion

In the USA, 53% of individuals with SCI surveyed assessed their therapeutic relationship as
below normative values on the Consultation And Relational Empathy (CARE) measure; a
finding more marked in those with pressure injuries [50]. However, individuals with tetraplegia
were more likely to rate interactions as above normative CARE scores [50]. In the USA, a survey
of physiotherapists found females more empathic, that work disengagement correlated negatively
with empathy [52]. In Spain, a pre-post study among SCI rehabilitation providers reported no

276 significant change in empathy, burnout, and satisfaction following motivational interviewing 277 training. However, pre-intervention scores on the measure of "ability to stand in patients' shoes" 278 were significantly higher among female providers [45]. In the USA, a survey examining 279 compassion satisfaction, burnout, and secondary traumatic stress among physiotherapists, 280 indicated 46.4% had high levels of compassion satisfaction. Physiotherapists with >15 years of 281 experience and those working in a private outpatient setting had greater odds of possessing high 282 compassion satisfaction [58]. In Ukraine, a cross-sectional survey among paediatric 283 rehabilitation staff and primary caregivers at an orphanage found 73% had moderate-high levels 284 of compassion fatigue and 47% moderate-high compassion satisfaction [44].

285

286 Outcomes associated with receiving empathy and/or compassion

287 Outcomes measured in relation to empathy and/or compassion included treatment satisfaction, 288 adherence, and mental health among individuals receiving care, and these varied in response to 289 perceived empathy and/or compassion from HCPs. In Korea, a survey found that rehabilitation 290 outpatients' rating their physician as highly affectively or cognitively empathic (compared to 291 moderately) reported greater satisfaction [41]. Participants rating their physicians as highly 292 affectively or cognitively empathic also reported significantly higher treatment adherence [41]. 293 Similarly, in Germany, perceived physician empathy, as rated on a cross-sectional survey by 294 rehabilitation inpatients, significantly predicted their satisfaction and treatment acceptance, but 295 not cooperation or adherence [43]. In Italy, higher perceived physician empathy immediately 296 following Botulinum Toxin injection therapy was associated with significant gains on the Goal 297 Attainment Scale amongst individuals with chronic stroke [49]. Conversely, in Brazil, a survey 298 assessing the psychometric qualities of the CARE measure among individuals with chronic

299 musculoskeletal pain, found PT empathy did not predict improvements in pain intensity [47]. In 300 the UK, individuals with acquired brain injury receiving Compassion-Focused Therapy reported 301 significant reductions post training in self-criticism, self-hating, anxiety, depression, and 302 increased self-reassuring [55]. In Australia, outpatients with chronic medical conditions (cardiac 303 rehabilitation and chronic pain) undertaking a group intervention over four sessions (comprising 304 mindfulness, loving kindness, self-compassion and gratitude) reported significant improvements 305 in depression and gratitude with non-significant trends to improvement on self-compassion, 306 positive and negative affect, satisfaction with life and high frequency heart rate variability[57] 307 (Table 8).

308

309 Discussion

310 Main findings

311 Empathy and/or compassion are conceptualized by individuals receiving and HCPs delivering 312 rehabilitation as an internal cognitive-perceptual skill and/or explicit behavioural quality that 313 increase understanding and appreciation for the state of the other and/or the self. Survey data 314 highlights that when adjudged by individuals receiving care in PM&R settings to be more 315 empathic, this is associated with improved outcomes such as treatment satisfaction, adherence, 316 and mental health. When conceptualized as a form of treatment, compassion-based interventions 317 have been associated with improvements in anxiety, depression, and quality of life among 318 individuals in PM&R settings, though studies have largely incorporated small sample sizes 319 without a control condition.

320

321 *Comparison with existing literature*

322 Conceptualization of empathy and/or compassion

323 Much of the literature on empathy and compassion echoes our finding that these constructs 324 involve both cognitive and behavioural elements. For example, a qualitative study using 325 Grounded Theory found that HCPs and medical patients conceptualize clinical empathy as 'a 326 sense of connection' between the HCP and individual receiving care, as well as involving 327 'perspective taking' and the expression of genuine concern [65]. Two other linked qualitative 328 studies using Grounded Theory propose an empirical model of compassion in healthcare 329 comprising both cognitive/affective and behavioural components—virtues, relational space, 330 virtuous response, seeking to understand, relational communicating, attending to needs and patient reported outcomes [66-67]. Another scoping review, reported that compassion is 331 332 comprised of seven dimensions, collectively these include cognitive/affective (understanding) 333 and behavioural elements (attentiveness, listening, confronting, involvement, helping, and 334 presence) [68].

335

336 Use of empathy and/or compassion

337 In keeping with the literature on empathy in healthcare more generally [69], our review indicated 338 that the use of empathy and/or compassion by HCPs varied according to a participant's stage in 339 rehabilitation, degree of impairment, HCP sex, years of clinical experience, and treatment 340 setting. Perhaps surprising given the fundamentally relational nature of mechanistic models for 341 empathy [65]and/or compassion [70], no intervention studies in our review were dyadic 342 (involving individuals receiving care and HCPs). Dyadic interventions featuring HCPs and 343 individuals receiving care are representative of a humanistic "narrative approach", whereby 344 relational and dialogic exchanges give rise to co-constructed understandings of illness, disability,

345 and needs [71]. Such approaches, as advanced by scholars such as Arthur Frank [72], elaborate 346 upon the unidirectional and hierarchical interactions that give rise to more 'instrumentalist' and 347 outcome-driven forms of engagement and compassion [71] Additionally, none of the 348 interventions in our review were delivered in an online format— a notable finding in the era of 349 the COVID-19 pandemic. There is debate about whether empathy and compassion are attenuated 350 when delivered virtually; [71] some evidence shows that computer-mediated communications 351 can facilitate empathy, digital exchanges having the potential to allow 'more favourable 352 interaction(s)' due to reduced inhibition and more personal disclosures [73-75]. Similarly, digital 353 care can be used to raise awareness among wide audiences about the suffering of others (i.e. Bell 354 Let's Talk Campaign, digital storytelling), to demonstrate compassionate actions, and elicit 355 compassionate responses in a timely and accessible manner (i.e., using telerehabilitation) [71].

356

357 *Outcomes of empathy and/or compassion*

358 A systematic review on the effectiveness of empathy in general practice reported improvements 359 in satisfaction, adherence, and anxiety among those individuals reporting higher perceived 360 physician empathy [76], but also found evidence of greater enablement, and improved 361 inflammatory and metabolic biomarker profiles [76]. Similarly, recent research attests to 362 effectiveness of compassion-based interventions. A 2021 systematic review found self-363 compassion-related interventions, for people with a range of chronic physical health conditions, 364 were effective at improving depression, anxiety, pain catastrophizing, chronic fatigue, and self-365 compassion [77]. Furthermore, a 2021 meta-analysis reported significant positive associations 366 between Self-Compassion Scale total score, positive subscales, and self-efficacy [78] — a belief 367 in one's abilities in the face of challenge [79], and a key construct in behaviour change,

individual goal attainment, and self-management, factors known to moderate outcomes of

369 individuals receiving rehabilitation care[80-82]. Only a few studies included in our scoping

370 review described interventions to improve HCP empathy. A 2014 systematic review reporting on

371 the effectiveness of interventions to improve physician empathy outlined that those interventions

372 with the highest quality evidence include communication skills training, role playing,

373 motivational interviewing and the humanities (reflective writing exercises and theatre)[83]. More

374 recent systematic reviews also support Mindfulness-based interventions (MBIs) as effective [84].

375

376 Our review also included two studies that addressed compassion fatigue [44,58]. We recognize

that compassion fatigue should not be conflated with empathy and compassion, as this may

imply that being compassionate or empathic is inherently "tiring" or can "deplete over time"

379 [85].However, we have included studies on compassion fatigue as we recognize that it may result380 in impairments to one's ability to deliver "quality patient care" [76].

381

382 Strengths and limitations of this study

383 By employing well described scoping review methods, this study provides a comprehensive map 384 of the evidence for the conceptualization, use and outcomes associated with empathy and/or 385 compassion in PM&R settings. Findings from this study highlight important gaps in the evidence 386 base, including an absence of RCTs assessing the effectiveness of empathy and compassion for 387 improving patient outcomes in PM&R, as well as the scarcity of a priori empathy and/or compassion definitions in 10/24 included papers (Table 4). A limitation of our study is including 388 389 only studies published in the English language. Given that compassion features prominently in 390 traditional philosophical and healing systems in Asia, [86] relevant, non-English language

391	literature may have been overlooked. Scoping reviews are useful as a means of providing an
392	overview on the range, extent and nature of research on a given topic, a relative strength, but are
393	limited in their ability to comment upon study quality, or to recommend policy or practice [87].
394	
395	Implications
396	A growing body of diverse research data, delineated in this scoping review, highlights that
397	empathy and compassion are concepts valued by patients and HCPs in PM&R settings. Future
398	research could test hypotheses arising from this conceptualization by using the UK Medical
399	Research Council Framework [2] to iteratively develop and evaluate empathy and/or compassion
400	as an intervention for patients and HCPs working in this context.
401	
402	Conclusions
403	Individuals receiving care and HCPs conceptualize empathy and compassion in both cognitive
404	and behavioural terms in PM&R settings. Empathy and compassion appear to be valued in this
405	context, where both HCP empathy, as perceived by those receiving care, and compassion-based
406	interventions may influence outcomes. More research is needed to better understand mechanisms
407	of action of empathy and compassion in this context, optimal use and, ultimately, effectiveness.
408	Acknowledgements: None
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410	
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Table 1 Study characteristics								
Study	Setting/country	Study design	Population/n	Intervention	Study recruitment/ attrition %	Outcomes	Data collection point(s)	
[40] Abbas et al. 2019	PT clinics, Pakistan	Quantitative, Cross- sectional survey	Rehabilitation patients, n= 374	N/A	N/A	"Servqual" questionnaire on tangibility, responsiveness, reliability, assurance, empathy accessibility and affordability.	Single questionnaire	
[62] Adamson et al. 2018 (1)	Paediatric rehabilitation hospital, Canada	Qualitative interviews, thematic narrative analysis	Paediatric rehabilitation nurses, n=8	Arts-based narrative training, 90 mins weekly over 6 weeks	Recruitment rate N/R Three narrative sessions attended by 7/8 participants	N/A	Pre-post interviews	
[63] Adamson et al. 2018 (2)	Paediatric rehabilitation hospital, Canada	Qualitative descriptive	Clinicians n=15, non-clinicians 14, total n=29	Schwartz Rounds	N/R	N/A	Post-interview	
[44] Allday et al. 2020	Rehabilitation Centre and orphanage, Ukraine	Quantitative, cross-sectional survey	Rehab staff (19), Orphanage caregivers (27), n= 46	N/A	N/R	MBI, ProQoL, STSS	Single questionnaire	
[61] Allen et al. 2017	General hospital, UK	Qualitative, focus groups	PT n=11, PT students n=6, total n=17	N/A	N/R	N/A	Single interview (via focus groups)	
[55] Ashworth et al. 2014	Neuropsychologic al rehabilitation outpatient clinic, UK	Mixed- methods, surveys & qualitative interviews	People with ABI, n=12 (9 interviewed)	CFT in addition to 18- week NP rehabilitation	A mean of 16 sessions out of 18 were attended by participants.	HADS, FSC/SA/SR	Pre-post-follow-up	
[58] Bowens et al., 2021	PT workforce, Alabama, United States	Mixed methods, survey & open ended questions	PT's and PTA's, n=742 (742 completed ProQol, 482 completed open ended questions)	N/A	13.5% response rate for ProQol and 8.8% response rate for open ended.	ProQoL	Single questionnaire	
[57] Brown et al. 2019	Rehabilitation outpatients at private	Mixed- methods, pre- post- interventional,	People with CVD n=7; chronic pain n=1	Weekly 1hr self- compassion	Recruitment rate 19% (8/42) Adherence 84.4%, Attrition 0%	CES-D, SCS, PANAS, SWL, GQ-6, HRV	Pre-post	

	rehabilitation centre, Australia	surveys & written qualitative feedback		intervention for 4 weeks			
[60] Cano et al., 2014	Spanish NHS , Spain	Qualitative; focus groups	Patients with LBP, n=32	N/A	80% of patients invited, agreed to participate (32/40)	N/A	Single focus group
[46] Chang et al. 2013	Rehabilitation Centre, University hospital, Korea	Quantitative; Conversational analysis	N=16 patients, 16 physicians, n=32	N/A	N/R	N/A	Observation of single videotaped patient- physician conversation
[42] Dibbelt et al. 2009	Rehabilitation clinics (3 orthopaedic, 4 internist), Germany	Quantitative, Pre-post survey	Rehab physicians, n=61; Rehab patients, n=470	N/A	Response rate physicians 88%, patients 83.8% Patient attrition 39% at follow-up	P.A.INT questionnaire	Pre-, 14-day ward round, post, 6month follow up
[41] Kim et al. 2008	University hospital, Korea	Quantitative, survey	Rehabilitation outpatients, n=150	N/A	N/A	Questionnaire on physician communication styles (Affective empathy, cognitive empathy, dominant communication)	Single questionnaire
[50] LaVela et al. 2017	SCI rehabilitation outpatients, USA	Quantitative, Cross- sectional survey	SCI, n=450	N/A	Response rate 39% (450/1160)	Demographic and injury characteristics, VR-12, CARE	Single questionnaire
[45] Lusilla- Palacios et al., 2015	SCI Unit, Spain	Quantitative, Pre-post interventional survey	Rehabilitation staff (nurses, physiotherapists, rehab physicians), n=45	Motivational Interviewing	60 % (18/45) participants did not complete post- intervention assessments	JSPE, MBI, a numeric scale to assess perceived job related stress	Pre-post
[47] Manzoni et al., 2019	Clinics and public hospitals, Sao Paolo, Brazil	Quantitative, psychometric survey study	Patients with chronic MSK pain, n=136 (106 for analyzing measurement properties of CARE measure)	N/A	Attendance data only collected from 50 participants; average attendance rate for PT was 93.6%	CARE, NPRS, GPES, MedRisk	4 time points: 48 hours after initial assessment (CARE only), baseline, 48-hour follow up, 2 month post baseline

[53] Norman et al., 2020	Long term community rehab, UK	Mixed methods, survey and semi- structured interviews	HCP's, ABI specialists, ABI survivors and family members, n=117 for questionnaire, n=31 for interviews	N/A	N/R	"Survey monkey" questionnaire.	Single questionnaire, single interview
[48] Ozyemisci- Taskiran et al., 2017	18 different institutions (University hospitals, state hospitals, etc.), Turkey	Quantitative, cross-sectional descriptive survey	Physiatrists, N=69 (32 residents, 37 specialists)	N/A	N/R	4 self-survey sections: demographic info, experiences and opinions on breaking bad news, self- assessment of communication skills.	Single survey
[49] Picelli et al. 2017	Rehabilitation outpatient spasticity clinic, Italy	Quantitative, Cohort study, ordinal regression analysis	People with chronic stroke and upper limb spasticity, n=20 (excluded if depressed on BDI)	Botulinum toxin treatment	N/R	CARE, MAS, WMFT, DAsS, GAS	Pre-post
[43] Quaschning et al. 2012	Rehabilitation inpatient clinics, Germany	Quantitative, survey, cross- sectional, structural equation modelling	Medical rehabilitation inpatients, n=402	N/R	Response rate 47.8% (468/979)	CARE measure, SDM-Q-9, Man Son Hing scale, compliance, ZUF-8	Single questionnaire
[52] Starr et al., 2020	Acute care hospitals; outpatient clinics; inpatient rehab hospital, United States	Quantitative, cross-sectional survey	PT's , (n=123)	N/A	N/R	JSE-HP; OBI	Single questionnaire
[54] Stevinson et al., 2006	Local oncology centre, UK	Mixed methods, surveys, semi- structured interviews	Adult cancer patients, n=12	Exercise rehabilitation program	81.8% (9/11) participants attending exercise sessions at week 10.	Feasibility measures (ie. recruitment and withdrawals), physical activity measure from EPIC study	Baseline, post- intervention, feasibility measures ongoing

[56] Wilson et al. 2008	Neurorehabilitatio n service, UK	Mixed- methods, pre- post, surveys and "qualitative feedback"	Rehabilitation HCP's (Medical, OT, NP, SW, PT, RN, SLT, CLN), n=78	Neuro- disability simulation exercises	55% at 3-month follow up	Questionnaire.	Pre-post-3month follow up
[51] Wise et al., 2014	Public and private health sectors, Australia	Quantitative, cross-sectional survey	Rehabilitation Health Professionals, n=221	N/A	38% of rehabilitation health professionals contacted took part.	Fat Phobia Scale, Modified Beliefs about Obese People Scale, Modified TEQ	Single survey
[59]Van der Cingel, 2011	Rehabilitation centre, home care organization, outpatient clinic, Netherlands	Qualitative, interviews	Nurses, (n=30) and patients (n=31).	N/A	N/R	N/A	Single Interview

¹ ABI– Acquired brain injury; **BDI** – Beck Depression Inventory; **CARE** – Consultation and Relational Empathy; **CES-D** – Centre for Epidemiologic Studies Depression scale ; **CFT** – Compassion focused therapy; **CLN** – Clinical nutrition/dietetics; **CVD** – Cardiovascular disease; **DAsS** – Disability Assessment Scale ; **EPIC**- European Prospective Investigation into Cancer; **GAS** – Goal Attainment Scale ; **GPES**- Global Perceived Effect Scale ; **GQ-6** – Gratitude Questionnaire-6; **HADS** – Hospital Anxiety and Depression Scale ; **HCP**– Health care provider; **HRV** – Heart Rate Variability; **JSE-HP**- Jefferson Scale of Empathy- Health Professionals; **JSPE**- Jefferson Scale of Physician Empathy; **LBP**- Lower Back Pain ; **MAS** – Modified Ashworth Scale; **MBI**- Maslach Burnout Inventory; **MSK** – Musculoskeletal; **N/A** – Not applicable; **NHS**- National Health Service; **NP** – Neuropsychology; **NPRS**- Numeric Pain Rating Scale; **N/R** – Not reported; **OBI**- Oldenburg Burnout Inventory; **OT** – Occupational Therapy; **. P.A.INT** - Patient-Arzt Interaktion (German); **PANAS** – Positive And Negative Affect Scale; **PT** – Physiotherapy; **PTA**- Physical Therapy Assistant; **ProQoL**- Professional Quality of Life; **RN** – Nursing; **SCI** Spinal Cord Injury; **SCS** – Self-Compassion Scale ; **SDM-Q-9** – Shared Decision Making Questionnaire-9; **SLT** – Speech and Language Therapy; **STSS**- Secondary Traumatic Stress Scale; **SW** - Social Work; **SWL** – Satisfaction With Life; Modified TEQ- Modified Toronto Empathy Questionnaire; **VR-12** – Veterans RAND 12-item health survey; **WMFT** – Wolf Motor Function Test; **ZUF-8** – Questionnaire on Patient Satisfaction

Study/ demographic	Ethnicity	Number of participants (% female)	Mean age (SD)	Socio-economic status	Employment status	Education status (SD)	Diagnoses
[40] Abbas et al., 2019	N/R	374, (22% female in public PT clinics; 22% female in private PT clinics	39% ages 45 and above	N/A	Employed PT's	Majority had qualification of matriculation	N/A
[62] Adamson et al. 2018 (1)	N/R	8/8 (100%) female	'Generally, between 30-39 yrs'	N/R	All employed nurses	N/R	N/A
[63] Adamson et al. 2018 (2)	N/R	24/29 (83%) female	N/R	N/R	All employed— either clinical or non-clinical hospital staff	N/R	N/A
[44] Allday et al., 2020	N/R	46, (78.9% female from rehab; 96% female from orphanage)	Rehab: 20-29 years old (n=10) 30-39 years old (n=5) 40-49 years old (n=1) 50+(n=3) Orphanage: 10-29 years old (n=2) 30-39 years old (n=12) 40-49 years old (n=10) 50+(n=3)	N/R	Employed rehab staff	9th grade or below (n=1) 10th grade (n=10) 11th grade (n=12) University (n=19) data missing (n= 4)	N/A
[61] Allen et al. 2017	N/R	10/17 (59%) female	21-60 (min-max)	N/R	11 PT, 6 PT student	All university level	N/A

 Table 2 – Participant characteristics

[55] Ashworth et al. 2014	All White British	5/12 female (42%)	40.9 (10.6)	N/R	N/R	N/R	TBI 7, anoxic brain injury 1, stroke 3, tumour 1
[58] Bowens et al., 2021	N/R	514/742, (69.2%) female	<25 (n= 10) 25-34 (n=234) 35-44 (n=181) 45-54 (n=180) 55-64 (n=90) 65-74 (n=21) >75 (n=1)	N/R	Employed PT's or PTA's	Associate (n=183) Bachelor (n=166) MPT (n=102) Other Master (n=22) DPT (n=239) Advanced Doctorate (n=3)	N/A
[57] Brown et al. 2019	N/R	4/8 (50%) female	63.6 (8.28)	N/R	N/R	87.5% high school or above	CAD 5, arrhythmia 2, chronic pain 1
[60] Cano et al., 2014	N/R	22/ 32, (68.75%) female	58.5 (Median) (50.5-64.5) (min- max)	N/R	active employment (n= 14) sick leave (n=2) retired (n=9) Housewife (n=7)	N/R	Leg pain, LBP
[46] Chang et al. 2013	N/R	Patients n 16, N/R Physicians n 16, N/R	N/R	N/R	Patients N/R Physicians 100%	N/R	N/R
[42] Dibbelt et al. 2009	N/R	Total patient n 470 34% female, Total physician n 61 Physicians 45% female	Patients average age 50.3yrs, Physicians average age 45yrs	N/R	Patients 13% unemployed	Patients 63% public school highest level	N/R
[41] Kim et al. 2008	N/R	74/150 (49%)	44.6 (21.5)	Monthly average income \$1,000- \$2,000	N/R	Average was high school	Brain lesion, SCI, chronic pain
[50] LaVela et al. 2017	73.26% white, 19.54% black, 5.66% Hispanic, 1.54% other	62/450 (13%) female	53.62 (14.44)	N/R	N/R	73% high school or above	91% traumatic SCI; 55% tetraplegia, 45% paraplegia

[45] Lusilla-Palacios	N/R	34/45, (75%)	45.2 (10.5)	N/R	Employed rehab	N/R	N/A
et al., 2015		female	28-62 (min-max)		staff		
	N/R	136, (66.7 %)	57.9 (15.7) in	N/R	N/R	N/R	chronic MSK pain
[47] Manzoni et al.,		female in	translation group				
2019		translation group;					
		(75.%) female in	56.8 (12.5) in				
		baseline group	baseline group				
[53] Norman et al.,	N/R	61/117, (52%)	18–25 years	N/R	N/R	N/R	ABI
2020		females for	(n=12)				
		questionnaire;	26–35 years				
		12/117 (10%)	(n=11)				
		females for	36–45 years				
		interview	(n=24)				
			46–55 years				
			(n=26)				
			56–65 years				
			(n=14)				
			66–75 years				
			(n=8)				
			76 years				
			(n=1)				
[48] Ozyemisci-	N/R	69, (63%) female	27 (median)	N/R	Employed	N/R	N/A
Taskiran et al., 2017		residents; (76%)	25-31 (min-max)		physiatrists		
		female specialists	for residents				
			25 (madian)				
			27.64 (min max)				
			27-04 (IIIII-IIIax)				
[40] Picelli et al	N/P	4/20 (20%)	64.8 (11.8)	N/P	N/P	N/P	All chronic stroke
2017	IN/IK	female	04.8 (11.8)	IN/ K	IN/K	IN/ IX	All chrome stroke
[43] Quaschning et	N/R	148/402, (36.8%)	54.95 (13.2)	N/R	18.5%	2y school 28.9%,	Psychosomatics/
al. 2012		female			unemployed	2y general school	addiction medicine
						47.3%,	28.4%,
						Grammar/high	orthopaedics/
						school 16.9%	rheumatology
							27.6%, Oncology
							16.4%, Internal

							medicine 14.2%, other 10.1%
[52] Starr et al., 2020	N/R	123, (82%) female	< 26 (14.6%) 27-31 (33.3%) 32-36 (14.6%) > 37 (37.4%)	N/R	Employed PT's	N/R	N/A
[54] Stevinson et al., 2006	N/R	12, (58.3%) female	59 (mean) 43-73 (min-max)	N/R	full time work (n=2) part-time work (n=2) Sick leave (n=1) retired (n=7)	secondary (n=5) further (n=2) higher (n=5)	Cancer
[56] Wilson et al. 2008	N/R	78, N/R	N/R	N/R	Employed HCPs	N/R	N/A
[51] Wise et al., 2014	N/R	221, (85%) female	21-29 (18.3%) 30-39 (23.9%) 40-49 (22.5%) 50-59 (30.3%) 60+ (5%)	N/R	Employed rehab professionals	Bachelor (51.8%) Master (16.5 %) Certificate (12.4 %) Diploma (7.8%) Other/unknown (7.3 %) Doctorate (5.5%)	N/A
[59] Van der Cingel, 2011	N/R	17/31 (55%) female patients; 28/30 (93%) female nurses	Mean age for patients = 71; mean age for nurses= 45	N/R	Employed nurses' ; N/R for patients	N/R	Rheumatic disease and COPD

¹ ABI- Acquired Brain Injury; CLN – Clinical nutrition/dietetics ; COPD- Chronic Obstructive Pulmonary Disease; DPT- Doctor of Physical Therapy; HCP- Health Care Professional; LBP- Low Back Pain; MPT- Master of Physical Therapy ; MSK- Musculoskeletal; N/A – Not applicable; NP – Neuropsychology; N/R – Not reported; OT – Occupational therapy; PT – Physiotherapy; PTA- Physical Therapy Assistant; RN – Nursing; SCI- Spinal Cord Injury; SLT – Speech and Language Therapy; SW - Social work; TBI – Traumatic brain injury

Table 3—Intervention descriptions							
Intervention	Rationale or Goal	Materials & Procedures	Intervention Provider	Mode of Delivery & Setting	Duration	Tailoring or Modifications	Adherence or Fidelity
Neuro- disability simulation exercises [56] Wilson et al., 2009	'To enable healthcare professionals to directly experience a range of disabilities commonly associated with brain injury'.	Seven 'stations' each of which provided the experience of a different neurodisability.	Participants were paired with staff members.	In person UK-based regional neuro- rehabilitation unit	3 hours	Simulation exercises featured the addition of a standardized test of sustained attention.	N/R
Motivational interviewing Lusilla- Palacios et al., 2015 [45]	A 'patient-centered approach to enhancing patient-health professional collaboration through emphatic listening among other communication skills.'	Videos with real patients and role- playing were used alongside the training. Training designed according to issues identified through focus groups and the standard motivational interviewing techniques.	'Two expert trainers, (members of the International MI Network of Trainers) and a researcher psychologist.'	In person Setting N/R	12 hour training (two-day training); delivered individually, or in small groups, in sessions of 50 to 60 minutes during a six-month period; followed by voluntary 2- hour reviewing session.	A tailored program for <i>professionals</i> based on motivational interviewing	N/R
Schwartz Rounds Adamson et al., 2018 [63]	An 'interprofessional forum for staff to openly engage in discussions about social-emotional aspects of care.'	Begins with interprofessional staff panel discussion on topics/themes drawn from actual cases; followed by an open and confidential group discussion; "Ground Rules,"	"Trained facilitators" for confidential group discussion	In person Pediatric rehab hospital	1 hour for 1, 2 or 3 or more sessions.	N/R	9 participants attended 1 of three or more rounds, 10 participants attended 2 of three or more rounds, and 10 participants

		established at the beginning of each Round.					attended three or more rounds.
Arts-based narrative intervention [62] Adamson et al., 2018	'The application of rigorous training in close reading, attentive listening, reflective writing or drawing.'	A short reading, expressive writing or drawing prompt. 'Session topics included: "The Other Side of Care," "Building Perspective," "Obstacles to Empathy," "Limits to Rehabilitation," "Making Room for Hope," and "A Letter to Myself."	'Two of three facilitators (with experience in narrative training for health professionals) led all sessions.	In person 'quiet location off unit at the study site'	6 weekly 90- minute sessions	Narrative training modified to engage topics commonly encountered by pediatric rehab nurses.	7/8 participants attended three sessions; remaining training sessions involved all participants.
Compassion Focused Therapy [55] Ashworth et al., 2015	'Highlights the role of developing compassion to activate our affiliative/soothing system, which aids in balancing our affect regulating systems, particularly in response to the threat system. CFT distinguishes between the therapy itself that involves the therapeutic relationship and the basic paradigms and formulation processes, and the specific training in compassion with the client.'	CFT was comprised of a 'mood group' and individual CFT sessions. 'The first 6 weeks of the programme (primarily group based),focused on (1) psycho- education about the bio psychosocial consequences of ABI and (2)introduction to 'taster' examples of tools or strategies to help manage these consequences. Education sessions focused on a specific	'Three CPs delivered the CFT intervention, all received supervision from a qualified CP and had attended a 3-day training in CFT.'	In person Cambridgeshire Community NHS Centre	18 weeks; first 6 weeks are group- based; weekly CFT psychotherapy sessions for the duration of 18- week programme.	Adaptations were made to ameliorate the cognitive limitations of patients.	A mean of 16 sessions out of 18 were attended by participants.

		component of the consequences of ABI.					
Self- compassion training [57] Brown et al., 2019	'To teach participants a healthy way to relate to hardship that is grounded in compassion, as opposed to self- criticism, nonacceptance, and frustration. Self- compassion-based interventions typically include formal mindfulness-based meditation practices wherein participants learn to self-generate positive emotional states directed toward the self, including loving-kindness, compassion, and gratitude.'	'Participants were provided resources such as a website with meditation audio recordings and a resource kit with tangible cues and prompts relating to the course content (eg, a scented candle to practice mindfulness of the senses).' 'Each week explored a different facet of self- compassion including mindfulness (week 1), loving-kindness (week 2), self- compassion for the body and mind (week 3), and a concluding integration week + gratitude (week 4).'	Course facilitators followed a study manual.	In person Group setting within North Eastern Rehabilitation Centre (NERC)—a private rehab centre.	Four 60-minute group sessions held weekly.	N/R	Adherence of 84.4%, with 0% attrition.
Botulinum Toxin injection therapy [49] Picelli et al., 2017	'Injection treatment used for reducing upper limb spasticity and improving arm passive function in adult patients.'	Incobotulinum Toxin A Injected into a least one muscle for each of the upper limb spasticity patterns.	Each treatment was performed by 1 of 5 physiatrists with equivalent clinical experience.	In person Spasticity service clinical unit	60 min electrical stimulation	N/R	'All patients included in the study completed all evaluations and were analysed'

		Immediately after injection, patients received a session of electrical stimulation.					
Exercise Rehabilitation intervention [54] Stevinson et al., 2006	A 'supervised circuit training class'. 'Aimed at improving aerobic and muscular fitness and mobility.'	Exercise information booklet, sheet describing exercises, pedometer, any equipment required for a circuit training class. 'Each class started with a progressive aerobic warm-up, and finished with a cool-down and relaxation period. The main part of the class incorporated a combination of light-to-moderate intensity, aerobic and resistive exercises in a circuit training format.' Participants were encouraged to monitor their exertion level.	The class was led by one of two experienced and qualified exercise instructors.	In person Exercise studio at the Centre for Sport, Exercise and Health at the University of Bristol	Once a week for 10 weeks, one hour sessions.	Exercises tailored to accommodate patient limitations or preferences.	Nine of 11 participants attended exercise sessions at week 10

Study	A Priori Definition of Empathy and/or Compassion and related constructs?	How is Empathy and /or compassion measured?
[40] Abbas et al., 2019	None	"Servqual" instrument
[62] Adamson et al., 2008 (1)	Yes	Use of a Framework approach to analyse interview transcripts
	'Empathy is the capacity to	
	imagine the situation of another,	
	while understanding their feelings	
	and perspective, and recognizing a	
	shared humanity which is essential	
[63] Adamson et al		Thematic parrative analysis of interview
2018 (2)		transcripts
	The capacity to imagine the	
	situation of each patient and their	
	feelings and perspective and	
	responding in ways that make	
	patients feel heard and cared for—	
	is known as empathy '	
[44] Allday et al., 2020	Yes	Professional Quality of Life Scale (ProQOL)
	Compassion fatigue describes the	
	overall experience of emotional and	
	service practitioners experience due	
	to the chronic use of empathy when	
	treating individuals who are	
	vulnerable or suffering in some	
	way'	
	'Compassion satisfaction,	
	which refers to those aspects of	
	human service work that provide	
	professional success, reward,	
[61] Allen et al., 2017	Yes	Use of a Framework approach to analyse focus
	'Empathy a facat of	group transcripts
	communication is often described	
	as the understanding and	
	communication of another person's	
	situation'	
[55] Ashworth et al., 2015	Yes	Interpretative phenomenological analysis of interview transcripts
	'Compassion Focused Therapy	1
	highlights the role of developing	
	compassion to activate	
	our affiliative/soothing system,	
	which aids in balancing our affect	
	regulating systems,	
	system.'	

Table 4—Author definitions of empathy and/or compassion and related constructs

[58] Bowens et al., 2021	Yes	Professional Quality of Life Scale (ProQOL)
	Compassion Satisfaction as 'HCP pleasure derived from being able to help people ' Compassion fatigue as ' feelings that negatively affect professional quality of life.'	
[57] Brown et al., 2019	Yes	Self-Compassion Scale (SCS)
	'Self-compassion , defined as being kind to oneself during moments of pain or suffering rather than being harshly self-critical'	
[60] Cano et al., 2014	None	Qualitative content analysis of focus group transcripts
[46] Chang et al., 2013	Yes 'Empathic listening – physicians respond to and address the patient's emotional state resulting from the patient's illness or difficulty.'	Conversational analysis that quantified utterances related to empathic listening
[42] Dibbelt et al., 2010	None	P.A.INT-Questionnaire. P.A.INT is the abbreviation for Patient–Arzt- Interaktion (German))
[41] Kim et al., 2008	Yes	"The questionnaire"
	'Affective empathy represents the physician's ability to respond to and improve his or her patient's emotional state Cognitive empathy denotes the physician's ability to accurately apprehend the mental state of his or her patient.'	'included a total of 26 items: 21 questionnaire items with 5-point Likert scale measuring physiatrist's communication style, patient outcomes; five items asking about the patient's age, sex, education, occupation, and income.'
[50] LaVela et al., 2017	Yes 'Mercer defines empathy in health care encounters as the ability of the health care provider to understand the patient's situation and perspective, communicate his/her understanding of the patient's situation and assess accuracy of his/her interpretation, and then to respond in a way that is helpful and therapeutic.'	Consultation and Relational Empathy Measure (CARE)
[45] Lusilla-Palacios et al., 2015	Empathy as ' the ability of understanding patients' feelings and concerns and it has been related to increased likelihood of patients' adherence to treatment'	Empathy (JSPE)
[47] Manzoni et al., 2019	Yes 'Empathy is defined as the ability of the health professional to share	Consultation and Relational Empathy Measure (CARE)

	the negative and positive feelings of	
[53] Norman et al., 2020	None	"Survey Monkey" questionnaire and thematic analysis of interview transcripts
[48] Ozyemisci- Taskiran et al., 2017	None	'Self-assessments of participants were categorized and evaluated according to steps of SPIKES protocol. SPIKES is an acronym for Setting, Perception, Invitation, Knowledge, Empathy, and Summary, a system developed for specifically for bad news delivery'
[49] Picelli et al., 2017	Yes 'Empathy refers to the ability to understand and share the feelings, thoughts or attitudes of another person'	Consultation and Relational Empathy Measure (CARE)
[43] Quaschning et al., 2013	None	Consultation and Relational Empathy Measure (CARE)
[52] Starr et al., 2020	Yes 'Clinical empathy has been defined as "a predominantly cognitive attribute that involves an understanding of the patient's experiences, concerns, and perspectives, combined with a capacity to communicate this understanding and an intention to help'	Jefferson Scale of Empathy–Health Professional (JSE-HP)
[54] Stevinson et al., 2006	None	Use of Framework approach to analyse interview transcripts
[56] Wilson et al., 2009	None	Qualitative data from interviews
[51] Wise et al., 2014	None	Modified Toronto Empathy Questionnaire (TEQ)
[59] Van der cingel et	None	Qualitative analysis of interviews

Table 5—Outcome measure definitions				
Measure	Description	Psychometric Properties		
Consultation and Relational	'A validated 10-item	'Strong correlations' with		
Empathy Measure (CARE)	questionnaire that investigates	conceptually relevant measures.		
	the patient's perception of the			
	physician's empathic	'Interviews confirmed the face and		
	understanding and behaviour	content validity of the final version		
	during the visit. Each response	of the CARE measure'		
	is marked on a 5-point scale,			
	where responses range from 1			
	(poor) to 5 (excellent). The	'The internal reliability of the		
	score was obtained from the	CARE measure remained high,		
	sum of all items (maximum	with an overall Cronbach's alpha		
	score 50; minimum score 10)'	value of 0.93.'		
Jefferson Scale of Empathy–Health	The JSE-HP was used for	'Internal consistency reliability		
Professional (JSE-HP)	measuring self-reported levels	(Cronbach's alpha) on JSE-HP has		
	of empathy among physical	been reported between .81 and .89'		
	therapists. The JSE was			
	originally developed to	'Test-retest reliability coefficient		
	measure empathy in	for JSE- HP has been reported as r		
	physicians and medical	= .65 with 3- to 4-month interval		
	students.A revised version	between testing'		
	was later developed for health			
	professionals, referred to as			
	the JSE-HP, which includes			
	20 questions answered on a 7-			
	point Likert-type scale, with			
	items equally split between			
	positively and negatively			
	worded items. Total scores			
	range from 20 to 140, with			
	nigner scores indicating a			
	greater level of empathy.			

Jefferson Scale of Physician Empathy (JSPE)	Assesses empathy in the context of medical education and patient care.	'Factor analysis revealed the major underlying construct of the instrument described the physician's view of the world from
	It encompasses 20 items answered on a 7-point Likert scale. General scores range from20 to 140, with higher scores indicating a more empathic orientation toward	the patient's perspective (Factor I). This, and other factors found 'are consistent with the components of physician empathy discussed in the literature.'
	patient care.	'Scores of the Physician Empathy scale were correlated with
	The JSPE	conceptually relevant measures.
	provides scores on three	such as Compassion. Empathic
	empathy dimensions: "taking	Concern. Perspective Taking.
	perspective", "compassionate	Sympathy, Fantasy, Tolerance,
	care", and professional ability "to stand in patient's shoes"	Personal Growth, and Faith-in- People.'
		'The alpha reliability estimate for residents was .87, and for students it was .89; both coefficients are in an acceptable range.'
Modified Toronto Empathy Questionnaire (TEQ)	contains 16 questions that encompass a wide range of attributes associated with the theoretical facets of empathy. Subjects were asked to circle one	'As predicted, the TEQ correlated positively with the Empathy Quotient, $r = .80$, p < .001, and negatively with the Autism Quotient, $r =33$, p < .01.'
	scale ranging from "never" to "always."	'Item-remainder coefficients for the TEQ were sound, ranging from .3471 .'
		'Internal consistency of our measure remained good, $\alpha = .87$.'
		'High test-retest reliability, $r = .81$,

P.A.INT-Questionnaire. (Patient- Arzt- Interaktion (German))	'Measures influential aspects of interaction between patient and physician.'	'Have a satisfying internal consistency and are sensitive to different situations and subjects'
	Items and scales of the P.A.INT-Questionnaire can be assigned to three "dimensions" of perceived quality of interaction: Affective Quality of Contact, Instrumental Quality, and Patient involvement and	'further testings on psychometric properties are needed'

	participation.	
Professional Quality of Life Scale	'Assesses both positive and	'Good internal consistency
(ProOOL)	negative aspects of work	$(\alpha = .7588)'$
	among helping professionals.	
	Higher composite Compassion	'Good construct and discriminant
	satisfaction subscale scores	validity $(r < 70)$ when compared to
	indicate the respondent	similar scales'
	derives greater satisfaction	sillina scales
	from his or her shility to	
	from his of her admity to	
	effectively perform work	
		(p . 1'. 1. '1'.
Questionnaire	26 items Addressed patient's	Reliability was estimated using
	perception of physician	Cronbach's alpha. As Table I
	communication styles:	shows, the coefficients for all the
	affective empathy, cognitive	scales, except for cognitive
	empathy, and dominant	empathy (0.68) , were well above
	communication.	0.70.'
	The other two variables	
	involved patient outcomes:	
	patient's satisfaction and	
	compliance.	
"Questionnaire" based on SPIKES	Consisted of 4 self-survey	Not reported.
protocol	sections : i) demographic	
-	information (age, sex, years of	
	specialty, training in	
	communication skills	
	including breaking bad news),	
	ii) experiences on breaking	
	bad news, iii) opinions	
	regarding when, where and by	
	whom bad news should be	
	delivered iv) self-assessment	
	of communication skills while	
	delivering the bad news. The	
	questionnaire aimed to gather	
	information regarding	
	avpariances originate and	
	experiences, opinions and	
	neeus regarunig breaking bad	
	liews	

Self-Compassion Scale (SCS)	The 26-item SCS measures self-compassion along 3 interrelated dichotomies: mindfulness versus over identification, self-kindness versus self-criticism, and common humanity versus a sense of over identification.	 'A six-factor model was found to fit the data well' 'Good test-retest reliability was obtained when participants' responses to the Self-Compassion Scale were compared across Time 1 and Time 2.'
		Cronbach's $\alpha = 0.78$. 'SCS had a significant moderate correlation with the Rosenberg self-esteem scale, the Berger Self-Acceptance Scale, the Self-Determination Scale, and the three subscales of the Basic Psychological Needs Scale.'
SERVQUAL Questionnaire	22- item instrument that measures consumer perspectives of service quality—modified for Physical Therapy Services	 'high reliabilities and consistent factor structures' ' strong support for SERVQUAL's convergent validity'
'a short online self-designed survey using "Survey Monkey"	The survey consisted of questions about age, participant type (e.g. ABI survivor, family, etc.), length and type of injury, and questions about participants' experiences of interacting with community health and social care organisations. Professionals were asked about their experiences of interacting with ABI survivors and their families within these settings. At the end of the questionnaire, participants were given the option to self- select to take part in follow-up interviews.	Not reported

Table 6 – Key findings conceptualization of empathy and/or compassion

Study	Aim	Methods	Findings
[62] Adamson et al. 2018 (1)	'To test the feasibility and perceived impact of an arts-based narrative training intervention involving pediatric rehabilitation nurses for the purpose of promoting nursing empathy '	Qualitative, interviews, thematic narrative analysis	Conceptualization of empathy and/or compassion- cognitive & behavioural Intervention positively impacted participants in three domains; Empathy for patients and families, Empathy within nursing team, Empathy for the self. Major finding included: Increased value placed on patients and families' backstory, Identification of moral empathic distress, Enhanced sense of collaborative nursing community, Renewal of professional purpose.
[63] Adamson et al. 2018 (2)	'To assess the perceived impact of Rounds in the health care context of pediatric rehabilitation, as well as a comparative analysis of how [Schwartz] Rounds affected clinical versus nonclinical staff'	Qualitative descriptive, thematic analysis	Conceptualization of empathy and/or compassion- cognitive Clinicians – became emotional when hearing stories of colleagues which generated another level of <i>empathy, which</i> increased compassion and appreciation for the experiences and circumstances of others. Non-clinicians better able to empathize with and relate to clinicians' narratives about work frustrations and/or grievances because they may have experienced something similar in their personal lives. Non-clinicians felt an admiration for the skill and dedication clinical work entails bred compassion between disciplines.
[61] Allen et al. 2017	'To explore physiotherapists' understanding of empathy , their perceptions of its impact on a MSK clinical encounter and their perceptions of teaching empathy and its role in physiotherapy training'	Qualitative descriptive, focus groups	Conceptualization of empathy and/or compassion- cognitive & behavioural 'Empathy was defined as being comprised of a sense of understanding, emotional resonance, as well an aptitude that could be learned, and behaviourally evoked in certain contexts.
[55] Ashworth et al. 2014	'To assessing the feasibility, safety, and potential value of CFT for ABI patients with emotional difficulties receiving neuropsychological rehabilitation'	Mixed-methods, surveys & qualitative interviews	Conceptualization of empathy and/or compassion - cognitive Three superordinate themes (psychological difficulties, developing trust and finding safety, and a new approach; latter relating to participants' developing understanding and empathy for their own situation.
[60] Cano et al., 2014	'To explore the perceptions of people with low back pain (LBP) treated within the Spanish National Health Service, and their experience while undergoing a new evidence-based treatment (''neuroreflexotherapy'').'	Qualitative, focus groups	Conceptualization of empathy and/or compassion- cognitive and behavioural One of ten topics identified in focus groups was: Seeking empathy and understanding from healthcare professionals. This was characterized by patient evaluations of HCP intrinsic aptitudes (i.e. being "good") as well as behavioural strategies (i.e.pain maintenance).
[53] Norman et al., 2020	'This study aimed to understand the ABI knowledge base of professionals across	Mixed methods, questionnaire and	Conceptualization of empathy and/or compassion—behavioural

	a range of organisations within the UK, and to identify areas for improvement.'	semi-structured interviews	 'lack of knowledge among HCPs and SCPs led to ABI survivors and their families feeling un-un-heard and supported. Many participants described this as a lack of empathy shown by a diverse range of professionals. 'Family participants and those with ABI did provide some positive experiences of empathy and found these useful to supporting them long term'
			among professionals.
[54] Stevinson et al., 2006	'Aimed at evaluating the feasibility and acceptability of a group-based exercise programme for cancer patients attending a local oncology centre'	Mixed methods, questionnaires, semi-structured interviews	Conceptualization of empathy and/or compassion—behavioural 'Participants appreciated the empathy conveyed by the class instructors', specifically they liked that instructors did not make them feel pressured to work harder than they wanted, and gave them one on one attention and tips.
[56] Wilson et al., 2008	'The purpose of the study was to evaluate the impact of training on reflective clinical practice [via] simulation exercises aimed at providing insights into the lived experience of those with a neurodisability'	Mixed-methods, survey, qualitative "feedback:	Conceptualization of empathy and/or compassion—cognitive & behavioural Participants found the simulation exercise experience insightful and increased their self-reported empathy and understanding for those they care for. At 3-month follow-up, 35 participants mentioned having greater awareness or increased empathy towards patients → conveyed through awareness, understanding, tailoring shorter treatment sessions etc.
[59] Van der Cingel, 2011	'To understand the benefit of compassion for nursing practice within the context of long-term care'	Qualitative, Interviews	 Conceptualization of empathy and/or compassion—behavioural The nature of compassion: There are 7 dimensions to compassion including, attentiveness, listening, confronting, involvement, helping, presence and understanding. Other sentiments involved recognizing the link between compassion and suffering, feeling compassion through processes of identification and imagining oneself as another, feeling compassion as an emotion, the distinction between compassion and pity, as well as ' the moral significance' of compassion as an instrument of care, and a way to enhance quality of care.

² ABI- Acquired Brain Injury; CFT – Compassion Focused therapy; HCP- Health Care; LBP—Lower Back Pain; MSK- Musculoskeletal Professional; SCP- Social Care Professional

Study	Aim	Methods	Findings
[40] Abbas et al., 2019	'To measure the patient perceptions about service quality delivered by the public and private physical therapy clinics in Lahore, Pakistan'	Quantitative, Cross-sectional survey	Use of empathy and/or compassion Service quality dimensions were rated in public and private physical therapy clinics as follows: tangibility was 4.68 and 4.29, reliability 4.46 and 4.04, responsiveness 4.74 and 4.15, assurance 4.81 and 4.32, empathy 4.00 and 4.11, and accessibility and affordability 4.58 and 4.26 (p<0.05 except for access and affordability). The largest quality gap in private clinics was "accessibility and affordability" and in public clinics was the dimension of "empathy"
[61] Allen et al. 2017	'To explore physiotherapists' understanding of empathy , their perceptions of its impact on a MSK clinical encounter and their perceptions of teaching empathy and its role in physiotherapy training'	Qualitative descriptive, focus groups	Use of empathy and/or compassion There was divergence on empathy acquisition and the extent to which it can be taught, however participants agreed that it is an innate characteristic. 'Senior physiotherapists placed greater emphasis on the importance of empathic communication than student physiotherapists, whilst student and junior physiotherapists considered limited clinical experience to be a barrier in delivering empathic communication, anticipating this to improve over time'
[46] Chang et al. 2013	'To examine (1) how effectively physicians talk to patients and how active patients are when they talk to their physicians; (2) how often physicians use nonverbal behaviors such as eye-contact and silence; (3) the relationship between a physician's communicative behaviors and a patient's active communicative behaviors; (4) how physicians' nonverbal behaviors are related to physicians' empathic behaviors'	Quantitative, Conversational analysis	Use of empathy and/or compassion Physicians' empathic communicative acts averaged <3% of their total utterances; empathic listening was 1.11%; use of partnership-building skills facilitated greater active communication from patients. 'Eye-contact showed a strong and significant correlation with empathic listening (0.721; p<0.01)' Empathic listening by physicians showed a significant association with a patient's expression of concerns (p<0.05)'
[42] Dibbelt et al., 2009	'To capture perceived quality of doctor- patient interaction in rehabilitation and to examine the relationship between perceived quality of interaction and long-term treatment outcomes. '	Quantitative survey, cross- sectional, structural equation modelling	Use of empathy and/or compassion From admission (t0) to discharge (t1) changes could be observed in patients judgements: perceived empathy decreased, while perceived contact barriers increased.

Table 7—Key Findings use of empathy and/or compassion

[48] Ozyemisci- Taskiran et al., 2017	'To explore Turkish physiatrists' experiences and opinions about BBN to patients with SCI.'	Quantitative, cross-sectional descriptive survey	Use of empathy and/or compassion Less than 60% of physiatrists indicated that they performed the most appropriate empathetic behaviours while BBN.
			Physiatrists with more experience in treating patients with SCI felt more incompetent in handling patient's negative emotional reactions than physiatrists with less experience ($P = 0.045$, and $P = 0.049$, respectively).
[51] Wise et al., 2014	'This study examined the attitudes and beliefs of rehabilitation health professionals in Victoria, Australia, toward obesity. Additionally, potential predictors of anti-fat attitudes (or "fat phobia") were explored.'	Quantitative, cross-sectional survey	 Use of empathy and/or compassion 'There were no differences between male and female respondents in age, mean BMI, or attitudes and beliefs about obesity, but females demonstrated significantly higher levels of empathy—mean Modified TEQ score: males, 5.4 (1.1); females, 5.2 (SD .42); t(172) = 2.47, p=0.023.' 'No differences between cardiac rehabilitation staff and those in non-cardiac settings regarding attitudes and beliefs about obesity or empathy' 'This study also supports the idea that while attitudes to obese individuals are influenced by cognitive judgments regarding the causes of obesity, empathy plays no part in predicting weight bias.'
3			

³ BBN- Breaking Bad News ; BMI- Body Mass Index; MSK- Musculoskeletal Professional; SCI- Spinal Cord Injury; TEQ- Toronto Empathy Questionnaire

Study	Aim	Methods	Findings
[44] Allday et al., 2020	'This study aims to bring insight into the professional experiences of those caregivers providing long-term care to children with disabilities in Ukraine.'	Quantitative, cross-sectional survey	 Outcomes of delivering empathy and/or compassion 73% of rehabilitation participants and 81% of orphanage participants had moderate to high compassion fatigue; and 47% of rehabilitation participants and 55% of orphanage participants had moderate to high compassion satisfaction. Compassion satisfaction scores against number of years work experience revealed a significant decrease in satisfaction over time [F (6, 38) = 2.635, p = .031]. Despite feeling more accomplished, 'participants did not experience a corresponding increase in their feelings of compassion satisfaction over time'
[55] Ashworth et al. 2014	'To assessing the feasibility, safety, and potential value of CFT for ABI patients with emotional difficulties receiving neuropsychological rehabilitation'	Mixed-methods, surveys & qualitative interviews	Outcomes of receiving empathy and/or compassion CFT associated with significant reductions in self-criticism ('inadequate' r.67, d=1.81; self-hating r.6, d=1.5), anxiety (r.52), depression (r.58, d=1.43), increased self-reassuring (r.56, d=1.38)
[58] Bowens et al., 2021	1) To determine the level of professional quality of life among physical therapists and physical therapist assistants in Alabama and 2) to identify personal or professional factors that may contribute to CS, burnout, and STS.	Mixed methods, survey & open ended questions	Outcomes of delivering empathy and/or compassion '51.5% of the participants were categorized as having moderate levels of burnout, 46.4% experienced high levels of CS, and 74.3% reported low levels of STS on the ProQOL.' Statistically significant findings were that physical therapists that worked more than 40 hours a week had 3x greater odds of reporting low to moderate levels of CS, while physical therapists with more than 15 years of experience, and working in a private outpatient setting had greater odds of possessing high CS. Open-ended responses indicated that workload, documentation, insurance requirements, unethical demands and lack of engagement from management, contributed greatly to PT burnout
[57] Brown et al. 2019	'To develop and test the feasibility of a 4-week group self- compassion -based intervention designed to improve self- report and biological markers of well- being in midlife and older adult patients living with chronic illness'	Mixed-methods, survey, written qualitative feedback post course	Outcomes of receiving empathy and/or compassion 'Participants found that the intervention was acceptable, rating sessions as enjoyable (6.8/7) and relevant to daily life (6.6/7)' Significant reduction in CES-D (g=-1.18, CI ₉₅ -0.18-2.16) and in 4 with clinically significant impairment the reductions took them below threshold, GS-6 (g=1.63, CI ₉₅

Table 8—Key findings outcomes of empathy and/or compassion

			0.20-3.05), non-significant changes in SCS (g=0.53, CI ₉₅ -0.27-1.33), PANAS (g=0.46, CI ₉₅ -0.47-1.39), SWL (g=0.13, CI ₉₅ -0.62-0.87)
[41] Kim et al.,	'To examine patient-perceived	Quantitative,	Outcomes associated with receiving empathy and/or compassion
2008	communication styles (empathic and dominant communication styles) of Korean physicians in rehabilitation and	Survey	Empathy significantly predicts patient satisfaction (β =0.32; C.R.=-4.87; p<0.001) and treatment acceptance (β =0.17; C.R.=-2.50; p=0.013), but not for compliance.
their effects on patient outcomes (patient satisfaction and compliance).'		64.4% patients who ranked their physician as highly affectively empathic were highly satisfied, whilst 28.2% who ranked their physician as moderately affectively empathic were highly satisfied ($p<0.01$) - Affective empathy correlated with satisfaction ($r=0.61$)	
			40% who considered physician highly affectively empathic reported being highly treatment compliant whereas 17.5% who rated physician moderately affective reported being highly treatment compliant (p=0.01)
		53.7% who ranked their physician as highly cognitively empathic were highly satisfied, whilst 28.2% who ranked their physician as moderately cognitively empathic were highly satisfied ($p<0.01$) - Cognitive empathy correlated with satisfaction ($r=0.68$)	
	28% who co treatment co empathic r	28% who considered physician highly cognitively empathic reported being highly treatment compliant whereas 17.5% who rated physician moderately cognitively empathic reported being highly treatment compliant (p<0.05)	
		Both affective (r=0.25) and cognitive (r=0.24) empathy correlated significantly with compliance	
 [50] LaVela et al. 2017 Describe perceptions of persons with SCI on their receipt of holistic care ar relational empathy during health care encounters' 	'Describe perceptions of persons with SCI on their receipt of holistic care and relational empathy during health care encounters'	Quantitative, Cross-sectional survey	Outcomes of delivering empathy and/or compassion Only 47% had scores at/above CARE norm (43); lower scores in those who were black vs white ethnicity
			Those with pressure injury had lower normative/above than those without (14 vs 24%; OR 0.541, $p=0.06$)
			Higher physical and mental health status, tetraplegia (vs para: OR 1.87 CI ₉₅ 1.20-2.91, p=0.006) associated with greater perceived empathy
	'The aim of the part of the study	Quantitative,	Outcomes of delivering empathy and/or compassion
[45] Lusilla-	reported here was twofold: (1) to	Survey	'No significant differences were found before/after intervention with regard to
Palacios et al.,	describe burnout, empathy, and		sociodemographics (gender, age, and marital status) and the basic job-related
2015	satisfaction at work of these		variables considered in this study (profession and time working in the field), in

	professionals and (2) to explore whether a tailored program based on motivational interviewing (MI)		relation to burnout, empathy and stress, and job satisfaction, either at baseline or after intervention.'
	techniques modifies and improves such features'.		The only significant difference was that women reported higher pre-intervention scores in emotional exhaustion, and in "ability to stand in a patients shoes".
[47] Manzoni et al., 2019	'To translate, cross-culturally adapt to Brazilian Portuguese, and analyze the measurement properties of the (CARE) Measure and investigate whether empathy can be a predictor of clinical improvement.'	Quantitative, psychometric study	Outcomes of receiving empathy and/or compassion Two univariate linear regressions revealed that physical therapist's empathy was not a predictor of improvement of pain intensity and perceived improvement in chronic MSK pain (p>0.05).
[49] Picelli et al. 2017	'To examine the relationship between patient-rated physician empathy and outcome of botulinum toxin treatment for post-stroke upper limb spasticity'	Quantitative, cohort,ordinal regression analysis	Outcomes of receiving empathy and/or compassion 'Ordinal regression analysis showed a significant influence of patient-rated physician empathy (independent variable) on the outcome (dependent variables) of botulinum toxin treatment at 4 weeks after injection, as measured by GAS (p <0.001)'
[43] Quaschning et al., 2012	'To develop and test a theory-based model for the predictive power of Shared decision making, Empathy and Team interaction for Patient satisfaction and Treatment acceptance. (2) To identify mediating effects of Compliance and Satisfaction'	Quantitative, survey, cross- sectional, structural equation modelling	Outcomes of receiving empathy and/or compassion The construct " Empathy " significantly predicts "Patient satisfaction" ($\beta = .32$; C.R. = -4.87; p < .001) and "Treatment acceptance" ($\beta = .17$; C.R. = -2.50; p = .013) but does not provide any predictive value for the patients' "Compliance" (Empathy \rightarrow Patient cooperation = .08; C.R. =94; p = .346; Empathy \rightarrow Adherence = .09; C.R. = .90; p = .370).
[52] Starr et al., 2020	'To investigate the level of self-reported clinical empathy in physical therapists and its relationship to practice environment and workplace engagement'	Quantitative, cross-sectional survey	Outcomes of delivering empathy and/or compassion 'A significant correlation was found between gender and empathy, with Spearman rank correlation $rs =20$ (p = .02) ' 'Pearson's correlation showed work disengagement was negatively correlated with empathy with $r =32$ and a 90% confidence interval [446,178], suggesting an inverse relationship. ' Empathy was not correlated with practice setting, age, or years of physiotherapy practice.

⁴ ABI- Acquired Brain Injury;; CARE – Consultation and Relational Empathy; CES-D – Centre for Epidemiological Studies – Depression scale; CFT – Compassion Focused therapy; CS- Compassion Satisfaction; GAS- Goal Attainment Scaling ; GS-6 – Gratitude Questionnaire; - Motivational Interviewing; MSK- Musculoskeletal ; PANAS – Positive And Negative Affect Scale; ProQOL- Professional Quality of Life; PT—Physical Therapy ; SCI- Spinal Cord Injury; SCS – Self-Compassion Scale; STS- Secondary Traumatic Stress; SWL—Satisfaction with Life

Figure Legend

- 629 Figure 1: PRISMA Flow Diagram. Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for
- 630 Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097.