

1 Instruments measuring community 2 pharmacist role stress and strain: a 3 systematic review

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10 Abstract

11 Background

12 While macro and meso approaches to implementing public health initiatives in community
13 pharmacies have been studied, the micro perspective of their pharmacist providers requires more
14 inspection. Community pharmacists report increasing stress, overload and limited control over
15 facets of their work.¹⁻⁷ Social exchange principles, e.g. role price, may help to typify pharmacist work
16 decisions so problematic situations can be modified, thus protecting workforce health. To do so, the
17 underlying pressures of the pharmacist role (i.e. role stresses) and indicators of systemically-caused
18 strain (i.e. role strains) should be measurable.

19 Objectives

20 To summarise validated and reliable instruments used to measure role stress and strain among
21 community pharmacists, and evaluate compatibility in testing a theoretically-derived framework.

22 Methods

23 In April 2020, journal articles describing reliable and validated instruments measuring role stress and
24 strain responses among community pharmacists were identified from an online search via Scopus,
25 Web of Science and PubMed. English-language articles after 1990 were selected; duplicates were
26 deleted. Inclusion and exclusion criteria were used to screen title/abstracts and full texts. Reference
27 lists were manually searched. Resultant instruments were analysed for theoretical compatibility.

28 Results

29 26 separate instruments were found: seven psychological strain instruments, 14 social strain
30 response instruments, and five role stress instruments. Role stresses were often present as facet-
31 specific dimensions in psychological and social strain instruments. Strain instruments measuring
32 individual evaluation of work were compatible with a social exchange approach.

33 Conclusions

34 Twenty-six reliable and validated instruments measuring role stress and role strain were found to
35 measure negative role outcomes from the micro community pharmacist perspective. Structural
36 measurement of role stress and resultant negative responses enable detailed examination into
37 pharmacist roles, and insights into pharmacist behaviour. Further research is required to develop

38 additional role stress and strain instruments, and to discover pharmacist role benefits and their
39 influence.

40 Keywords

41 Community pharmacist; role theory; social exchange; psychometric properties; workforce

42 Introduction

43 Cognitive pharmacy services in the community sector include vaccination programs, disease
44 screenings, point-of-care diagnostic testing, minor ailments triage, medication reconciliation and
45 management services. In the past thirty years, efforts to change community pharmacist activity to
46 encompass professional pharmacy services have demonstrated limited success: behavioural
47 interventions such as changes to remuneration, role partner expectations, and organisational
48 interventions have only been partially effective.⁸⁻¹² Given the wide support for pharmacy services in
49 many modern federal public health programs,¹³⁻¹⁹ this apparent behavioural resistance in
50 pharmacists warrants further investigation. Many of these interventions target macro and meso
51 organisational levels in community pharmacy. However, noting their limited effectiveness, analysing
52 the community pharmacist's micro perspective may be useful. This could provide insight into
53 otherwise unseen challenges that community pharmacists face in their work,^{9, 19-27} and which may be
54 hindering the adoption of new patient-facing tasks that pharmacists ideologically approve of, such as
55 professional pharmacy service delivery.²⁸⁻³¹

56 Internationally, there are indicators that community pharmacists may not always have complete
57 behavioural control in their work,^{10, 32-37} perhaps because of the pressures of the role system they
58 are socialised to work within.³⁸ One perspective from social science examines individuals in their
59 roles, where forces emanating from their role, or 'role stresses', shape the roles that individuals
60 occupy in society.³⁹⁻⁴³ Hardy & Conway's definition states these role stresses are not necessarily
61 negative or positive, but are a representation of the role system experienced by the individual.⁴⁰ In
62 role theory, a role is defined by its role stresses. For example, a pharmacist is overqualified to be a
63 dispensary technician yet underqualified to be a medical doctor. The role itself can partially be
64 described by these role stresses, which are named after the physics concept of 'stress' that relates to
65 a directional force. The role stress types of role ambiguity, conflict, incongruity, over/underload and
66 over/under-qualification are thus differentiated from the concept of psychological distress.

67 However, as depicted in Figure 1, subjective outcomes experienced by the individual as a result of
68 playing that role may be both negative and positive. Negative outcomes, or role strain responses,
69 include: psychological strain responses (e.g. burnout, psychological stress, feelings of helplessness,
70 frustration and isolation), physiological strain responses (e.g. fatigue, physical consequences of
71 standing for long periods of time) and social strain responses (e.g. job dissatisfaction, job turnover
72 intention and actual withdrawal from jobs or pharmacy career).^{38, 40} On the other hand, positive
73 outcomes of individuals playing a role could include job satisfaction and greater embeddedness in
74 their job position, workplace and career.⁴⁴⁻⁴⁶

75 Insert Figure 1 (Role stress and Strain)

76 In the scoping review by Yong, Garcia-Cardenas, Williams et al. that produced the Community
77 Pharmacist Role Stress Factor Framework (CPRSFF) depicted in Figure 2,³⁸ many factors were
78 reported by pharmacists to influence how their role is enacted. The confluence of all these factors
79 and role stresses may produce physiological, psychological and social strain responses in the
80 pharmacist, and affect their work behaviour and commitment. Three categories of the social strain
81 responses, dissatisfaction and turnover, were additionally identified for community pharmacists:

82 within their **role** or job position (e.g. as staff, manager, proprietor or pharmacist sectors such as
83 hospital pharmacy), in their **job** or workplace (e.g. as an employer or employee of a particular
84 pharmacy organisation), and in their pharmacist **career**. These role strains, and other negative
85 individual responses (e.g. frustration) were found to be present in international community
86 pharmacist literature, as were all role stress types.³⁸

87 [Insert Figure 2 \(CPRSFF\) and Figure 3 \(Role price\)](#)

88 In social exchange theory, these social strain responses are chosen after individuals weigh the costs
89 and benefits of a particular role: once the 'total expense', or role price, is calculated to be overly
90 expensive (i.e. too many negative outcomes), this can lead to dissatisfaction and voluntary
91 withdrawal. Since these outcomes are subjective and may include personal factors that originate
92 outside their work, the role price may vary even between individuals in similar roles. Theoretically,
93 when the role price is subjectively too expensive for the individual, this could result in dissatisfaction
94 and/or withdrawal from their role, job or career.⁴⁰ However, a positive role price calculation (i.e.
95 more positive than negative outcomes) could cause greater engagement and embeddedness of the
96 individual in their role, job and/or career.⁴⁴

97 With the addition of these public health activities, it could be hypothesised that an imbalanced role
98 system has arisen for community pharmacists, given that numerous pharmacist research reports
99 work-related stress, burnout and job dissatisfaction in multiple countries.^{24, 38, 47-51} Even when
100 pharmacists may intend to provide cognitive pharmacy services, they have cited increased
101 workloads, unsatisfactory wages, support and autonomy as reasons for poor professional
102 satisfaction, which sometimes ended in withdrawal from their jobs and pharmacist careers.^{4, 6, 52-59}
103 These reports of role strain indicate an existing imbalance in the community pharmacist role system.

104 According to Hardy & Hardy,⁴⁰ social exchange, symbolic interactionism and role theory concepts
105 permit an exploration of the role system: does it pressure pharmacists to work in ways incongruent
106 with their personal and professional outlook? What kind of subjective outcomes are pharmacists
107 considering, that cause them to act in a manner incongruent with their personal preferences? From
108 a role theory perspective, could it be that the legacy community pharmacist role system does not
109 support the newer cognitive pharmacy services, since role stresses may have remained the same:
110 could they be inhibiting innovative community pharmacy practice, thus causing role strain? If so,
111 what are the *current* role strains and stresses present, and how could we change these to sustain
112 and maintain cognitive pharmacy services, in order to better service the health of the general
113 public?

114 There is a need, then, to accurately measure these role stresses that community pharmacists face,
115 and how this affects their work, which may lead to subjective negative responses (i.e. role strains).³⁸
116 Identifying and using measures of role stress and strain could identify imbalances or unusual
117 patterns of work caused by the role itself,⁴⁰ which may be impeding progress in improved patient
118 care and protecting community pharmacist workforce health. By clearly measuring role stresses and
119 negative outcomes stemming from the pharmacist role, it may become more obvious as how to
120 balance these pressures and responses within social exchange and organisational theory principles,
121 thus reinforcing patient-facing pharmacist roles and behaviour.⁴⁰ Gathering instruments that have
122 been found to be reliable and valid in community pharmacist populations in this systematic review
123 would allow the CPRSFF to be tested and used in a methodical investigation into influential factors
124 which cause or relieve strain in community pharmacists and, by proxy, those that interfere with
125 cognitive service provision.

126 Objectives

127 This review aims to:

- 128 (1) Report validated and reliable instruments used, internationally, in the community pharmacist
- 129 population for measuring role stresses and role strain responses; and
- 130 (2) Analyse and evaluate instruments in the context of the CPRSFF, which unifies disparate
- 131 constructs from various disciplines for detailed pharmacist workforce research.

132 Ethics Approval

133 This systematic review was exempt from approval by human research ethics review committee due
134 to its study design.

135 Methods

136 PRISMA guidelines were followed for this systematic review.⁶⁰ An initial search for relevant articles
137 was performed on PubMed and Scopus. Key words and indexing terms from the applicable articles
138 were used to create a search strategy for journal articles, reviews and trials (Appendix 1). PubMed,
139 Scopus and Web of Science databases were initially searched in January 2018, and updated in
140 January 2019 and April 2020. Results were loaded into an Endnote database. Screening for
141 duplicates followed. Using inclusion and exclusion criteria (Appendix 2), title and abstract screening
142 identified papers that reported original research describing community pharmacist role stresses
143 (role ambiguity, role conflict, role incongruity, role overload, role overqualification, role underload,
144 role underqualification) or role strains (social, psychological or physiological responses that result
145 from negative subjective emotions)^{38, 40} (definitions are available in Appendix 2).

146 Remaining papers were read by full text, and the exclusion criteria were applied. Studies were
147 excluded if they were not original quantitative research in the English language about community
148 pharmacist role stress types and strains published from 1990 onwards, and if community pharmacist
149 results were not separated from other sectors (e.g. hospital, aged care, etc.). Hand-searching of
150 reference lists for relevant articles was undertaken. Authors were contacted for further information
151 if necessary. The reliability and validity of role stress and strain instruments in eligible articles were
152 checked, using Boateng et al's guidelines.⁶¹ Where instrument reliability and validity was not
153 mentioned in the included article, but referred to a different source, this was reviewed. These
154 references were retrieved, and reliability or validity (including methods of checking validity)
155 confirmed for community pharmacists. If the original measures and reliability/validity could not be
156 confirmed, the original author was contacted for comment. If these authors did not reply, the tool
157 was excluded. Any studies that did not have a reliable or validated instrument for community
158 pharmacists were excluded.

159 Data extraction

160 A Microsoft Excel spreadsheet was used for the data extraction process, with the following
161 information collected: publishing year, authors, article title, country of origin, sample size, response
162 rate, study design, publishing journal, data collection method, models, originating theories, survey
163 concepts covered, number of questions included for each concept, whether questions had been
164 selected from the scale, number of Likert options used, reliability of scale calculated, validity, type of
165 scale, scale names, source of scale (if not self-developed), language used, responsiveness, methods
166 of analysis, general outcomes reported, and data tables that had been included as results in studies.
167 Two researchers, FY and RC, examined included papers based on study inclusion and exclusion
168 criteria for eligible instruments, and came to a consensus upon the final number of instruments and
169 studies to be included.

170 Instruments measuring role stresses and strains were tabulated with their full items and measures,
171 and reliability and validity were reported. If measures were subject to copyright, only the domains
172 are reported in this review (see Appendix 5). Where instrument reliability and validity was not
173 mentioned in the included article, but referred to a different source, this was also reported. Only
174 instruments measuring the stated overall concept were listed, e.g. if a tool had been validated to
175 measure job satisfaction but had domains measuring different role stress/strains, it would only be
176 listed under job satisfaction. Instruments were listed as possessing construct validity if they
177 possessed at least two of the following: convergent validity, discriminant/divergent validity,
178 differentiation by known groups and correlation analysis.⁶¹

179 Instruments were categorised into the relevant role stress or role strain construct, based on the
180 constructs in the CPRSFF.³⁸ The CRPSFF was used to bring uniformity to the application of various
181 theories in pharmacy practice literature. This framework uses Mead's role theory construct
182 definitions, as synthesised by Hardy & Hardy, which can be traced back to when role theory itself
183 began as a foundational concept of social science.⁴⁰ Sociological thought later branched out to urban
184 sociology, frame analysis, ethnography, organisational theory and various cognitive theories
185 throughout the century.^{39, 62-69} This theoretical placement allows much of today's scholarship in
186 these various disciplines to be compatible for integration with the CPRSFF. Rather than workforce
187 issues of organisational culture, safety culture, personality and job satisfaction being disparately
188 investigated as unrelated concepts, these constructs can instead be visualised as part of a
189 theoretically constructed system that individuals face in their everyday practice.

190 Due to the various definitions and theories informing the construction of the different instruments,
191 instrument scale items were then analysed for compatibility with theoretical definitions from the
192 CPRSFF.

193 Results

194 From the 11480 items initially retrieved from a search of PubMed, Scopus and Web of Science, 6306
195 records remained after deleting duplicates. After an initial screening of title and abstract, full-text
196 screening, and linking together multiple records of the same study, 20 quantitative studies were
197 included. See Figure 4 for the PRISMA flowchart of the search process,⁶⁰ and Appendix 3 for a list of
198 the included studies.

199 The majority of the studies were undertaken in the USA (13 studies). Three studies were from the
200 UK, Canada and France were each represented by two studies, and one study each from Lithuania
201 and Turkey. All the studies described instruments that were administered via self-report surveys. 18
202 studies utilised mail/postal surveys to collect data (9.0 - 95.5% response rates), one study used an
203 online survey with a 2.0% response rate,⁷⁰ and the remaining study used a drop-off/pick up survey
204 technique (no response rate reported).⁷¹ The sample sizes ranged from 200 to 54,447 participants,
205 which were mostly cross-sectional samples of pharmacists. Eight of the 20 studies did not detail a
206 specific theoretical framework for instrument development, whilst 12 studies cited organisational
207 theory, engineering and social science underpinnings (namely organisational support theory, human
208 factors framework, Maslach's burnout model, career commitment, Kanter's structural theory of
209 empowerment, social identity theory, and safety culture).

210 There were seven psychological strain response instruments (see Tables 1-3 in Appendix 4 for
211 tabulated summaries of the extracted instruments). Four instruments measured job/work/work-
212 related stress^{1, 5, 50, 70, 72}: a modified version of the Wolfgang's Health Professions Stress Index,⁵⁰ A
213 Shortened Stress Evaluation Tool (ASSET),⁷² the Short version of the Effort-Reward Imbalance

214 Questionnaire (ERI),¹ and through a Visual Analogic Scale (VAS 0-100).⁷⁰ Burnout was measured by
215 the Maslach Burnout Inventory (MBI) in one study,⁷³ and was also translated for use with Turkish
216 community pharmacists in another⁷¹: these were considered as the same tool. Psychological distress
217 was measured by the General Health Questionnaire-28 (GHQ-28),⁷⁴ and anxiety and depression were
218 measured with the Hospital Anxiety and Depression Scale (HADS) questionnaire.⁷⁰

219 Within the included studies, social strain response instruments were the most common (14
220 instruments): nine instruments measured job satisfaction,^{50, 75-84} three instruments measured job
221 turnover intention,^{50, 77, 78, 82, 85-88} and two instruments measured satisfaction with managers and
222 supervisors separately.⁸⁴ See Table 2 in Appendix 4 for a summary.

223 Five extracted instruments across two studies specifically measured three role stresses: role
224 ambiguity,⁵⁰ role conflict^{50, 89} and the related work-home conflict,⁵⁰ and role overload.⁵⁰ See Table 3
225 in Appendix 4 for more detail.

226 There were no instruments measuring physiological role strain or the role stress types of role
227 incongruity, underload or overqualification/underqualification captured in this review.

228 Of the 26 instruments extracted, 19 did not report the scale items of instruments used in the studies
229 (see Appendix 5 for more details). Thirteen instruments did not report if they had been modified
230 from the original source (i.e. items had been extracted or added, and/or answering options had been
231 modified), however, 11 of these instruments could be verified against the referenced sources,
232 according to the number and description of scale items. Eight instruments were reported as being
233 modified or extracted from pre-existing validated scales. As an example of the type of implications
234 this could have, there are recommendations that both facet-free job satisfaction (i.e. overall job
235 satisfaction) and facet-specific job satisfaction should be measured.⁹⁰ However, only three out of the
236 nine extracted instruments measured both facet-free and facet-specific constructs,^{79, 80, 82} with the
237 remainder being largely facet-free. This has implications for comparability with other industries,
238 subsequently detaching pharmacist data from organisational theory literature and further research
239 done in that discipline.

240 Although all the instruments included in this review were validated and found to be reliable, not all
241 had been validated within the community pharmacist population by the authors of the included
242 studies (see Appendix 4 for psychometric properties of instruments). Some had reported factor
243 analysis of included instrument and similar validation methods, yet did not report validation in
244 community pharmacists, instead referencing external articles where validation had been completed
245 in other populations: seven instruments did not report the tool's reliability and/or validity from the
246 study itself, but referenced other articles, which allowed confirmation of the use of instruments in
247 their entirety without modification.^{70-74, 76, 79, 80} Only the Turkish MBI reported test-retest reliability
248 coefficients for health professionals.⁷¹ The majority (24 out of 26 instruments) utilised Cronbach's
249 alpha or composite reliabilities, with coefficients between 0.66-0.95.^{1, 5, 50, 71-73, 75-80, 82-89} The
250 remaining instruments used K-R 20 (89% for job satisfaction),⁸¹ Spearman's correlations (Depression
251 subscale $r=0.70$, anxiety $r=+0.74$).⁷⁰ Inter-rater reliability was calculated (compared to the HADS) for
252 the VAS 0-100 sleep disturbance scale.⁷⁰

253 All of the instruments, except the VAS, used a Likert-type scale ranging from 3 to 7 point scales.
254 Most compared scale means and frequencies. However, scoring methods in the following
255 instruments differed: the Likert scales of three instruments were dichotomised for analysis^{50, 77-79, 81,}
256 ⁸⁶⁻⁸⁸; in one study, role stress measures were not scored separately since confirmatory factor analysis
257 and composite reliabilities were used to form discrete scales, and these individual items were

258 summed for these subscales⁵⁰; MBI sub-scales were scored and compared to reference tables, where
259 'high burnout' is assigned when subjects achieved high scores in Emotional Exhaustion and
260 Depersonalisation, but gave low scores for Personal Accomplishment^{71, 73}; for the GHQ-28, the two
261 greater options were scored as 1, and a total possible score of >5 out of 28 suggested morbidity⁷⁴;
262 the VAS was scored with a cut-off point of 70/100; and HADS scores of >7 for either of its subscales
263 were considered abnormal.⁷⁰ See Appendix 5 for more detail.

264 Of the 26 instruments in this review, social and psychological role strain responses were highly
265 represented, perhaps due to pragmatism in pharmacy practice research. However, few role stress
266 instruments have been used as outcomes in recent community pharmacist research.

267 Most of these instruments were either short forms of a longer instrument (i.e. a tested and validated
268 short form based on the factor analysis of a longer instrument), or had been abbreviated from
269 longer instruments (e.g. particular items may have been chosen for theoretical reasons). Reliability
270 analyses for these instruments tended to be limited to Cronbach's alpha reliability and correlations,
271 and further testing for test/re-test reliability was not reported. Validity analyses also tended towards
272 simpler analysis methods. This could be due to the poor research engagement of time-poor
273 community pharmacists, which has been reported in Australia⁹¹ but may be less well documented
274 due to publication bias. Inter-rater reliability calculation for the VAS 0-100 sleep disturbance scale
275 compared to the HADS,⁷⁰ also, is an unusual methodological approach since both are self-report
276 measures, and inter-rater reliability is typically calculated for measuring consistency in the answers
277 of different participants (i.e. raters).⁹² These limited psychometric qualities call for further
278 pharmacist studies with repeated longitudinal data collection (e.g. annually), and detailed
279 transparent reporting of methods and results. This would enable calculation of more robust
280 reliability measures such as test/re-test reliability, identification of gold measures of pharmacist role
281 stress and strain, and allow comparison with similar concepts and instruments in organisational
282 theory.

283 Issues with instrument content validity, alone and in relation to analysis for compatibility with the
284 CPRSFF, were apparent:

285 1. *Undefined constructs*

286 Some constructs were not defined by authors. This was an issue as the lay terms such as
287 "stress" in organisational and role theory do not have lay definitions, and should not have
288 been left to the reader to assume. While the separation of work stress and strain constructs
289 in organisational theory is derived from social science,^{62, 66, 90} some of the research here
290 appeared to be more consistent with the psychological approach, and were sometimes used
291 outside of original theoretical frameworks.^{62, 63, 66, 93} Perhaps the inconsistent application of
292 definitions from social science and organisational theory has caused confusion, as different
293 authors may use the same terminology for different concepts.^{64, 65} For this reason, when
294 investigating using this perspective, constructs should be clearly defined and delineated by
295 researchers wanting to work in the area.^{39, 42, 64, 67, 94, 95}

296 2. *Inconsistent use of similar terms across pharmacy practice research*

297 Ideally, analysing constructs with the same nomenclature would not require content
298 validation. Although inclusion and exclusion criteria for this review was stringent and limited
299 to role theory terminology for this reason, it appears to have been inadequate without
300 further item examination. As stated earlier, the same vocabulary was used to denote
301 different constructs:

- 302 a. Instruments measuring the similar terms “job stress”, ‘work stress’, and ‘work-
303 related stress’ were identified in this review. If possible, avoiding these ambiguous
304 terms would circumvent reader confusion between the lay meaning of psychological
305 stress, and the social science/organisational theory definition of stress.^{40,90} Instead,
306 they could be more appropriately categorised as ‘role/job/career strain’ (strain
307 caused by role/job/career) or ‘psychological strain’ (relating to generalised
308 psychological distress).
- 309 b. Role stress instruments identified in this review have been constructed to measure
310 an unhealthy environment, although theoretically, role stresses and their measures
311 should be neutral.⁴⁰ In organisational theory, constructs possibly causing
312 psychological distress are also called ‘stressors’,⁹⁰ perhaps to avoid this confusion.

313 3. *Commercialised instruments unavailable for content analysis*

314 The multiple definitions for instrument constructs using the same or similar terms
315 necessitated a secondary check of item content validity. However, for commercialised
316 instruments, the lack of freely reported instrument items and guidelines for scoring meant
317 the significance of these instruments to the CPRSFF is not known. For example, the construct
318 of burnout was derived from various disciplines and later defined by subsequent research.^{96,}
319 ⁹⁷ The most recent version of the MBI and guidelines for the now copyrighted MBI burnout
320 tool were found to be only available through payment to Mind Garden⁹⁸, while five different
321 MBI instruments now exist. Furthermore, on their website, the authors caution against the
322 use of arbitrary cut-off scores as this ‘lacks diagnostic validity’.⁹⁹ In the studies in this review,
323 however, cut-off scores were since the referenced freely-available guidelines recommended
324 this,^{96,100} and it is not obvious from literature that *new* MBI guidelines exist, or if the MBI
325 instrument is now altered. Similarly, the items of other copyrighted measures like the GHQ,
326 ASSET and HADS could not be evaluated for their relevance to this review without payment
327 to copyright holders. Commercialisation of instruments makes them functionally unavailable
328 for academic review, and thus should be avoided when possible.

329 4. *Missing information*

330 Many studies did not fully report the instruments they used, without mention of copyright
331 issues. Also, several instruments did not match the instruments in the sources they cited
332 (see Appendix 5), whether in the number of items, Likert scale, or the Likert options
333 available. For example, of the three turnover intention instruments included in this review,
334 two may potentially be the same measure, as they are listed as being sourced from the
335 Michigan Organizational Assessment Questionnaire; however, this suspicion could not be
336 verified, as one instrument was not reported.⁸²

337 [Instrument compatibility with the CPRSFF](#)

338 [Role stress instruments](#)

339 Interestingly, constructs within some social strain instruments, such as job satisfaction and ‘work
340 stress’ instruments, were identifiable definition as role stresses. Tracing their referenced sources
341 makes it evident that many of these construct items originated in role theory literature.^{5, 72, 79, 80, 83-85}
342 This points to the relevance of the examination of role stress and strain concepts, since pharmacist
343 workforce issues are becoming increasingly prominent.^{1, 4, 5, 24, 50, 51, 70, 101-105}

344 Unfortunately, the adoption of role stress terms into organisational theory appears to have been in
345 the search for unhealthy role ambiguity, conflict, over/underload and over/underqualification, often

346 in the context of job dis/satisfaction. On the whole, it appears that examination of the neutral role
347 stresses may not be possible without construction of new role stress instruments. This has been
348 confounded by the fact that not all role theory literature has not followed the perspective taken in
349 this review,^{39, 64} and organisational theory literature does not always clearly separate stress and
350 strain constructs. With ongoing transitions of the community pharmacist role¹⁰⁶ possibly
351 complicating further research into this area, clear delineation of role stresses in the context of
352 community pharmacists requires greater insight. For example, the following questions require
353 research.

354 First, could role ambiguity be framed as flexibility in the pharmacist role instead: what is non-
355 negotiable in a community pharmacist role, and where are pharmacists expected – or not expected
356 – to use autonomy? Perhaps this would allow research into pharmacist autonomy^{36, 37, 107} to be
357 analysed in the context of the role system.

358 Second, could role under/overload could be conceptualised as a subjective workload^{21, 76} continuum,
359 whether in a qualitative/cognitive/mental sense, or a quantitative sense?

360 Third, understanding the constructs of role conflict and incongruity in the community pharmacist
361 context would require further insight into pharmacist identities^{14, 31, 108, 109}: are pharmacist identities
362 subservient to the overall professional pharmacist identity, or are certain identities more influenced
363 by organisational and socialised roles more? How do personality and individual differences change
364 this? Could moral distress be a strain resulting from role incongruity?

365 Finally, could role under/overqualification be conceptualised as a continuum? By using an evaluation
366 of actual (rather than reported or mandated) community pharmacist competencies compared to
367 their actual (observable *and* cognitive tasks) work activities, this could perhaps be categorised
368 according to various pharmacist identities, and combined with an understanding of formal and
369 informal training during socialisation processes. The specialisation of pharmacist workforces¹¹⁰⁻¹¹²
370 adds to the complexity of investigating “role stress” constructs in the context of community
371 pharmacists, as the blurring of role boundaries occurs during role transitions.⁴⁰

372 *Role strain instruments*

373 These psychological strain instruments measure different facets (e.g. burnout, anxiety and
374 depression, and psychological distress). Since these constructs are reasonably differentiated, their
375 concomitant use in the CPRSFF to measure pharmacist strain should be explored.

376 The following considerations were noted for social strain instruments:

377 *Dis/satisfaction*

378 Job satisfaction literature (and thus role and career satisfaction as well) makes it clear that despite
379 satisfaction/dissatisfaction being a continuum, they do not have the same antecedents: i.e., the
380 removal of factors causing dissatisfaction do not immediately cause satisfaction, and vice versa.⁹⁰ For
381 this reason, conceptually, job satisfaction and dissatisfaction could be detached from one another as
382 constructs for understanding role price calculations. In other words, Job satisfaction could be
383 considered a positive outcome of the role (i.e. a role benefit) and job dissatisfaction would be
384 considered a negative outcome (i.e. role strain).

385 *Turnover*

386 As commented upon by Leupold, Ellis & Valle, job embeddedness is potentially a more accurate
387 estimate of the likelihood of a community pharmacist to leave their job than turnover intention,
388 which was found to be a poor predictor of actual turnover for pharmacists.^{44, 79, 102} As a result, it may

389 be necessary to link job embeddedness with job turnover instruments when testing the CPRSFF.
390 While the two verified scales are widely used,^{50, 77, 78, 85-88} the Mobley turnover intention scale
391 appears to have a higher Cronbach's alpha (perhaps because it only has three items in it), and the
392 original Mobley instrument¹¹³ it is derived from is theoretically compatible with the CPRSFF.

393 Discussion

394 Those who are cognisant of social science research at present would know that structural/functional
395 role theory and its associated concepts alone are rarely used as a context for understanding
396 individual actions. However, the perspective adopted in this review employs role theory, symbolic
397 interactionism and social exchange concepts in a dramaturgical and interactional approach, which
398 allow for individualism without discounting the influence of a societal role an individual occupies.
399 This particular social science definition and approach appears to be specific to the sociologists who
400 synthesised them from health professional literature in the 1980's,⁴⁰ where subsequent applications
401 appeared localised to the nursing discipline and various health applications.^{114, 115} This does not
402 mean this particular perspective has no merit in today's society. For example, the inclusion of
403 several role stress constructs such as role overload, role conflict and role ambiguity as facet-specific
404 job satisfaction factors^{79, 80} give weight to the conceptualisation of job satisfaction as a hedonistic
405 calculation of role price.³⁸ Other instruments captured in this review could also be conceptualised as
406 other methods of role price calculation: for example, the Effort-Reward-Imbalance scale^{1, 116} is based
407 on equity of the social contract, and the demand-control-support model¹¹⁶ could be seen as a
408 method of measuring role strain caused by role stresses, mitigated by power, resources and status.
409 In this way, role price calculation measures that can be administered by quantitative survey, such as
410 the ERI, JCQ and various job satisfaction instruments, are important for understanding the subjective
411 experiences of community pharmacists, who do not always have the time or availability to
412 participate in more involved forms of research. Comparing role price calculation perspectives using
413 frameworks of equity, power/resources/status, and hedonism would display *different facets* of the
414 role system which are causing excessive role strain, although they may not give a full picture of the
415 entire role system.

416 Missing from this review are the constructs of absenteeism and presenteeism,⁹⁰ which would be
417 conceptualised as social strain measures, since absenteeism is when employees do not go to work
418 despite the physical health to do so, and presenteeism is when employees go to work, despite being
419 physically unwell. Both are major workforce issues which can cause a harmful drop in productivity,⁹⁰
420 and represent a disconnect between the practitioners and the work they do: in absenteeism,
421 individuals withdraw socially from the workplace under the guise of sickness, and in presenteeism,
422 individual practitioners may downplay or deny how their own sickness could affect the vulnerable
423 patients they serve, or their own work performance. One UK study (which did not meet the inclusion
424 criteria of this review) reported a higher prevalence rate of presenteeism (76%) in pharmacists of all
425 sectors compared to the working population, consistent with presenteeism rates in other health
426 care workers. In their study, presenteeism (rather than absenteeism) was linked with anxiety,
427 depression and errors, which could result in decreased productivity, longer periods of sickness, and
428 potentially expose the practitioner to legal action.¹¹⁷ In the future, it may be fascinating to trace
429 whether absenteeism or presenteeism have an effect on job satisfaction, turnover and the provision
430 of cognitive pharmacy services.

431 The CPRSFF provides further detail to the constructs of satisfaction/dissatisfaction and turnover,
432 since it divides role, job and career into separate categories.³⁸ Here, *role* dis/satisfaction and
433 turnover relate to subjective perspectives of industry sector job position norms and associated

434 expectations, e.g. the types of roles/job postings available in community pharmacies. This is in
435 contrast with the organisation-focused *job* dis/satisfaction and turnover, which is more closely
436 related to personal experiences of workplace-specific norms and expectations, including perceived
437 organisational support and workplace relationships.¹¹⁸ This, in turn, allows a separate discussion
438 about *career* dis/satisfaction and turnover, which here relates to industry-wide norms and
439 expectations, regardless of sector, e.g. roles/job postings available across hospital, community,
440 industry and other pharmacist sectors. This is important as single-organisation “traditional” career
441 trajectories are no longer the norm, and today’s society necessitates different conceptualisations of
442 “non-traditional” careers such as “boundaryless careers”.¹¹⁹ Although these role/job/career
443 dis/satisfaction and turnover constructs are likely to be closely related, by separating these
444 constructs as in the CPRSFF, separate analysis can be performed by looking at the relationships
445 between: (1) role commitment and role dis/satisfaction & turnover, (2) organisational commitment
446 and job dis/satisfaction & turnover, and finally (3) the relationships between professional
447 commitment (i.e. individual commitment to the *future of the profession*), career commitment (i.e.
448 personal ambition and goals for ongoing career as an *individual pharmacist*) and career
449 dis/satisfaction & turnover. (The necessity of distinction between professional and career
450 commitment becomes clear when considering the impact of commercial practices of certain
451 community pharmacy organisations on the profession, for example.)

452 Those wanting to measure strain in community pharmacists should consider the reliability, validity
453 and comparative literature for the instruments they choose. Since community pharmacists may not
454 be predisposed to engaging with researchers,^{91, 120} the brevity of instruments should be valued. Also,
455 since there was no specific physiological strain instrument identified in this review, to be consistent
456 with the CPRSFF’s conceptualisation, weight could be given to a scale like the GHQ and ASSET which
457 appear to also measure some aspects of physiological strain, although these instruments were not
458 been available for review. However, it should be noted that when the lengthier instruments are
459 administered with other detailed scales such as facet-specific job satisfaction, the participant may
460 feel they are answering the same questions worded differently, particularly with those instruments
461 originating from stress and strain concepts.

462 To evade confusion with same or similar construct names with different definitions, pharmacy
463 practice research should be transparent in their adoption of other theories, clearly state their
464 construct definitions, and report instrument scale items wherever possible. This allows other
465 researchers to conduct a secondary content validation for evaluating construct compatibility from
466 their own chosen perspective – a process which may be increasingly needed, as demonstrated by
467 this review.

468 Rather than following other pharmacy practice researchers’ understanding of concepts from other
469 disciplines, researchers should also immerse themselves in theoretical explanations and literature
470 from the originating discipline for better comprehension, as in qualitative research.^{121, 122} Care
471 should also be taken in employing theories from other disciplines and their associated terminology,
472 as a cursory review of a few papers may not be sufficient to understand the terminology
473 complexities of another discipline. This is particularly important when nomenclature within a
474 discipline is inconsistent: as with social science and occupational theory,^{39, 40, 43, 62, 64, 65, 90, 95}
475 researchers are expected to specify their adopted perspective within that discipline.

476 It should be acknowledged be that localised pharmacist role systems within one workplace differ
477 from another, dependent on organisational flexibility for the redistribution of resources, rewards
478 and sanctions⁴⁰ that may be required for successful cognitive pharmacy service provision, rather
479 than a cursory addition of cognitive pharmacy services to the pile of ‘pharmacist things to do’

480 without considering specific implementation processes.^{6, 12, 23, 123} Differences in governmental
481 policies and professional climate between countries and organisations may similarly affect the
482 results of these instruments, and thus should be validated once more in the populations in which
483 they are carried out. Nevertheless, the use of role strain and stress measures guided by the CPRSFF
484 may allow a detailed, systemic examination of dysfunction being experienced by pharmacists today.

485 Future implications

486 Issues with psychometric quality found in this review are consistent with other reviews examining
487 instruments used in pharmacy practice, which also report a lack of data and transparency.^{124, 125}
488 Various reporting guidelines and instruments are available,^{61, 92, 126-130} and it is strongly
489 recommended that these are used.

490 In community pharmacists, focusing on role strain outcomes alone portrays negative/pathogenic
491 outcomes of the role system, such as job dissatisfaction; however positive/salutogenic outcomes⁴⁶
492 such as job satisfaction are necessary for an accurate portrayal of how community pharmacists
493 calculate personal role price. Further research could uncover the subjective positive outcomes of
494 pharmacist roles (see Figure 5 for prospective research areas using the CPRSFF, with the following
495 concepts added: role benefits, absenteeism and presenteeism). Promotion of such positive
496 outcomes could enable an increased uptake and provision of patient-facing tasks and professional
497 pharmacy services, by informing the design of strategies and interventions to avoid role strains and
498 potentiate positive outcomes of role stress. Whilst role stress constructs examine how pharmacist
499 roles are structured in the system they work within, qualitative work to understand salient symbolic
500 dynamics would add to these findings. Together, these results could then be interpreted with
501 organisational and social exchange theory for various purposes: e.g. to implement organisational
502 strategies designed to improve the quantity of pharmacist services being provided, to provide
503 improved pharmacist working conditions, satisfaction and retention, etc.

504 (Insert Figure 5)

505 It could be interesting to collect data in one population for multiple strain instruments, and to
506 perform exploratory and confirmatory factor analysis in order to ascertain one larger instrument
507 that measured all dimensions of psychological, physiological and social strain. A separate analysis of
508 role price calculation scales combined and pharmacist work behaviour (e.g. job satisfaction, ERI,
509 demand-control-supply) may also prove insightful and pinpoint factors pharmacists consider
510 important in their work satisfaction/turnover decisions. Although a similar study in the UK was
511 completed to analyse their effects on safety climate,¹¹⁶ a focus on practitioner wellbeing and task
512 selection would be insightful. This would preferably followed with qualitative interviews for further
513 understanding into how these affect current pharmacy practice, especially if the current role
514 changes are indeed a transition, wherein participants may not be able to separate their provision
515 of cognitive pharmacy services from general community pharmacy practice.

516 Additionally, examining links between disease and work stress in current pharmacists may be an
517 interesting avenue of research for those interested in the pharmacy workforce. Using the CPRSFF as
518 a conceptual map, the role stress types, role strains and various factors involved in community
519 pharmacist stress and strain can be systematically investigated and catalogued in order to first
520 improve workforce health and retention, and second, improve patient care.

521 Limitations

522 The nature of quantitative work and strict inclusion criteria may have limited the results, as only
523 specific role stress terms were sought. There may be instruments measuring similar concepts with
524 different classification or nomenclature that were excluded from this review, due to difficulties in

525 identifying hundreds of terms that may not measure precisely the same concept. For example, work-
526 life balance could be classed as a neutral measure of inter-role conflict: UK pharmacists significantly
527 troubled by 'work-life balance' reported a negative effect on their physical and psychological
528 health⁷²: i.e. they were experiencing psychological and physiological strain as a result of their work-
529 life role imbalances. Moral/ethical dilemmas in pharmacists^{9, 22, 23, 131, 132} could be classed as
530 measures of role incongruity. Also, the higher prevalence of role strain measures could be due to a
531 wider pool of terms that were accepted: e.g. substance use⁷⁴ and negative pharmacist coping
532 strategies⁴⁶ could be seen as role strain responses, but only one of these studies were included in
533 this review since they also measured anxiety and depression. In a similar manner, although more
534 traditional role theory research measured outcomes such as blood pressure, heart rate and
535 catecholamine blood levels, current pharmacist stress literature has yet to associate increased stress
536 with specific medical indications. This created some difficulties in searching for physiological
537 pharmacist strain, although it is well accepted that psychological stress can result in economic,
538 psychological and physiological consequences for employees and organisations alike.⁹⁰ Also, omitted
539 information in included studies may have affected the results of this review, as some authors could
540 not be contacted for further information.

541 Notwithstanding, this review has collated validated and reliable instruments which measure
542 pressures and consequences for individual pharmacists in their roles. As an example of theoretical
543 utility of such measures, interventional trials that require high fidelity could identify pharmacists
544 who are not cognitively and quantitatively overloaded to be recruited to their trial. These may,
545 therefore, be vital measures for those monitoring the health of the pharmacist workforce, or
546 wanting to examine cognitive pharmacy services and interventional trials using implementation
547 science, since these research studies may be reliant on pharmacists themselves to carry
548 interventions out.

549 Conclusion

550 Twenty-six reliable and validated instruments were found which measure role stress and strain in
551 community pharmacists. Most instruments focused on pharmacist satisfaction and job turnover,
552 which may be used to indicate work pressures present in the community pharmacy environment,
553 and individual pharmacist impact. Although the extracted instruments measure negative role
554 outcomes of community pharmacist work on individuals, scale development is required for role
555 benefits that balance strain. Further research is necessary to develop community pharmacist
556 measures for physiological role strain and neutral role stresses.

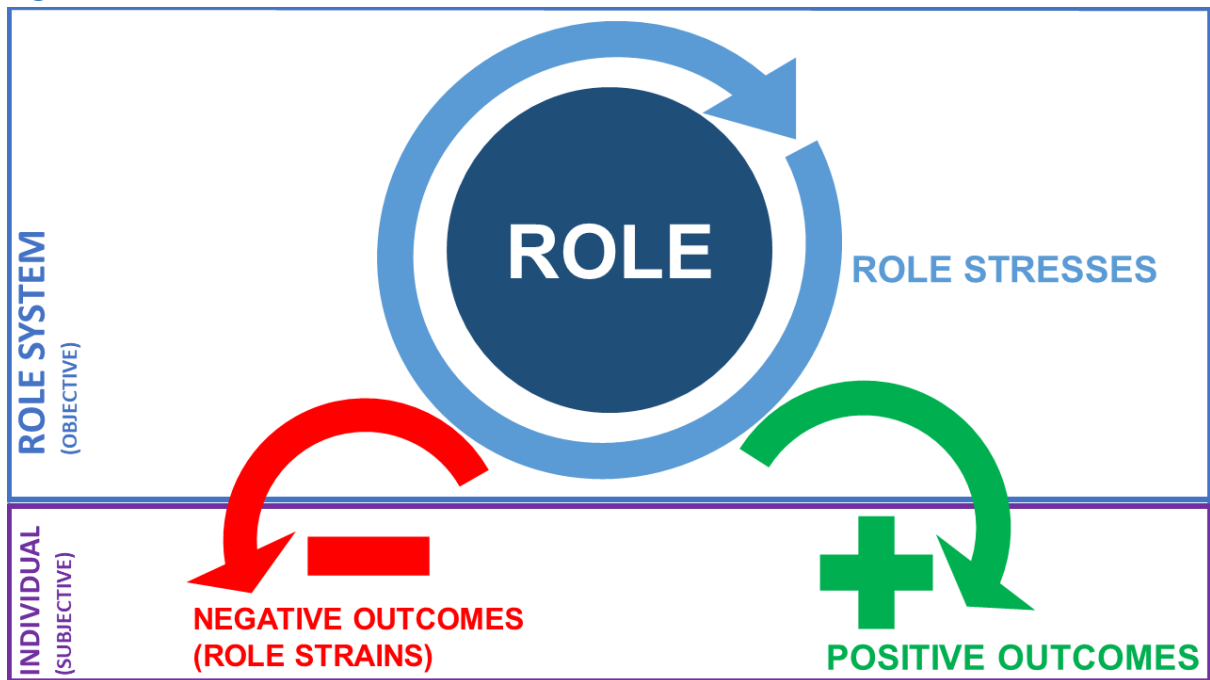
557 Funding

558 The author received no specific funding for this work.

559 Conflicts of interest

560 The author has declared that no competing interests exist.

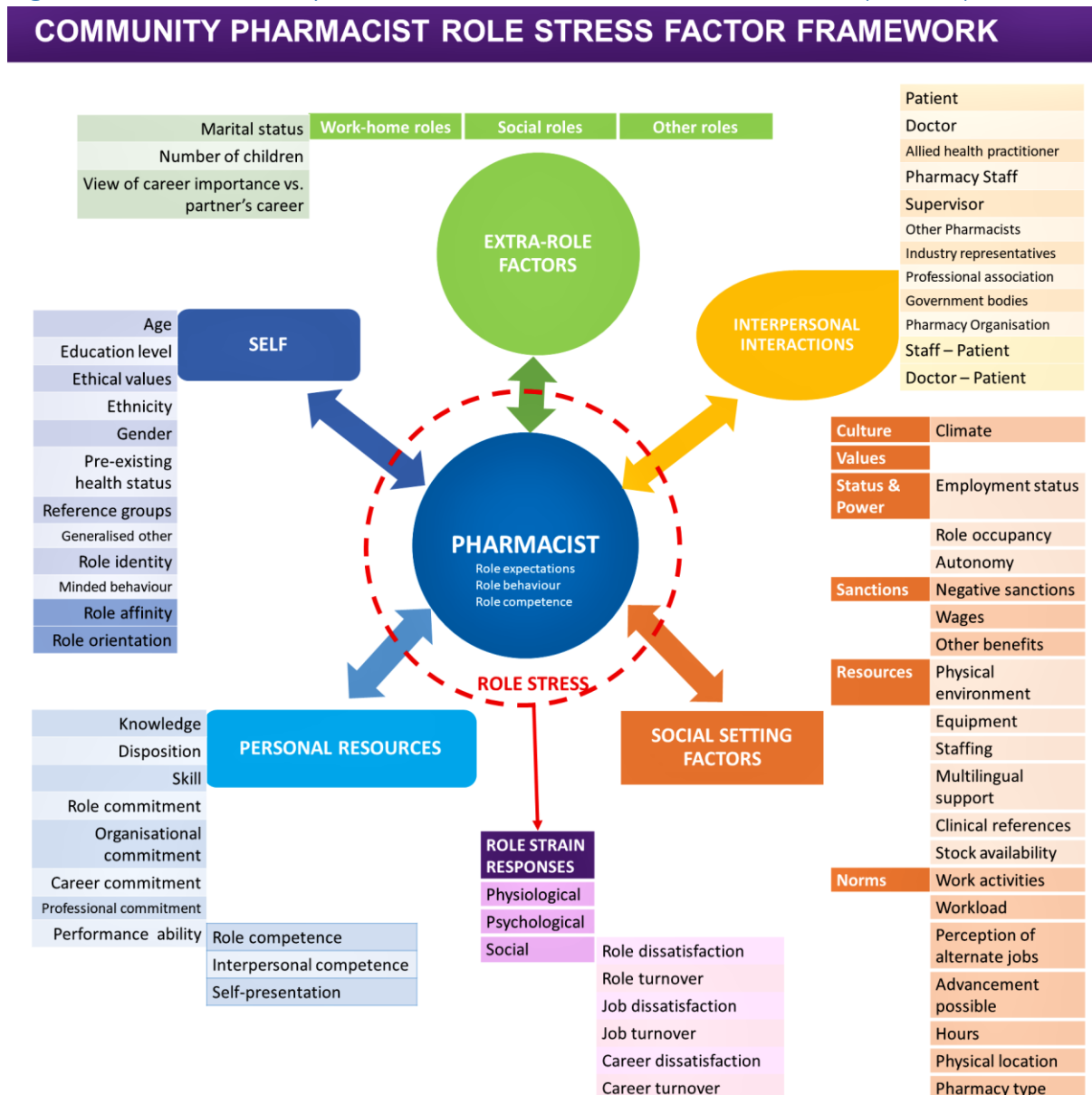
561 Figure 1: How role stress and strain are related.



562

563 Stresses around the actual role could create subjective negative or positive outcomes for the
564 individual. Negative outcomes are defined as role strains, which could be psychological, physiological
565 and social role strain responses

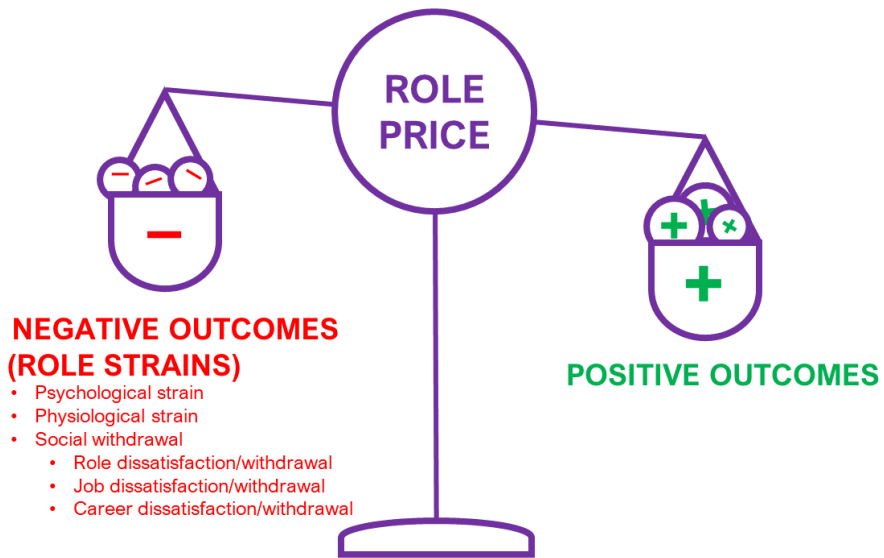
Figure 2: The Community Pharmacist Role Stress Factor Framework (CPRSFF)



567

568 This framework displays pharmacist role strain responses possible.

569 Figure 3: A representation of role price

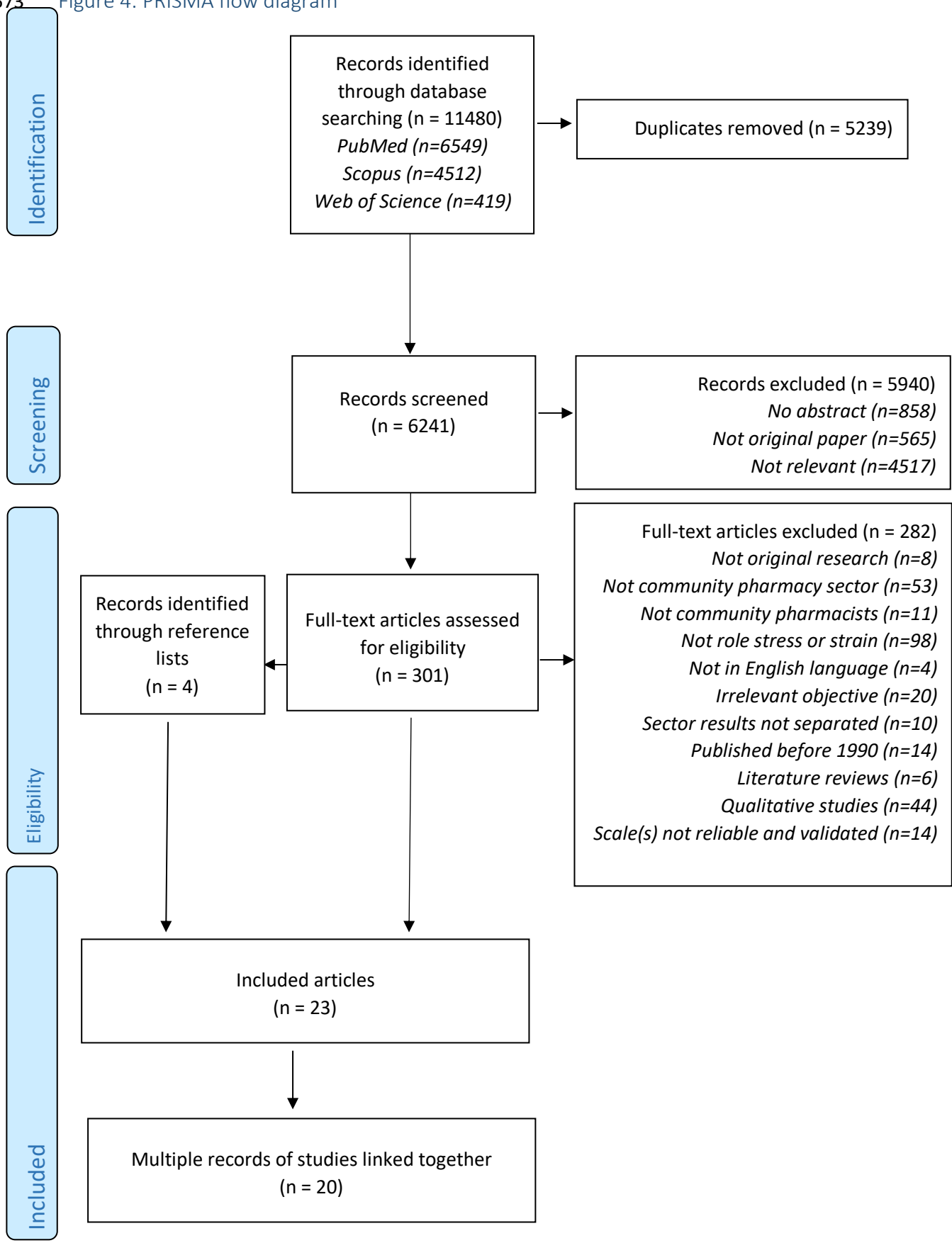


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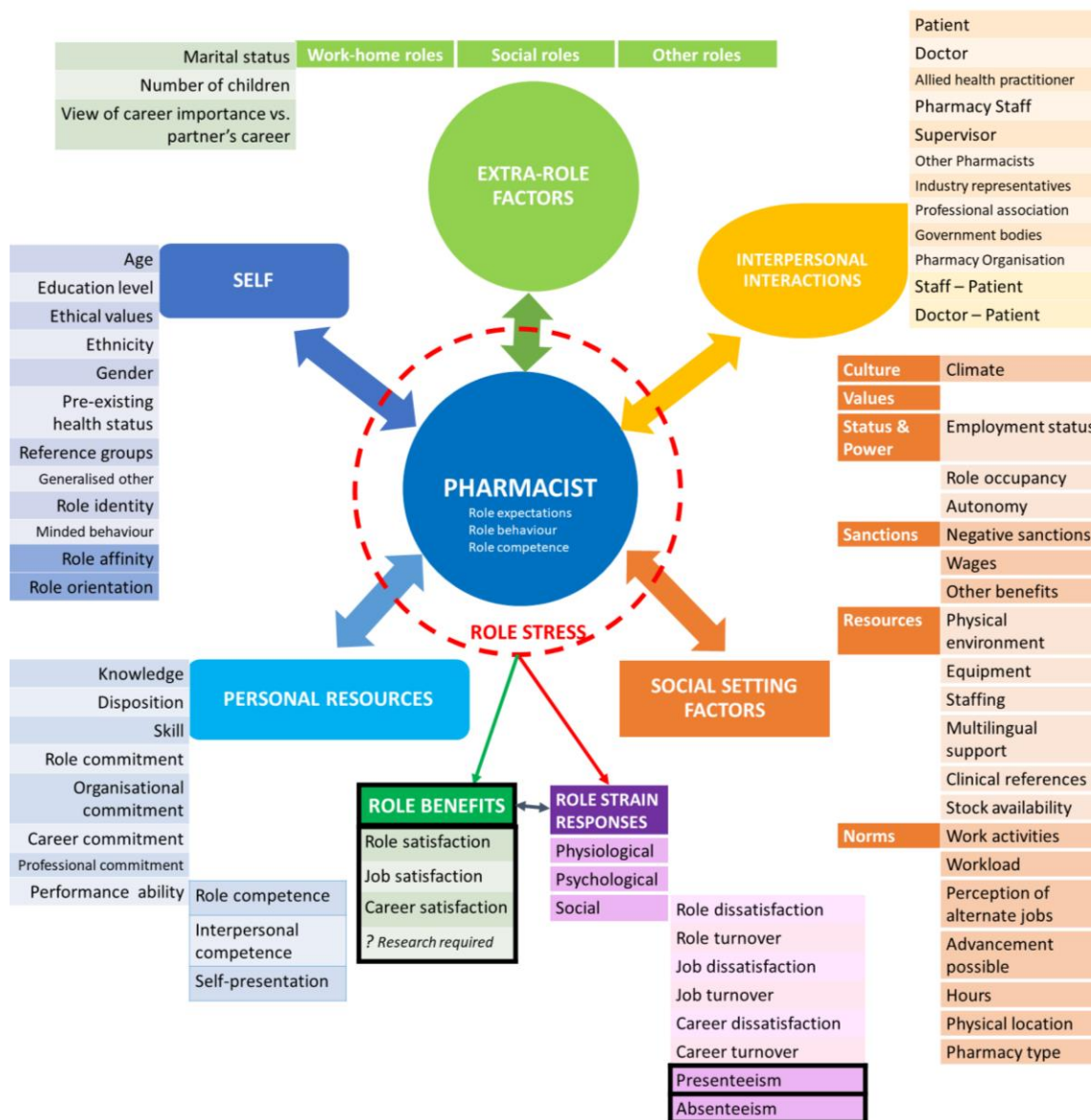
571 A role price is calculated by an individual adding up positive and negative outcomes from their role.

572

573 Figure 4: PRISMA flow diagram⁶⁰



574 Figure 5: Possible future directions for Community Pharmacist workforce research



575
 576 Role benefits, absenteeism and presenteeism are hypothetically added here to the CPRSFF (outlined
 577 in thick black borders). This framework could be used to guide further workforce research.

APPENDIX 1: SEARCH STRATEGIES USED

Database	Search strategy	Additional
Pubmed	(((("organizational culture"[Mesh] OR "attitude of health personnel"[Mesh] OR "pharmaceutical services/manpower"[Mesh] OR "pharmacies/statistics & numerical data"[Mesh] OR workload[Mesh] OR "communication"[Mesh] OR "patient care/standards"[Mesh] OR "patient handoff/organization and administration"[Mesh] OR "patient handoff/standards"[Mesh] OR "personnel staffing and scheduling"[Mesh] OR "stress, psychological/etiology"[Mesh] OR "self concept"[Mesh] OR "professional role"[Mesh])) AND ("community pharmacy services/organization and administration"[Mesh] OR "community pharmacy services/standards"[Mesh] OR "pharmaceutical services/organization and administration"[Mesh] OR "pharmacists/organization & administration"[Mesh] OR "pharmacists/psychology"[Mesh] OR "pharmacists/standards"[Mesh] OR "Pharmacists/supply and distribution"[Mesh])) AND ("medication errors/psychology"[Mesh] OR "medication errors/statistics and numerical data"[Mesh] OR "job satisfaction"[Mesh] OR "Professional-patient relations"[Mesh] OR "quality of health care"[Mesh] OR "quality of life"[Mesh] OR "task performance and analysis"[Mesh] OR "stress, psychological/psychology"[Mesh] OR "stress, psychological/epidemiology"[Mesh] OR "burnout, professional/epidemiology"[Mesh] OR "career choice"[Mesh] OR "personnel turnover/statistics and numerical data"[Mesh] OR "career mobility"[Mesh])) AND English[Language]	Exported 200 at a time
Scopus	(((TITLE-ABS-KEY (("safety culture") OR workload OR handoffs OR ("human factors") OR ("organizational identification") OR ("job turnover intention") OR ("construed external image") OR organizations OR ("work-home conflict") OR ("role stressor") OR ("role stress")) OR TITLE-ABS-KEY (("role perception") OR ("professional identity") OR ("self-perception") OR ("role expansion") OR ("organizational culture") OR ("personality trait") OR ("patient perceptions")))) AND (TITLE-ABS-KEY (("community pharmacy") OR pharmacists OR ("pharmacist workforce") OR ("pharmacy practice research") OR ("pharmacy roles") OR ("pharmacist roles") OR ("Pharmacists' personality traits") OR ("pharmacy culture") OR ("Pharmacist attribute"))) AND ((TITLE-ABS-KEY (("quality related events") OR satisfaction OR ("job satisfaction") OR stress OR ("Job stress") OR ("work stress") OR ("patient safety") OR error OR overload OR ("medication safety") OR ("pharmaceutical care") OR dissatisfaction) OR TITLE-ABS-KEY (("interpersonal interactions") OR ("patient-pharmacist interaction") OR ("role conflict") OR ("role ambiguity") OR ("role overload") OR attrition OR ("intentions to quit") OR ("role strain")))) AND (LIMIT-TO (SUBJAREA , "PHAR") OR LIMIT-TO (SUBJAREA , "MEDI") OR LIMIT-TO (SUBJAREA , "HEAL") OR LIMIT-TO (SUBJAREA , "BIOC") OR LIMIT-TO (SUBJAREA , "BUSI")) AND (LIMIT-TO (LANGUAGE , "English"))	Exported first 2000 sorted by date newest, then sorted by date oldest for subsequent numbers
Web of Science	TS=("safety culture" OR workload OR handoffs OR "human factors" OR "organizational identification" OR "job turnover intention" OR "construed external image" OR organizations OR "work-home conflict" OR "role stressor" OR "self-perception" OR "role expansion" OR "organizational culture" OR "personality trait" OR "patient perceptions") AND TS=("community pharmacy" OR pharmacists OR "pharmacist workforce" OR "pharmacy practice research" OR "pharmacy roles" OR "pharmacist roles" OR "pharmacists' personality traits" OR "pharmacy culture" OR "Pharmacist attribute") AND TS=("quality related events" OR satisfaction OR "job satisfaction" OR stress or "job stress" OR "work stress" Or "patient safety" OR error OR overload OR "medication safety" OR "pharmaceutical care" OR dissatisfaction OR "interpersonal interactions" OR "patient-pharmacist interaction" OR "role conflict" OR "role ambiguity" OR "role overload" OR attrition OR "intention* to quit" OR "role strain")	Limited to article or review or clinical trial, and excluded Medline database, the Korean and Russian databases.

581 APPENDIX 2: SCREENING CRITERIA

582 Inclusion criteria:

583 Studies reporting role stress type or role strain instruments for pharmacists practising in community
584 pharmacy settings where:

- 585 • The objective of study analyses or explores a role stress type or role strain in community
586 pharmacy
- 587 • The publishing date is from 1990 – Jan 2019
- 588 • Community pharmacist statistics are separately listed from other sectors of pharmacy
- 589 • Quantitative methodology

590 Definitions

591 Role theory concepts underlie social science and use lay terms that could confuse those unfamiliar
592 with it, and the literature does not agree on specific definitions. The terms used here were selected
593 as they were derived from Hardy's synthesis of health profession role literature.⁴⁰

594 Role stress types

595 Role stresses are seen to define societal roles, and are described as inert pressures that may interact
596 to cause subjective individual strain.

597 **Role conflict** occurs when an individual's distinct responsibilities in two different roles clash,
598 resulting in the need for the individual to prioritise or resolve this conflict.⁴⁰ This can occur within the
599 pharmacist role (i.e. intra-role conflict), or be the result of a conflict between the pharmacist role
600 and another outside their pharmacist job, i.e. inter-role conflict (e.g. an "extra-role" factor such as
601 being a parent)⁴⁰. Work-family and work-home conflict therefore fell under the category of inter-
602 role conflicts, and were included in the analysis.

603 **Role incongruity** is when the individual's values or self-perception clash with the given role.⁴⁰ No
604 other terms were found to be equivalent.

605 **Role ambiguity** describes a type of role stress where the individual is not sure of their role
606 prescriptions or expectations (i.e. what they should do in the role), and often occurs when the
607 individual first assumes a new role⁴⁰ (e.g. newly registered pharmacist) or is undergoing role
608 modification and/or specialisation (e.g. first performance of a professional service, or learning to be
609 a diabetes educator). No other terms were found to be equivalent.

610 **Role overload and underload** refers to the situation where the individual subjectively finds
611 themselves to have either too many or too little tasks to do, either cognitively or quantitatively.⁴⁰
612 Role overload is often due to multiple subroles and/or an excessive number of tasks.⁴⁰ Since these
613 role stress types refer to a subjective perception of workload, objective measures of workload (e.g.
614 prescription numbers daily) were excluded, and subjective measures of "cognitive
615 overload/underload" and "quantitative overload/underload" were included.

616 **Role overqualification and underqualification** describe the role stresses an individual faces when
617 they have either too much or too little knowledge, skills and personal resources to fulfil a role.⁴⁰
618 Since these role stress types are equivalent to subjective or perceived
619 overqualification/underqualification, these terms were included.

620 **Role strain responses**

621 **Psychological strain responses** refer to subjective negative feelings or reactions that arise from the
622 role stresses that the individual experiences, such as stress, anxiety, and similar psychological terms.
623 ⁴⁰ Those associated with “stress” and “burnout” in the included articles were analysed.

624 **Social withdrawal responses** include withdrawal from roles in a job, organisations, and careers.⁴⁰
625 Equivalent terms included were role/job/career withdrawal and turnover which represent
626 individual’s withdrawal from these social groups.

627 **Physiological strain responses** are abnormal levels of objectively measured physiological markers,
628 such as blood pressure, cholesterol, catecholamines, etc. as a response to experienced role
629 stresses.⁴⁰ Due to the variety of literature on these terms solely and the correlation of this concept
630 to stress itself, no specific search term was included for physiological strain.

631 **Exclusion criteria**

- 632 1. Study type: Not original studies, including commentaries, opinion and text that do not
633 involve original research, nor literature reviews
- 634 2. Setting: Non-community pharmacies
- 635 3. Population: Not community pharmacists
- 636 4. Outcomes: Studies not reporting factors associated with role stress, or role strain
- 637 5. Languages: Studies not written in English
- 638 6. Objective of study is not about community pharmacy role stress types or role strain
- 639 7. The publishing date is before the year 1990
- 640 8. Community pharmacy statistics are not separately listed from other sectors of pharmacy
- 641 9. Not qualitative methodology

Appendix 3: List of studies included in systematic review

Author/s, year	Article title	Study design*	Country	Sample size	Response rate	Data collection
2015, G. Urbonas et al.	Assessing the effects of pharmacists' perceived organizational support, organizational commitment and turnover intention on provision of medication information at community pharmacies in Lithuania: a structural equation modeling approach	QT	Lithuania	420	74.0%	Mail survey
2016, G. Urbonas & L. Kubiliene	Assessing the relationship between pharmacists' job satisfaction and over-the-counter counselling at community pharmacies	QT	Lithuania	420	72.6%	Mail survey
2014, M.A. Chui, K.A. Look & D.A. Mott	The association of subjective workload dimensions on quality of care and pharmacist quality of work life	QT	USA	224	33.0%	Mail survey
1990, M.R. Lahoz, H.L. Mason	Burnout among pharmacists.	QT	USA	2780	45%	Mail survey
1999, C.A. Gaither	Career commitment: a mediator of the effects of job stress on pharmacists' work-related attitudes	QT	USA	1088	60.0%	Mail survey
1992, C.A. Gaither & H.L. Mason	Commitment to the employer: do pharmacists have it?	QT	USA	2400	39%	Mail survey
2011, Z. Calgan, D. Aslan & S. Yegenoglu	Community pharmacists' burnout levels and related factors: an example from Turkey	QT	Turkey	296	84.8%	Mail survey
2005, A. Kahaleh & C.A. Gaither	Effects of empowerment on pharmacists' organizational behaviors	QT	USA	1054	42.4%	Mail survey
2007, A. Kahaleh & C.A. Gaither	The effects of work setting on pharmacists' empowerment and organizational behaviors	QT	USA	5000	35.1%	Mail survey
2009, E. Seston <i>et al.</i>	Exploring the relationship between pharmacists' job satisfaction, intention to quit the profession, and actual quitting	QT	UK	42010	76.6%	Mail survey
2001, S.P. Desselle & D.J. Tipton	Factors contributing to the satisfaction and performance ability of community pharmacists: A path model analysis.	QT	USA	1002	9%	Mail survey
2010, J. Perepelkin & R.T. Dobson	Influence of ownership type on role orientation, role affinity, and role conflict among community pharmacy managers and owners in Canada	QT	Canada	2000	32.3%	Mail survey
2007, J.L. O'Neill & C.A. Gaither	Investigating the relationship between the practice of pharmaceutical care, construed external image, organizational identification, and job turnover intention of community pharmacists	QT	USA	800	15.1%	Mail survey
2010, P.C. Hardigan & N. Sangasubana	A latent class analysis of job satisfaction and turnover among practicing pharmacists	QT	USA	2400	17.9%	Mail survey

Author/s, year	Article title	Study design*	Country	Sample size	Response rate	Data collection
2014, S. Leignel <i>et al.</i>	Mental health and substance use among self-employed lawyers and pharmacists	QT	France	3600	32.0%	Mail survey
2008, C.A. Gaither <i>et al.</i>	A modified model of pharmacists' job stress: the role of organizational, extra-role, and individual factors on work-related outcomes	QT	USA	4895	46.0%	Mail survey
2016, T.A. Boyle <i>et al.</i>	Pharmacist work stress and learning from quality related events	QT	Canada	1035	25.6%	Mail survey
1999, P.P. McHugh	Pharmacists' attitudes regarding quality of worklife	QT	USA	2014	60%	Mail survey
2000, S. Lerkiatbundit	Predictors of job satisfaction in pharmacists	QT	USA	1396	54.3%	Mail survey
2014, S.J. Johnson <i>et al.</i>	The relationships among work stress, strain and self-reported errors in UK community pharmacy	QT	UK	2000	45.2%	Mail survey
1992, T.V. Gubbins & K.L. Rascati	Satisfaction with Management and Overall Job Satisfaction of Texas Chain Store Pharmacists	QT	USA	200	95.5%	Mail survey
2014, S. Jacobs <i>et al.</i>	Workplace stress in community pharmacies in England: associations with individual, organizational and job characteristics	QT	England (UK)	2000	45.2%	Mail survey
2017, D. Balayssac <i>et al.</i>	Work-related stress, associated comorbidities and stress causes in French community pharmacies: A nationwide cross-sectional study	QT	France	54447	2.0%	Online survey

643 * QT= Quantitative study

644

646 Table 1: Psychological strain instruments

Construct: <i>name of tool</i>	Source reference	Dimensions: # of items, (Total #)	Reliability α: Cronbach’s alpha, CR: composite reliability	Validity (<i>method</i>) AVE = Average variance extracted	Included study
Anxiety and depression: <i>Hospital Anxiety and Depression Scale (HADS) questionnaire</i>	Zigmond & Snaith 1983	Anxiety: 7, Depression: 7 (Total 14 items)	<i>Spearman correlations.</i> Anxiety: r = +0.74, Depression: r = 0.70	<input checked="" type="checkbox"/> content validity (<i>Zigmond & Snaith 1983</i>) <input type="checkbox"/> predictive criterion validity <input checked="" type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity <input type="checkbox"/> convergent validity <input type="checkbox"/> divergent validity <input checked="" type="checkbox"/> differentiation by “known groups” <input checked="" type="checkbox"/> correlation analysis	Balayssac, Pereira, Virot et al. 2017
Burnout: <i>Maslach Burnout Inventory</i>	Maslach & Jackson 1981	Emotional Exhaustion (EE): 9, Depersonalisation (DP): 5, Personal accomplishment (PA): 8 (Total 22 items)	EE: frequency α =0.90, intensity α =0.89; DP: frequency α =0.74, intensity α =0.75; PA: frequency α =0.79, intensity α =0.79 (<i>From Lahoz & Mason 1989 in US pharmacists</i>) Test-retest reliability for MBI not completed in pharmacists. Turkish version: EE: α = 0.83, D: α=0.65, PA: α=0.72. Test/re-test reliability coefficients. EE=0.83, D=0.72, PA=0.67 (<i>From Ergin 1993, in health professionals</i>)	<input type="checkbox"/> content validity <input type="checkbox"/> predictive criterion validity <input type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity (<i>Lahoz & Mason 1989: principal factoring with iteration and orthogonal varimax rotation</i>) <input checked="" type="checkbox"/> convergent validity (<i>Maslach & Johnson 1981: correlated with independent behavioural ratings by people who knew them well, presence of certain job characteristics expected to contribute to burnout, and various outcomes hypothesised to be related to burnout</i>) <input checked="" type="checkbox"/> divergent validity (<i>Maslach & Johnson 1981: comparison with Job Diagnostic Survey (JDS) measure of ‘general job satisfaction’ and Crowne-Marlowe (1964) Social Desirability (SD) scale</i>) <input type="checkbox"/> differentiation by “known groups” <input type="checkbox"/> correlation analysis Turkish: Ergin 1993	Lahoz & Mason 1990; Chui, Look & Mott 2014 (EE subscale only); Turkish MBI: Calgan, Aslan & Yegenoglu 2008

Construct: <i>name of tool</i>	Source reference	Dimensions: # of <i>items, (Total #)</i>	Reliability α : Cronbach's alpha, CR: composite reliability	Validity (<i>method</i>) AVE = Average variance extracted	Included study
Job stress: <i>Health Professions Stress Inventory (HPSI)</i>	Wolfgang 1988	6 items extracted from the HPSI, but items chosen were not listed	$\alpha = 0.79$	<input type="checkbox"/> content validity <input type="checkbox"/> predictive criterion validity <input type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity (<i>exploratory and confirmatory factor analyses</i>) <input checked="" type="checkbox"/> convergent validity <input checked="" type="checkbox"/> divergent validity <input type="checkbox"/> differentiation by "known groups" <input checked="" type="checkbox"/> correlation analysis (<i>correlation matrix</i>)	Gaither, Kahaleh, Doucette et al 2008
Work stress: <i>Short form of the Effort-Reward Imbalance Questionnaire (ERI)</i>	Siegrist, Wege, Puuhlofer et al. 2009	Effort: 3, Reward: 7, Over-commitment: 6 (Total 16 items)	Effort: CR = 0.86, Reward: CR = 0.85, Overcommitment: CR= 0.89	<input type="checkbox"/> content validity <input checked="" type="checkbox"/> predictive criterion validity (<i>Phipps, Malley & Ashcroft 2012: regression analysis with job demand-control-support in predicting safety climate</i>) <input type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity <input checked="" type="checkbox"/> convergent validity (<i>Partial Least Squares analysis: Effort: AVE= 0.67, Overcommitment: AVE = 0.66, Reward: AVE= 0.66</i>) <input checked="" type="checkbox"/> discriminant validity (<i>Effort: AVE= 0.67, Overcommitment: AVE = 0.66, Reward: AVE= 0.66. Phipps, Malley & Ashcroft 2012: regression analysis</i>) <input type="checkbox"/> differentiation by "known groups" <input type="checkbox"/> correlation analysis	Boyle, Bishop, Morrison et al. 2016
Work stress: A <i>Shortened Stress Evaluation Tool (ASSET)</i>	Faragher, Cooper & Cartwright 2004, Johnson & Cooper 2003, Johnson 2009	Work relationships: 8, Work-life balance: 4, Job security: 4, Resources and communication: 4, Pay and benefits: 1, Aspects of your job: 8, Psychological	Work relationships: $\alpha=0.837$, Your Job: $\alpha=0.659$, Overload: $\alpha=0.817$, Control: $\alpha=0.813$, Job security: $\alpha=0.602$, Resources and communication: $\alpha=0.693$, Work-life balance: $\alpha=0.748$, Pay and benefits: N/A (only 1 item), Physical health: $\alpha=0.781$, Psychological	Faragher, Cooper & Cartwright 2004: <input type="checkbox"/> content validity <input type="checkbox"/> predictive criterion validity <input type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity <input checked="" type="checkbox"/> convergent validity (<i>Psychological health scale with the GHQ-12, and 'Your job'</i>)	Johnson, O'Connor, Jacobs et al. 2014; Jacobs, Hassell, Ashcroft et al. 2013

Construct: <i>name of tool</i>	Source reference	Dimensions: # of <i>items, (Total #)</i>	Reliability α : Cronbach's alpha, CR: composite reliability	Validity (<i>method</i>) AVE = Average variance extracted	Included study
		health: 11, Physical health: 6 Total 37 items extracted from ASSET (missing dimensions: Commitment of the organization to the employee: $\alpha=0.826$, Commitment of the employee to the organization: $\alpha=0.722$).	well-being: $\alpha=0.929$ (From Faragher, Cooper & Cartwright 2004 and Johnson & Cooper 2003: <i>crossed out dimensions were not used in the included study</i>)	<i>factor with the Warr- Cook-Wall Job satisfaction scale</i> <input checked="" type="checkbox"/> divergent validity (<i>structural equation standardised regression, inter- factor (Pearson) correlations</i>) <input type="checkbox"/> differentiation by "known groups" <input type="checkbox"/> correlation analysis	
Work-related stress: <i>Visual analogic scale (VAS, 0-100) or Stress VAS</i>	Lesage & Berjot 2011, Lesage, Berjot & Deschamps 2012	Not applicable. (Total 1 item)	Yes: Inter-rater reliability with HADS (From Lesage & Berjot 2011, Lesage Berjot & Deschamps 2012: <i>not pharmacists</i>)	From Lesage & Berjot 2011, Lesage Berjot & Deschamps 2012: <input type="checkbox"/> content validity <input type="checkbox"/> predictive criterion validity <input type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity <input checked="" type="checkbox"/> convergent validity <input checked="" type="checkbox"/> discriminant validity (<i>between VAS and PSS-14, Pearson's correlations between VAS and HADS</i>) <input type="checkbox"/> differentiation by "known groups" <input type="checkbox"/> correlation analysis	Balayssac, Pereira, Virost et al. 2017
Psychological distress: <i>General Health Questionnaire- 28 (GHQ-28)</i>	Goldberg & Hillier 1979	Somatic complaints: 7, Anxiety and insomnia: 7, Social dysfunction: 7, Depression: 7 (Total 28 items)	$\alpha = 0.78-0.95$ for the English version (From Goldberg, Gater, Sartorius et al. 1997). NB: The study this scale was extracted from was conducted in French: reliability and validity was referenced as from Lykouras, Adrachta, Kalfakis et al. 1996 and de Mont-Marin, Hardy, Lepine et al. 1993	Goldberg, Gater, Sartorius et al. 1997, Goldberg & Hillier 1979: <input type="checkbox"/> content validity <input type="checkbox"/> predictive criterion validity <input type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity <input checked="" type="checkbox"/> convergent validity <input checked="" type="checkbox"/> discriminant validity <input type="checkbox"/> differentiation by "known groups" <input type="checkbox"/> correlation analysis	Leignel, Schuster, Hoertel et al. 2014

648 Table 2: Social strain instruments

Name	Source reference	Dimensions: # of items (Total #)	Reliability α : Cronbach's alpha, CR: composite reliability	Validity (method) AVE = Average variance extracted	Included study
Construct: JOB SATISFACTION					
Index of Job Satisfaction	Brayfield & Rothe 1951	N/A – 3 items extracted from source	$\alpha = 0.75$ CR = 0.86	AVE=0.67. <input checked="" type="checkbox"/> content validity (evaluation by three experts, not quantified; minor adjustments after pilot testing by 47 pharmacists) <input checked="" type="checkbox"/> predictive criterion validity (bidirectional relationship with OTC counselling and Age using PLS-SEM: Stone-Geisser Q-squared coefficient values>0, and non-linear analysis via Partial Least Squares Regression with p values calculated through bootstrap resampling technique (999 samples) <input type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity <input checked="" type="checkbox"/> convergent validity (AVE=0.67) <input checked="" type="checkbox"/> discriminant validity (square root AVE above any correlation between job satisfaction and latent variables) <input type="checkbox"/> differentiation by “known groups” <input type="checkbox"/> correlation analysis	Urbonas & Kubiliene 2015
The Michigan Organizational Assessment Questionnaire Job Satisfaction Subscale	Camman, Fichman, Jenkins et al. in Seashore, Lawler, Mirvis et al. 1983	Facet free job satisfaction (Total: 3 items)	$\alpha = 0.91$	<input type="checkbox"/> content validity <input type="checkbox"/> predictive criterion validity <input type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity (principal component analysis) <input checked="" type="checkbox"/> convergent validity <input checked="" type="checkbox"/> discriminant validity <input type="checkbox"/> differentiation by “known groups” <input checked="" type="checkbox"/> correlation analysis (multiple regression analysis)	Chui, Look & Mott 2014
N/A	Bacharach, Bamberger & Conley 1991	N/A (Total: 5 items)	Pretest $\alpha = 0.93$ $\alpha = 0.92$ CR = 0.91	Gaither, Kahaleh, Doucette et al. 2008: <input type="checkbox"/> content validity <input type="checkbox"/> predictive criterion validity <input type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity (exploratory and confirmatory factor analyses) <input checked="" type="checkbox"/> convergent validity <input checked="" type="checkbox"/> discriminant validity <input type="checkbox"/> differentiation by “known groups” <input checked="" type="checkbox"/> correlation analysis	Gaither 1999, Gaither, Kahaleh, Doucette et al. 2008
Amended version of the Warr-Cook-Wall job satisfaction scale	Warr, Cook & Wall 1979; Hassell, Seston & Shann 2007	Global job satisfaction: 1, Intrinsic dimensions: 5, Extrinsic dimensions: 5 (Total 11 items)	$\alpha = 0.90$ (From Hassell, Seston & Shann 2007)	Hassell, Seston & Shann 2007: <input type="checkbox"/> content validity <input checked="" type="checkbox"/> predictive criterion validity (binary logic regression) <input type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity <input type="checkbox"/> convergent validity <input checked="" type="checkbox"/> discriminant validity (binary logit) <input type="checkbox"/> differentiation by “known groups” <input checked="" type="checkbox"/> correlation analysis (correlation matrices)	Seston, Hassell, Ferguson et al. 2009

Name	Source reference	Dimensions: # of items (Total #)	Reliability α: Cronbach's alpha, CR: composite reliability	Validity (method) AVE = Average variance extracted	Included study
<i>Minnesota Satisfaction Questionnaire Short Form (Short form MSQ)</i>	Weiss, Davis, England et al. 1967	Intrinsic dimension: items 1-11, 15, 16, 20; Extrinsic dimension: items 5, 6, 12-14, 19; General satisfaction: 1-20 (20 items)	<i>Hoyt reliability coefficients.</i> Intrinsic = 0.91 Extrinsic = 0.82 General = 0.92	<input type="checkbox"/> content validity <input type="checkbox"/> predictive criterion validity <input type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity <input checked="" type="checkbox"/> convergent validity (<i>based on long-form MSQ validity</i>) <input checked="" type="checkbox"/> discriminant validity (<i>path model analysis: multiple regression analyses</i>) <input type="checkbox"/> differentiation by "known groups" <input checked="" type="checkbox"/> correlation analysis (<i>path analysis</i>)	Desselle & Tipton 2001
N/A	Schommer, Pedersen, Gaither et al. 2005	Current job as a whole, career advancement, met expectations (5 items)	K-R 20: 89%	<input type="checkbox"/> content validity <input type="checkbox"/> predictive criterion validity <input type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity (latent class analysis) <input checked="" type="checkbox"/> convergent validity <input checked="" type="checkbox"/> discriminant validity <input type="checkbox"/> differentiation by "known groups" <input type="checkbox"/> correlation analysis	Hardigan & Sangasubana 2010
<i>Shortened version of the "Job Satisfaction Survey"</i>	Spector 1997	Overall job satisfaction, satisfaction with rewards, satisfaction with supervision, satisfaction with workload (Total items not listed)	$\alpha = 0.86$	<input type="checkbox"/> content validity <input type="checkbox"/> predictive criterion validity <input type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity (principal component analysis) <input type="checkbox"/> convergent validity <input type="checkbox"/> discriminant validity <input type="checkbox"/> differentiation by "known groups" <input type="checkbox"/> correlation analysis	McHugh 1999
N/A	North & Kirk 1990, Barnett & Kimberlin 1988	Items extracted from both sources: no dimensions listed (Total 8 items)	$\alpha = 0.859$	<input checked="" type="checkbox"/> content validity (<i>face validity</i>) <input type="checkbox"/> predictive criterion validity <input type="checkbox"/> concurrent criterion validity <input type="checkbox"/> <input checked="" type="checkbox"/> construct validity <input type="checkbox"/> convergent validity <input type="checkbox"/> discriminant validity <input type="checkbox"/> differentiation by "known groups" <input type="checkbox"/> correlation analysis	Gubbins & Rascati 1992
<i>Job dissatisfaction index measure</i>	Caplan, Cobb, French et al. 1975	N/A (Total 4 items)	$\alpha = 0.86$	Caplan, Cobb, French et al. 1975: <input type="checkbox"/> content validity <input type="checkbox"/> predictive criterion validity <input type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity <input checked="" type="checkbox"/> convergent validity (<i>t-tests, ANOVA</i>) <input checked="" type="checkbox"/> discriminant validity (<i>t-tests, ANOVA</i>) <input type="checkbox"/> differentiation by "known groups" <input checked="" type="checkbox"/> correlation analysis (<i>intercorrelations</i>)	Lerkiatbun dit 2001
Construct: SATISFACTION WITH...					
<i>Satisfaction with My</i>	Scarpello & Vandenburg 1987	No dimensions.	$\alpha = 0.938$	Scarpello & Vandenburg 1987: <input checked="" type="checkbox"/> content validity <input type="checkbox"/> predictive criterion validity	Gubbins & Rascati 1992

Name	Source reference	Dimensions: # of items (Total #)	Reliability α: Cronbach's alpha, CR: composite reliability	Validity (method) AVE = Average variance extracted	Included study
<i>Manager - store manager</i>		(12 items - not specified, extracted from 16 item scale)		<input type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity <input checked="" type="checkbox"/> convergent validity <input checked="" type="checkbox"/> discriminant validity <input type="checkbox"/> differentiation by "known groups" <input type="checkbox"/> correlation analysis	
<i>Satisfaction with My Supervisor Scale (SWMSS) – area pharmacist manager</i>	Scarpello & Vandenburg 1987	No dimensions. (12 items - not specified, extracted from 16 item scale)	$\alpha = 0.953$	<input checked="" type="checkbox"/> content validity (<i>face validity with academics and pre-testing with pharmacists</i>) <input type="checkbox"/> predictive criterion validity <input type="checkbox"/> concurrent criterion validity <input type="checkbox"/> construct validity <input type="checkbox"/> convergent validity <input type="checkbox"/> discriminant validity <input type="checkbox"/> differentiation by "known groups" <input type="checkbox"/> correlation analysis	Gubbins & Rascati 1992
Construct: TURNOVER INTENTION/JOB TURNOVER INTENTION					
<i>The Michigan Organizational Assessment Questionnaire 1979, unpublished</i>	Camman C, Fichman M, Jenkins D, Klesh J 1979 (unpublished)	N/A (Total 2 items)	$\alpha = 0.86$ CR = 0.86	<input checked="" type="checkbox"/> content validity (<i>evaluation by three experts, not quantified; minor adjustments after pilot testing by 47 pharmacists</i>) <input type="checkbox"/> predictive criterion validity <input type="checkbox"/> concurrent criterion validity <input type="checkbox"/> construct validity <input checked="" type="checkbox"/> convergent validity (<i>AVE = 0.78</i>) <input checked="" type="checkbox"/> discriminant validity (<i>shared variance, chi-square difference test, common method variance: Harman's single factor test using CFA</i>) <input type="checkbox"/> differentiation by "known groups" <input type="checkbox"/> correlation analysis	Urbonas, Kubiliene, Kubilius et al. 2015
N/A	Mobley, Horner & Hollingsworth 1978	N/A (Total 3 items)	$\alpha = 0.91$ (<i>Maison & Gaither 1992</i>) $\alpha = 0.86$ CR = 0.91 (<i>Gaither 1991</i>)	Kahaleh & Gaither 2005: <input checked="" type="checkbox"/> content validity (<i>120 pharmacists in pilot testing</i>) <input checked="" type="checkbox"/> predictive criterion validity (<i>structural equation modelling regression analysis</i>) <input type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity (<i>Exploratory and confirmatory analyses</i>) <input type="checkbox"/> convergent validity <input checked="" type="checkbox"/> discriminant validity (<i>structural equation modelling regression analysis</i>) <input type="checkbox"/> differentiation by "known groups" <input type="checkbox"/> correlation analysis	Gaither & Mason 1992, Gaither 1999, Kahaleh & Gaither 2005 (Kahaleh & Gaither 2007 is the same study), O'Neill & Gaither 2007, Gaither, Kahaleh, Doucette et al. 2008
<i>Michigan Organizational Assessment Questionnaire</i>	Cooke, Hepworth & Wall 1981	N/A (Total not listed)	$\alpha = 0.73$	<input type="checkbox"/> content validity <input type="checkbox"/> predictive criterion validity <input type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity (<i>principal components factor analysis</i>)	McHugh 1999

Name	Source reference	Dimensions: # of items (Total #)	Reliability α : Cronbach's alpha, CR: composite reliability	Validity (method) AVE = Average variance extracted	Included study
				<input checked="" type="checkbox"/> convergent validity <input checked="" type="checkbox"/> discriminant validity <input type="checkbox"/> differentiation by "known groups" <input type="checkbox"/> correlation analysis	

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650 Table 3: Role stress instruments

Sub-type: name	Source reference(s)	Dimensions (Total #)	Reliability α : Cronbach's alpha	Validity (method) AVE = Average variance extracted	Included study
Role ambiguity	Rizzo, House & Lirtzman 1970	N/A (Total 6 items)	$\alpha = 0.85$	<input type="checkbox"/> content validity <input type="checkbox"/> predictive criterion validity <input type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity (exploratory and confirmatory factor analyses) <input checked="" type="checkbox"/> convergent validity <input checked="" type="checkbox"/> discriminant validity <input type="checkbox"/> differentiation by "known groups" <input checked="" type="checkbox"/> correlation analysis (Rizzo, House & Lirtzman 1970: intercorrelations)	Gaither, Kahaleh, Doucette et al. 2008
Role conflict	Mott, Pederson, Doucette et al. 2001; Mott, Doucette, Gaither et al. 2004; Kreling, Doucette, Mott, et al. 2006; Schommer, Pedersen, Gaither et al. 2006; Doucette, Krelin, Schommer et al. 2006	N/A (Total 3 items)	$\alpha = 0.691$	<input checked="" type="checkbox"/> content validity (5 community pharmacy managers and 6 academics) <input type="checkbox"/> predictive criterion validity <input type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity <input type="checkbox"/> convergent validity <input type="checkbox"/> discriminant validity <input checked="" type="checkbox"/> differentiation by "known groups" (ANOVA, t-tests) <input type="checkbox"/> correlation analysis	Perepelkin & Dobson 2010
Role conflict	Rizzo, House & Lirtzman 1970	N/A (Total 7 items)	$\alpha = 0.79$	<input type="checkbox"/> content validity <input type="checkbox"/> predictive criterion validity <input type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity (exploratory and confirmatory factor analyses) <input checked="" type="checkbox"/> convergent validity <input checked="" type="checkbox"/> discriminant validity <input type="checkbox"/> differentiation by "known groups" <input checked="" type="checkbox"/> correlation analysis (Rizzo, House & Lirtzman 1970: intercorrelations)	Gaither, Kahaleh, Doucette et al. 2008
Work-home conflict	Bacharach, Bamberger & Conley 1991	N/A (Total 2 items)	$\alpha = 0.66$	<input type="checkbox"/> content validity <input type="checkbox"/> predictive criterion validity <input type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity (exploratory and confirmatory factor analyses) <input checked="" type="checkbox"/> convergent validity	Gaither, Kahaleh, Doucette et al. 2008

Sub-type: <i>name</i>	Source reference(s)	Dimensions (Total #)	Reliability α : Cronbach's alpha	Validity (<i>method</i>) AVE = Average variance extracted	Included study
				<input checked="" type="checkbox"/> discriminant validity <input type="checkbox"/> differentiation by "known groups" <input checked="" type="checkbox"/> correlation analysis	
Role overload	Bacharach, Bamberger & Conley 1990	N/A (Total 4 items)	$\alpha = 0.85$	<input type="checkbox"/> content validity <input type="checkbox"/> predictive criterion validity <input type="checkbox"/> concurrent criterion validity <input checked="" type="checkbox"/> construct validity <i>(exploratory and confirmatory factor analyses)</i> <input checked="" type="checkbox"/> convergent validity <input checked="" type="checkbox"/> discriminant validity <input type="checkbox"/> differentiation by "known groups" <input checked="" type="checkbox"/> correlation analysis	Gaither, Kahaleh, Doucette et al. 2008

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652 APPENDIX 5: INSTRUMENT CONTENT, OPTIONS & SCORING

653 1. Psychological strain

Sub-type: name	Changed?	Item measures	Answer options	Scoring method	Included articles
Anxiety and depression: <i>Hospital Anxiety and Depression Scale (HADS) questionnaire</i>	Not mentioned	Not reproduced due to copyright. Anxiety - 7 items Depression - 7 items	Anxiety: 1. (0=Not at all, 1=from time to time, occasionally, 2=a lot of the time, 3=most of the time) 2. (0=Not at all, 1=A little, but it doesn't worry me, 2=Yes, but not too badly, 3=Very definitely and quite badly) 3 & 4. (0=Only occasionally, 1=From time to time but not too often, 2=A lot of the time, 3= A great deal of the time) 5. 0=Not at all, 1=Occasionally, 2=Quite often, 3=very often 6. 0=Not at all, 1=Not very much, 2=quite a lot, 3=very much indeed 7. 0=Not at all, 1=Not very often, 2=Quite often, 3=Very often indeed Depression: 1. (0=Definitely as much, 1=not quite as much, 2=only a little, 3=hardly at all) 2. (0=As much as I always could, 1= Not quite so much now, 2=Definitely not so much now, 3=Not at all) 3. 0= Most of the time, 1=Sometimes, 2= Not often, 3=Not at all 4. 0=Not at all, 1=Sometimes, 2=Very often, 3=Nearly all the time 5. 0=I take just as much care as ever, 1=I may not take quite as much care, 2=I don't take so much care as I	For each subscale, a total score 7+ is considered normal, 8-10 is borderline or suggestive of possible anxiety/depression, 11+ is indicative of mood disorder or pathology.	Balayssac, Pereira, Virot et al. 2017

Sub-type: <i>name</i>	Changed?	Item measures	Answer options	Scoring method	Included articles
			should, 3=Definitely 6. 0=As much as ever I did, 1=Rather less than I used to, 2=Definitely less than I used to, 3=Hardly at all 7. 0=Often, 1=sometimes, 2= not often, 3=very seldom		
Burnout: <i>Maslach Burnout Inventory</i>	No	Not reproduced due to copyright. Emotional exhaustion (EE) – 9 items Depersonalization (DP) – 5 items Personal accomplishment (PA) – 8 items <i>(Optional items: fourth factor: Involvement)</i>	0=never, 6=everyday	Low EE & PA, high DP = burnout. See MBI reference charts for better understanding.	Lahoz & Mason 1990; Chui, Look & Mott 2014 (EE subscale only)
Burnout: <i>Turkish Maslach Burnout Inventory</i>	Not mentioned	Ergin 1993	0=never, 4=always	High EE & D, and low PA shows burnout.	Calgan, Aslan & Yegenoglu 2008
Job stress: <i>Health Professions Stress Inventory (HPSI)</i>	Yes, 6 items extracted 30 item measure. Options were also changed from 1=never stressed and 5=frequently stressed.	5. Being interrupted by phone calls or people while performing job duties 20. Not receiving adequate feedback on your job performance 11. Not having enough staff to adequately provide necessary services <i>Not apparent in paper which items these descriptions refer to:</i> Experiencing job policies and procedures which are not enforced consistently	0= does not apply, 4=highly stressful	Means and frequencies	Gaither, Kahaleh, Doucette et al 2008
Work stress: <i>Short form of the Effort- Reward Imbalance Questionnaire (ERI)</i>	No	Effort 1. I have constant time pressure due to a heavy work load 2. I have many interruptions and disturbances while performing my job 3. Over the past few years, my job has become more and more demanding Reward 4. I receive the respect I deserve from my superior or a respective relevant	1=strongly agree, 2=agree, 3=disagree, 4=strongly disagree	Subscales are summed. Higher Effort and Overcommitment subscale scores, and lower Reward subscale scores reflect a more stressful experience	Boyle, Bishop, Morrison et al. 2016

Sub-type: <i>name</i>	Changed?	Item measures	Answer options	Scoring method	Included articles
		person 5. My job promotion prospects are poor 6. I have experienced or I expect to experience an undesirable change in my work situation 7. My job security is poor 8. Considering all my efforts and achievements, I receive the respect and prestige I deserve at work 9. Considering all my efforts and achievements, my job promotion prospects are adequate 10. Considering all my efforts and achievements, my salary/income is adequate Overcommitment 1. I get easily overwhelmed by time pressures at work 2. As soon as I get up in the morning I start thinking about work problems 3. When I get home, I can easily relax and 'switch off' work 4. People close to me say I sacrifice too much for my job 5. Work rarely lets me go, it is still on my mind when I go to bed 6. If I postpone something that I was supposed to do today I'll have trouble sleeping at night			
Work stress: A Shortened Stress Evaluation Tool (ASSET)	Not mentioned	Not reproduced due to copyright. Work relationships - 8 items X. My relationships with colleagues are poor Y. I do not receive the support from others (boss/colleagues) that I would like Work-life balance - 4 items X. I work longer hours than I choose or want to. Overload - 4 items X. I am set unrealistic deadlines Job security - 4 items X. My job is not permanent.	Perceived stressor scales: 6 Likert scale (strongly disagree to strongly agree). Physical & psych health: 4 Likert scale (never, rarely, sometimes, often)	Means and frequencies	Johnson, O'Connor, Jacobs et al. 2014; Jacobs, Hassell, Ashcroft et al. 2013

Sub-type: <i>name</i>	Changed?	Item measures	Answer options	Scoring method	Included articles
		Control - 4 items X. I am not involved in decisions affecting my job. Resources and communication - 4 items X. I am never told if I am doing a good job. Pay and benefits - 1 item 1. My pay & benefits are not as good as other people doing the same or similar work. Aspects of your job - 8 items X. My work is dull and repetitive Psychological health - 11 items X. Constant tiredness Physical health - 6 items X. Headaches			
Work-related stress: <i>Visual analogic scale (VAS, 0-100) or Stress VAS</i>	Not mentioned	Indicate how stressed you feel on the small ruler.	Small, unmarked 100mm ruler with endpoints labelled 'none' and 'as bad as it could be'.	A single subjective stress score is indicated on the ruler. Cut-off threshold for stress is 70/100.	Balayssac, Pereira, Virot et al. 2017
Psychological distress: <i>General Health Questionnaire-28 (GHQ-28)</i>	No; options are different from GHQ-28 however, probably because this study was done in France.	Not reproduced due to copyright. Somatic complaints - 7 items Anxiety and insomnia - 7 items Social dysfunction - 7 items Depression - 7 items	Better than usual Same as usual Less than usual Much less than usual	0-0-1-1 scoring method: 0 is given for lesser two symptom severity options (better than usual/same as usual), 1 for greater two symptom severity options (less than usual/much less than usual). Test result can be expressed as a sum with value between 0-28. Cut-off of 5 was used as threshold for morbidity. 5+: currently having poor mental health; <5: fair to good mental health Total score of 24 and above is classified as psychiatric (although not an absolute cut-off)	Leignel, Schuster, Hoertel et al. 2014

Name	Changed?	Item measures	Answer options	Scoring method	Included articles
JOB SATISFACTION					
<i>Index of Job Satisfaction (Brayfield & Rothe 1951)</i>	Yes, 3 questions extracted; double translated into Lithuanian	1. I feel fairly satisfied with my present job. 2. Most days I am enthusiastic about my work. 3. I find real enjoyment in my work.	Strongly disagree to strongly agree	Means and frequencies	Urbonas & Kubiliene 2015
<i>The Michigan Organizational Assessment Questionnaire Job Satisfaction Subscale</i>	No	1. All in all, to what extent are you satisfied with your job? 2. In general, to what extent do you NOT like your job? 3. In general, to what extent do you like working here?	0=not at all, 1= just a little, 2= a moderate amount, 3= pretty much, 4= quite a lot, 5= a great deal, 6=don't know	Means and frequencies	Chui, Look & Mott 2014
<i>N/A: Bacharach et al. 1991</i>	Not mentioned	How satisfied are you with: 1. Your present job when you compare it to jobs in other organizations? 2. The progress you are making towards the goals you set for yourself in your present organization? 3. The chance your job gives you to do what you are best at? 4. Your present job when you consider the expectations you had when you took the job? 5. Your present job in light of your career expectations?	1=very dissatisfied, 5=very satisfied	Means and frequencies	Gaither 1999, Gaither, Kahaleh, Doucette et al. 2008
<i>Amended version of the Warr-Cook-Wall job satisfaction scale</i>	Yes: crossed out questions were not included in the study. Italicised text was added in the study survey.	Indicate how satisfied or dissatisfied you are with: 1. The physical work conditions 2. The freedom to choose your own method of working 3. Your (<i>colleagues and</i>) fellow workers 4. The recognition you get for good work 5. Your immediate boss 6. The amount of responsibility you are given 7. Your rate of pay 8. Your opportunity to use your abilities 9. Industrial relations between management and workers in your firm 10. Your chance of promotion 11. The way your firm is managed 12. The attention paid to	1= extreme dissatisfaction, 2= very dissatisfied, 3= moderately dissatisfied, 4= not sure, 5= moderately satisfied, 6= very satisfied, 7=extremely satisfied	Values 5-7 were recoded as 1 ("satisfied") and all other values recoded as 0 ("not satisfied"). Means and frequencies	Seston, Hassell, Ferguson et al. 2009

Name	Changed?	Item measures	Answer options	Scoring method	Included articles
		<p>suggestions you make</p> <p>13. Your hours of work</p> <p>14. The amount of variety in your job</p> <p>15. Your job security.</p> <p>16. Patient contact</p> <p>x. Now, taking everything into consideration, how do you feel about your job as a whole?</p>			
<p><i>Minnesota Satisfaction Questionnaire Short Form (Short form MSQ)</i></p>	<p>No, but choices from source are slightly different: 1=very dissatisfied, 2=dissatisfied, 3=neither, 4=satisfied, 5=very satisfied</p>	<p>On my present job, this is how I feel about:</p> <p>1. Being able to keep busy all the time.</p> <p>2. The chance to work alone on the job.</p> <p>3. The chance to do different things from time to time.</p> <p>4. The chance to be "somebody" in the community.</p> <p>5. The way my boss handles his/her workers.</p> <p>6. The competence of my supervisor in making decisions.</p> <p>7. Being able to do things that don't go against my conscience.</p> <p>8. The way my job provides for steady employment.</p> <p>9. The chance to do things for other people.</p> <p>10. The chance to tell people what to do.</p> <p>11. The chance to do something that makes use of my abilities.</p> <p>12. The way company policies are put into practice.</p> <p>13. My pay and the amount of work I do.</p> <p>14. The chances for advancement on this job.</p> <p>15. The freedom to use my own judgment.</p> <p>16. The chance to try my own methods of doing the job.</p> <p>17. The working conditions.</p> <p>18. The way my co-workers get along with each other.</p> <p>19. The praise I get for doing a good job.</p> <p>20. The feeling of accomplishment I get from the job.</p>	<p>Very dissatisfied, Dissatisfied, I can't decide whether I am satisfied or not with this aspect of my job, Satisfied, Very satisfied</p>	<p>Answers to each item coded as equal-interval data; "negative" items recoded so higher scale scores represented higher levels of respective variables. The score for a multi-item scale was the sum of responses to each item in the scale. Raw scores for each MSQ scale can be converted to percentile scores, using the appropriate tables of normative data. An individual's percentile score on any scale gives his relative position in a norm group. Similarity in norm groups should be based on a large number of characteristics such as instruments used, materials used, tasks performed, type of supervision, rate of pay and physical working conditions (otherwise MSQ)</p>	<p>Desselle & Tipton 2001</p>

Name	Changed?	Item measures	Answer options	Scoring method	Included articles
				may be misinterpreted).	
N/A	Yes	Current job as a whole, career advancement, met expectations (not given)	1=very dissatisfied, 5=very satisfied	Means and frequencies	Hardigan & Sangasubana 2010
<i>Shortened version of the "Job Satisfaction Survey"</i>	Not mentioned	Overall job satisfaction, satisfaction with rewards, satisfaction with supervision, satisfaction with workload (not given)	1= low, 6=high	Not reported	McHugh 1999
<i>Job dissatisfaction measure of psychological strain (Caplan, Cobb, French et al. 1975)</i>	No	<i>(From Caplan, Cobb, French et al. 1975: Now we would like you to think about the type of work you do in your job in this company.)</i> 1. Knowing what you know now, if you had to decide all over again whether to take the type of job you have now, what would you decide? 2. If you were the free right now to go into any type of job you wanted, what would your choice be? 3. If a friend of yours told you he/she was interested in working in a job like yours, what would you tell your friend? 4. All in all, how satisfied would you say you are with your job?	1. Decide without hesitation to take the same type of job (1)/ Have some second thought (2)/ Decide definitely not to take this type of job (3). 2. Take the same type of job as now have (1)/ Take a different type of job (2) / Do not want to work (3). <i>(According to Caplan et al. 1975, this last option (3) in this item were assigned a missing data code before computation of inter-item correlations and index construction.)</i> 3. Strongly recommend it (1)/ Have doubts about recommending it (2) / Advise him/her against it (3). 4. Very satisfied (1)/ Somewhat satisfied (2)/ Not too satisfied (3)/ Not at all satisfied (4)	Means and frequencies From Caplan, Cobb, French et al. 1975: These four items were standardised (Z scores) to equalise the very different means and variances because of the different lengths of response scales used in the items. The mean of the standardised scores for the four items were calculated, a constant of 3.3 added to each index score (to ensure all index scores were positive). Values of this index can only be directly compared with other research if the means and standard deviations used to standardise the item scores are known, which are the means 1.52, 1.43. 1.59 and 1.82 respectively, and standard deviations 0.628, 0.496,	Lerkiatbundit 2001

<i>Name</i>	<i>Changed?</i>	<i>Item measures</i>	<i>Answer options</i>	<i>Scoring method</i>	<i>Included articles</i>
				0.643 and 0.778 respectively.	
N/A	Yes, items taken from both sources	8 items, not listed	5 point Likert, not listed	Summing the responses	Gubbins & Rascati 1992
SATISFACTION WITH...					
<i>Satisfaction with My Manager - store manager</i>	Not mentioned.	Not listed – may be the same 12 items as the below scale, except with “My manager” instead of “my supervisor”	1=very dissatisfied, 5=very satisfied	Means and frequencies	Gubbins & Rascati 1992
<i>Satisfaction with My Supervisor Scale (SWMSS) – area pharmacist manager</i>	Yes, 12 items instead of 18: not clear which of these are the items used in the included article.	<ol style="list-style-type: none"> 1. The way my supervisor listens when I have something important to say. 2. The way my supervisor sets clear work goals. 3. The way my supervisor treats me when I make a mistake. 4. My supervisor's fairness in appraising my job performance. 5. The way my supervisor is consistent in his/her behavior toward subordinates. 6. The way my supervisor helps me to get the job done. 7. The way my supervisor gives me credit for my ideas. 8. The way my supervisor gives me clear instructions. 9. The way my supervisor informs me about work changes ahead of time. 10. The way my supervisor follows through to get problems solved. 11. The way my supervisor understands the problems I might run into doing the job. 12. The way my supervisor shows concern for my career progress. 13. My supervisor's backing me up with other management. 14. The frequency with which I get a pat on the back for doing a good job. 15. The technical competence of my supervisor. 16. The amount of time I get to learn a task before I'm moved to another task. 17. The time I have to do the job right. 18. The way my job responsibilities are very clearly defined. 	1=very dissatisfied, 5=very satisfied	Means and frequencies	Gubbins & Rascati 1992
TURNOVER					

Name	Changed?	Item measures	Answer options	Scoring method	Included articles
<i>The Michigan Organizational Assessment Questionnaire 1979, unpublished</i>	Yes, 2 questions extracted	MOAQ_1: I often think of leaving the organization. MOAQ_2: It is very possible that I will look for a new job soon.	5 point scale, Strongly agree to strongly disagree	Items summed	Urbonas, Kubiliene, Kubilius et al. 2015
<i>N/A: Mobley, Horner & Hollingsworth 1978</i>	Not mentioned	How likely is it that you will: 1. Think about leaving your current employer within the next year? 2. Search for another job with another employer within the year? 3. Actually leave your current employer within the next year?	1=very unlikely, 2=moderately unlikely, 3=moderately unlikely, 4=neutral, 5=slightly likely, 6=moderately likely, 7=very likely	Items summed to obtain mean scale score. Likely= very likely, moderately likely, and slightly likely; unlikely=slightly unlikely, moderately unlikely and very unlikely	Gaither & Mason 1992, Gaither 1999, Kahaleh & Gaither 2005 (Kahaleh & Gaither 2007 is the same study), O'Neill & Gaither 2007, Gaither, Kahaleh, Doucette et al. 2008
<i>Michigan Organizational Assessment Questionnaire</i>	Yes	Item number and content not listed	1= low, 6=high	Not reported	McHugh 1999

656

657 **3. Role stress measures**

Sub-type	Changed?	Item measures	Answer options	Scoring method	Included study
Role ambiguity: <i>Rizzo et al</i>	Not mentioned	1. I feel certain about how much authority I have. 2. Clear, planned goals and objectives for my job. 3. I know that I have divided my time properly. 4. I know what my responsibilities are. 5. I know exactly what is expected of me. 6. Explanation is clear of what has to be done.	1=strongly disagree, 7=strongly agree	Items summed	Gaither, Kahaleh, Doucette et al. 2008
Role conflict	Changed options and wording of questions to suit	1. I receive incompatible requests from 2 or more people. 2. I often have to choose between the business and professional aspects of pharmacy. 3. I am required to do things in my job that are against my professional judgement.	1=never, 2=rarely, 3=sometimes, 4=often, 5=always	After CFA, this scale was analysed as part of the "organizational environment role-related experiences" dimension	Perepelkin & Dobson 2010
Role conflict: <i>Rizzo et al</i>	Yes – 7 questions used instead of 8; unclear from study which items	1. I have to do things that should be done differently. 2. I receive an assignment without the manpower to complete it.	1=strongly disagree, 7=strongly agree	Based on CFAs and composite reliabilities, individual items were summed to form scales	Gaither, Kahaleh, Doucette et al. 2008

Sub-type	Changed?	Item measures	Answer options	Scoring method	Included study
	were included. Also, options were changed from original survey from 1=very unlikely, 7=very likely.	3. I have to buck a rule or policy in order to carry out an assignment. 4. I work with two or more groups who operate quite differently. 5. I receive incompatible requests from two or more people. 6. I do things that are apt to be accepted by one person and not accepted by others. 7. I receive an assignment without adequate resources and materials to execute it. 8. I work on unnecessary things.			
Work-home conflict: <i>Bacharach et al</i>	Yes – 2 items extracted from 4 item measure. It is unclear which is the second item used in the Gaither et al. study – items in italics are the possible ones.	1. In general, the demands of work do not interfere with my home, family or social life. (reverse-coded). <i>2. Does the time you spend at work detract from your family or social life?</i> <i>3. Does your work have disadvantages for your family or social life?</i> <i>4. Do you not seem to have enough time for your family or social life?</i>	1=very unlikely, 7=very likely	Based on CFAs and composite reliabilities, individual items were summed to form scales	Gaither, Kahaleh, Doucette et al. 2008
Role overload: <i>Bacharach et al.</i>	Yes – 4 item measure instead of original Bacharach 3 item measure. Remaining item is unknown.	1. I don't have time to finish my job. 2. I'm rushed in doing my job. 3. I have a lot of free time on my job. (reversed)	1= strongly disagree, 7=strongly agree	Based on CFAs and composite reliabilities, individual items were summed to form scales	Gaither, Kahaleh, Doucette et al. 2008

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