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RESEARCH ARTICLE

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Linking interprofessional work to outcomes for employees: A meta-analysis

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ABSTRACT

The aim of this meta-analysis of studies of workers in the health and social care sector was to examine the relationship between interprofessional work and employee outcomes of job stress, autonomy, burnout, engagement, job satisfaction, turnover intention, and perceived service quality, and to examine the influence of different moderators on those relationships. A systematic literature search of the PsycInfo, Embase, Medline, and the Cumulative Index to Nursing and Allied Health Literature databases was conducted to identify relevant articles. A total of 45 articles with results for 53 independent samples was included in the meta-analysis. A random effects model was used to estimate the mean effect sizes (correlations). Most employees were nurses working in hospitals. Interprofessional work was weakly negatively associated with job stress, burnout, and turnover intention (range mean r = −.13 to −.22); and was moderately positively associated with autonomy, engagement, job satisfaction, and perceived service quality (range mean r =.33 to .46). When feasible, interprofessional work was categorized as teamwork (most intensive), collaboration, or cooperation. Teamwork, the most intense of three forms of interprofessional work, promoted lower burnout and turnover intention. The results of this meta-analysis suggest that interprofessional work is linked to better well-being for employees in health and social care.

KEYWORDS
burnout, collaboration, health and social care, meta-analysis, teamwork

1 | INTRODUCTION

Providing good health and social care requires the combined effort of multiple professionals. The importance of interprofessional work has been emphasized in international government policies (Reeves, Lewin, Espin, & Zwarenstein, 2010a), and a number of interventions have been developed to improve interprofessional working relationships at the pre- and post-licensure level (Martin, Ummenhofer, Manser, & Spirig, 2010; Reeves, Perrier, Goldman, Freeth, & Zwarenstein, 2013; Suter et al., 2012). Although systematic reviews of these interventions have proved inconclusive, preliminary findings suggest a positive impact on health outcomes for patients (Martin et al., 2010; Reeves et al., 2013), employees, and organizations (Suter et al., 2012).

The term interprofessional work is used in the present study to refer to teamwork, collaboration, and cooperation, which are separate but related concepts. Teamwork and collaboration share many key dimensions, such as a common understanding of goals; mutual trust and respect; and value of each other's contributions, perspectives, knowledge, and competences (D'Amour, Ferrada-Videla, Rodriguez, & Beaulieu, 2005; Reeves et al., 2010a). Interprofessional work can be seen as a continuum, from cooperation as the lowest intensity, to collaboration, to teamwork as the highest intensity. Teamwork describes close working relationships between team members.

Collaboration is characterized by less intense work relationships while working toward a common goal, and cooperation involves fewer meetings and discussions and less communication (Reeves, Lewin, Espin, & Zwarenstein, 2010b). The three are additive: teamwork requires both collaboration and cooperation between team members, and collaboration requires cooperation. The aim of this meta- analysis was to provide a more definitive look at the relationship between interprofessional work and employee outcomes of job stress, autonomy, burnout, engagement, job satisfaction, turnover intention, and perceived service quality, and to examine the influence of different moderators, including intensity of interprofessional work, on those relationships.

1.1 | Interprofessional work as a resource for employees

Interprofessional working relationships are a job resource for those who provide care and support to clients and patients. The Job Demands-Resources (JD-R) model (Bakker & Demerouti, 2016; Schaufeli & Taris, 2014) is a useful established model that describes the relationship between job resources and job demands, worker well-being (burnout and engagement), and organizational outcomes. Job demands include different job stressors that are related with burnout, while job resources are related to better engagement, support goal-achievement in work, stimulate learning, and buffer the negative effects of job demands. Identifying job resources like interprofessional work, therefore, has implications related to the training of professionals and how health and social services should be organized in order to lead to better outcomes for employees and clients.

According to the JD-R model, burnout and engagement serve as mediators for a variety of individual and organizational outcomes. Burnout is related to absenteeism, turnover intention, organizational commitment, and job performance (Alarcon, 2011; Swider & Zimmerman, 2010), and to poorer employee health (Demerouti & Bakker, 2011). Engagement has shown a positive relationship with organizational outcomes such as productivity, profitability, and customer satisfaction, and alternatively has a negative relationship with turnover and safety incidents (Harter, Schmidt, & Hayes, 2002).

Three meta-analyses using the JD-R model have been completed. The most frequently studied job resources are autonomy in the workplace and social support (Crawford, LePine, & Rich, 2010; Halbesleben, 2010; Nahrgang, Morgeson, & Hofmann, 2011). Teamwork, collaboration, and cooperation were not studied as job resources in the aforementioned meta-analyses or listed as job resources in an overview of job demands and resources provided by Schaufeli and Taris (2014).

1.2 | Organizational outcomes

The JD-R model has been used to predict organizational outcomes such as job safety (Nahrgang et al., 2011), commitment, performance, health, and turnover intention (Halbesleben, 2010). The current meta-analysis will focus on job satisfaction, turnover intention, and perceived service quality, variables of particular interest for the health and social care sector.

Job satisfaction has been found to mitigate turnover among nurses in a review (Lu, Barriball, Zhang, & While, 2012), and among child welfare workers in a meta-analysis (Kim & Kao, 2014). In a systematic review, Lu et al. (2012) examined factors related to job satisfaction, an important consideration given the challenges in the health care sector to recruit and retain nurses (Lartey, Cummings, & Profetto-McGrath, 2014). Kim and Kao (2014) identified turnover as one predictor of turnover intention in a meta-analysis of studies in child welfare services, because of the detrimental impact turnover can have on children and their families. In one review, high turnover rates were related to costs for hospitals due to productivity losses and a reduction in service quality for patients (Hayes et al., 2012). In meta-analyses, job satisfaction has been linked to performance (Judge, Thoresen, Bono, & Patton, 2001), to improved organizational commitment (Lu et al., 2012), and to customer satisfaction and productivity (Blegen, 1993; Harter et al., 2002).

To our knowledge, there is only one previous meta-analysis of the relationship between nurse-physician collaboration and job satisfaction, in which a positive and moderately strong relationship was found (mean r =.37; Zangaro & Soeken, 2007) in a small sample of six studies. In a review of interventions to promote retention among nurses, team-oriented interventions had positive effects on retention in two studies (Lartey et al., 2014).

The aim of this meta-analysis is to summarize and integrate empirical research findings that examined the relationship between interprofessional work (i.e., collaboration, teamwork, and cooperation) and outcomes that are important for employees in the health and social care sector. We decided to focus on health and social care professionals because these professionals often must actively work together to provide for the overall care of individuals. Many countries (e.g., Norway, Sweden, and Finland) are promoting integration of services by co-locating health, mental health, and welfare professionals, in order to improve quality of care. Health care professionals, such as nurses, physicians, or psychologists focus on providing, promoting, or restoring overall health, while social service professionals, such as social workers, and child protection workers focus on improving the welfare of citizens (World Health Organization, 2004).

Figure 1 illustrates the expected links between interprofessional work and the variables examined in the current study. The unidirectional arrows from job demands and resources to worker well-being and to organizational outcomes represent the theoretical relationships of the variables according to the JD-R model. We did not focus on the mediating role of burnout and engagement but only on the relationship of interprofessional work to job stress, autonomy, burnout, engagement, job satisfaction, turnover intention, and perceived service quality as assessed by employees.

2 | METHOD

A meta-analysis is a method to aggregate key findings of quantitative studies and to estimate mean effect sizes for the relationship of selected predictors to various outcomes. In addition, it is possible to

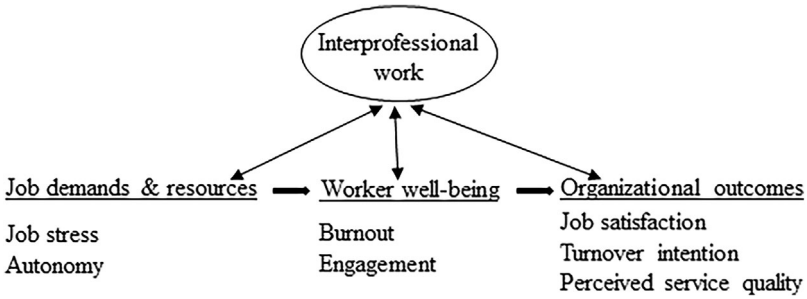

FIGURE 1 An illustration of the conceptual framework used in the current meta-analysis. The unidirectional arrows from job demands & resources to worker well-being and to organizational outcomes represent the theoretical relationship of the variables according to the Job Demands-Resources Model

examine the influence of moderator variables if the variation in effect sizes between studies is significant (Lipsey & Wilson, 2001).

2.1 | Literature search

A systematic literature search in the databases PsycInfo, Embase, and Medline was conducted in March 2016 to find empirical studies of the relationship between interprofessional work and outcome variables among professionals of health and social care services. The Cumulative Index to Nursing and Allied Health Literature (CINAHL) database was searched for articles in June 2017.

The search was adapted to each of the databases and included three steps: In step one, we searched for health and social care professionals such as social workers, child protection workers, nurses, physicians, midwife, counseling, or clinical psychologists. In step two, we searched using the terms collaboration, teamwork, cooperation, interdisciplinary-, or multidisciplinary treatment approach. In step three, we searched for outcome measures such as burnout, engagement, job satisfaction, working conditions, job characteristics, or organizational characteristics. The search yielded 7,775 articles.

References cited in relevant reviews and meta-analyses found during the literature search and in the Cochrane library were searched for articles. This led to the inclusion of five more articles. Screening the reference lists of the included studies and the publication list of two known researchers in the field led to eight more articles, and five papers were found during the literature search. Thus, the search resulted in a total of 7,793 articles.

2.2 | Inclusion criteria

Articles were included in the analysis if they were (a) written in English or German; (b) reported the relationship between different types of interprofessional work (including collaboration, team work, cooperation) and outcomes; (c) were studies of health or social care professionals or institutions; (d) included the specified outcome variables; and (e) provided statistics that could be used in the meta-analysis calculations. Studies were excluded if they focused on the social aspects of relationships between employees (e.g., social support by colleagues or group cohesion) rather than on how employees work together.

All studies meeting the search criteria prior to March 2016 in PsychInfo, Embase, and Medline and prior to June 2017 in CINAHL were examined. Of the 7,793 articles found in the literature search, 45 studies were included in the meta-analysis (Figure 2).

2.3 | Study characteristics

The articles were coded based on the following information: name of the first author, year of publication, country where the study was conducted, response rate, sample size, profession (e.g., nurse, social worker), type of institution (e.g., hospital, school, community mental health services), percentage of women, mean age (years), overall work experience (years), and percentage of full-time workers. Some authors did not report variables like age in mean number of years but the number of participants in different age ranges; in these cases, an approximate mean age was calculated. Overall work experience was based on variables such as (total) years of nursing experience, years of service, years of experience in health care occupation, hospital tenure, or mean tenure.

2.4 | Outcome variables

2.4.1 | Job stress

Job stress refers to "the amount of stress . . . [workers] perceive in relationship to their jobs" (Shader, Broome, Broome, West, & Nash, 2001, p. 213), and is typically experienced when the demands such as workload or time pressure exceed the available individual resources and available social support (Frankenhaeuser, 1991). When multiple variables that fit the label job stress were reported, they were combined before they were entered in the meta-analysis.

2.4.2 | Autonomy

Autonomy at the workplace has been defined as "the degree to which the job provides substantial freedom, independence, and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out" (Hackman & Oldham, 1976, p. 258). In one case, the variable was called "milieu of respect and autonomy" (Lee, Dai, & McCreary, 2015, p. 524), in another "job

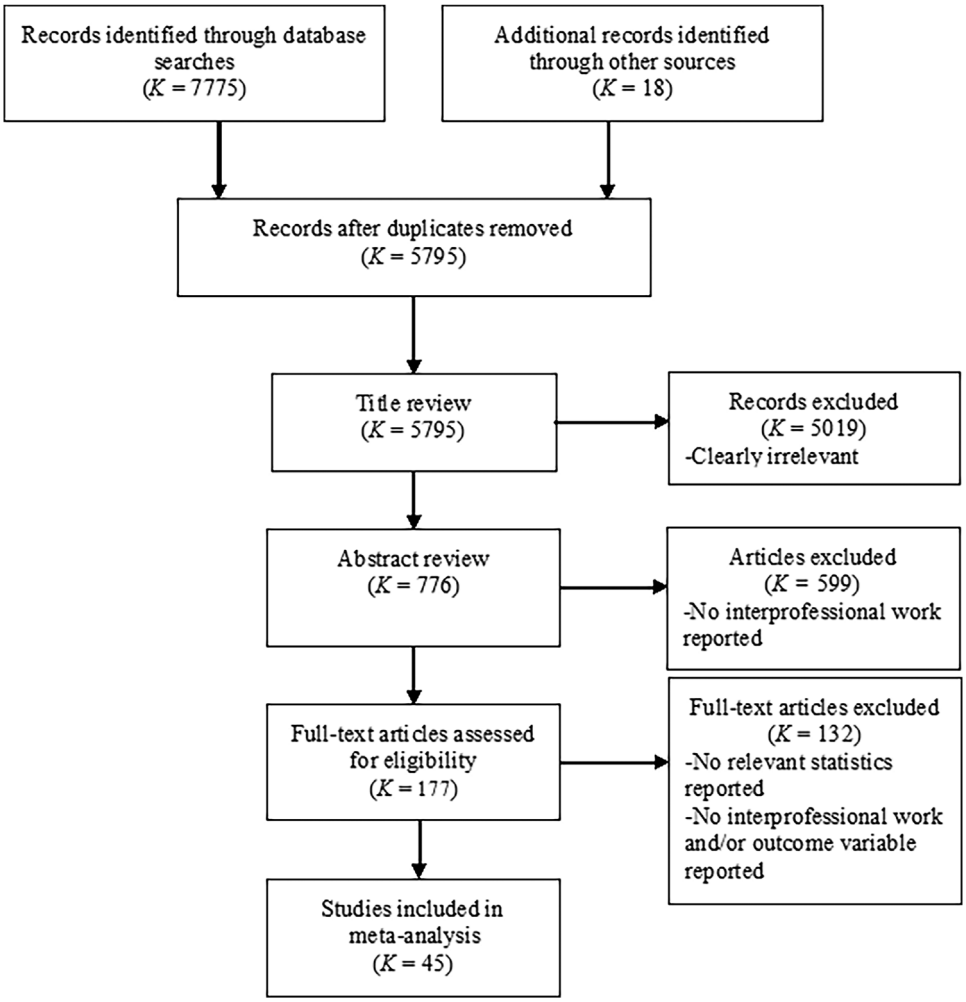

FIGURE 2 Flow diagram of the literature search

control" (Heponiemi, Aalto, Puttonen, Vanska, & Elovainio, 2014, p. 797), and one article reported multiple scales, and the "overall" category was used (Karanikola et al., 2014, p. 474).

2.4.3 | Burnout

Burnout is a psychological syndrome characterized by a high level of emotional exhaustion and depersonalization and a low level of professional accomplishment. People feel emotionally tired and drained, distance themselves cognitively and emotionally from work, and develop feelings of incompetence and reduced productivity (Maslach, Schaufeli, & Leiter, 2001). Emotional exhaustion, depersonalization, and personal accomplishment were most often assessed with the Maslach Burnout Inventory (Maslach, Jackson, & Leiter, 1996). In one case, the Oldenburg Burnout Inventory was used, and job valuation was coded as personal accomplishment and disengagement as depersonalization (Cheng, Bartram, Karimi, & Leggat, 2013). For one article, the correlations between interprofessional work and emotional exhaustion and between interprofessional work and depersonalization was set to .00 because only significant results were reported (Baumgardt, Moock, Rossler, & Kawohl, 2015).

2.4.4 | Engagement

Engagement is a psychological state that consists of three components: dedication, vigor, and absorption. Engagement is characterized by a high energy level, enthusiasm, the willingness to put effort into work, and the ability to focus and fully concentrate on work (Schaufeli, 2013). Engagement was assessed with the Utrecht Work Engagement Scale (Schaufeli & Bakker, 2003). One article reported correlations for two of the three scales, and the results were combined and coded as Engagement.

2.4.5 | Job satisfaction

Job satisfaction has been defined as a "pleasurable emotional state resulting from the appraisal of one's job as achieving or facilitating the achievement of one's job values" (Locke, 1969, p. 316). In most reports, this variable was called job or work satisfaction.

2.4.6 | Turnover intention

This variable includes items or scales that assess the employees' intention to leave the organization, not the profession. Two articles

reported results for the relationship between interprofessional work and intention to stay. The sign of the correlation coefficients were reverse coded.

2.4.7 | Perceived service quality

The variable of perceived service quality is a subjective measure of provider perceptions. The label was used for assessments by employees of quality of care or service. Correlations between different factors or scales of perceived service quality were combined (Begat, Ellefsen, & Severinsson, 2005; Larrabee, Ostrow, Withrow, Janney, & Burant, 2004).

2.5 | Moderator variables

Moderator variables are categorical or continuous variables that may influence the mean effect sizes and explain a part of the between-study variance. In the current study, The continuous moderators were publication year, percentage of women, mean age, overall work experience, and percentage of employees in full-time position. Categorical moderator variables included country where the study was conducted (USA vs. non-USA), institution (hospital vs. non-hospital), profession (nurse vs. non-nurse), and assessment of interprofessional work.

Type of interprofessional work was coded as cooperation, collaboration, or teamwork, based on the description of the scale or wording of items used in the articles. Studies only of nurses asked about their satisfaction or experiences of teamwork or collaboration, both with other nurses and with other professionals at their hospital. Because many articles focused specifically on the working relationship between nurses and physicians, an additional category, called nurse-physician collaboration, was made to distinguish these articles from the rest. Reported correlations between factors or scales of interprofessional work with different professionals and an outcome variable were combined, and the mean correlations were used in the analyses, in order to ensure independent effect sizes in the meta-analysis. Measures of interprofessional work with management or a superior were not included, as we were only interested in work among staff.

2.6 | Coding procedure and inter-rater reliability

The first author coded all studies and consulted with the other authors. The second author coded 10 of the 45 studies (22%) to assess inter-rater reliability. Cohen's kappa was 1.00 for country where study was conducted, .62 for institution, .82 for profession, and .84 for assessment of interprofessional work. The intra-class correlation coefficient (ICC) was .99 for publication year, 1.00 for percentage of women, mean age, and employees in full-time position, .82 for overall work experience, and .89 for response rate. The ICC for the sample size and the correlation coefficients between interprofessional work and job satisfaction, autonomy, turnover intention, and emotional exhaustion were 1.00. The ICC for the correlation coefficients between interprofessional work and perceived service quality was .99. Disagreement was resolved by discussion and consensus.

2.7 | Statistical analyses

SPSS version 23 was used to calculate the descriptive statistics, and the software Comprehensive Meta-analysis (CMA) version 3 was used for the meta-analysis calculations (Borenstein, Hedges, Higgins, & Rothstein, 2007). The analyses were based on the Fisher's *z*-scores that CMA computes based on the entered correlation coefficients. The summary effects of Fisher's *z* were then back-transformed to the summary correlation unit by the software (Borenstein, Hedges, Higgins, & Rothstein, 2009). Effect sizes were classified as small (.10), moderate (.30), and large (.50) based on Cohen's guidelines (Cohen, 1988). Because we assumed that there would be real differences between the studies (e.g., how interprofessional work was assessed), a random effects model was chosen to estimate the mean effect sizes and the corresponding confidence intervals (Borenstein et al., 2009).

A fixed effect model was used to calculate the homogeneity test (*Q*; Borenstein et al., 2009). A significant *Q* indicates that there are real differences between studies that can be explained by moderator variables (Hedges & Olkin, 1985). The I^2 index is the proportion of true variance that is not due to sampling error (Borenstein, Higgins, Hedges, & Rothstein, 2017). Mixed-effects analyses were used for moderator analyses with categorical variables. A significant total between *Q*-value (Q_B) indicates true differences in the effect sizes between the subgroups (Borenstein et al., 2009). Meta-regression analyses were used for continuous moderators, using a random effects model with full maximum likelihood estimation and Knapp–Hartung adjustment, which is recommended for analyses with small sample sizes (Hartung, Knapp, & Sinha, 2008). Outlier and influence diagnostics were based on the studentized residuals, Cook's distance, and visual inspection of the scatterplot (Viechtbauer & Cheung, 2010).

Sensitivity analyses were conducted using the one study removed method to examine the impact of individual studies on the overall mean effect size for each outcome (Borenstein et al., 2009). Duval & Tweedie's (2000) trim and fill sensitivity analysis was used to estimate the number of missing studies and the impact that they would likely have on the effect size and confidence interval for each outcome (Duval, 2006).

3 | RESULTS

3.1 | Study characteristics

The 45 articles were reports of results for 53 independent samples. Articles were published between 1990 and 2016 ($M = 2007$; $SD = 6.22$). Most samples were from the USA ($K = 18$); other nations with multiple samples were Canada, Australia, and England ($K = 4$ each), Norway and Italy ($K = 3$ each), and Germany, Finland, and Switzerland ($K = 2$ each). The combined sample size was 42,354. Most samples were from hospitals ($K = 42$); seven were from schools, clinics,

doctor's practice, child welfare services, and other services in the community, and four were of employees who worked at multiple sites, including at least one hospital.

Nurses were most frequently studied ($K = 39$), followed by non-nurses including social workers, physicians, mental health professionals ($K = 7$), and mixed samples that included nurses ($K = 7$). About 82% of the participants were female ($K = 35$, $SD = 17.05$), with a mean age of 39.27 years ($K = 43$, $SD = 5.53$), and an overall work experience of 13.62 years ($K = 32$, $SD = 5.01$). About 74% of the employees were full-time workers ($K = 19$, $SD = 16.74$).

Interprofessional work was most frequently assessed as nurse-physician collaboration ($K = 21$) followed by teamwork ($K = 14$), collaboration ($K = 12$), and cooperation ($K = 4$). The mean response rate was 61% ($K = 49$, $SD = 19.61$). Table 1 presents the study characteristics for all studies in the meta-analysis.

3.2 | Pooled effect sizes

Table 2 presents the mean effect sizes for the effect of interprofessional work on the outcome variables. All mean correlations between interprofessional work and the outcomes were significant. The highest mean correlations were found between interprofessional work and perceived service quality (mean $r = .46$), and between interprofessional work and autonomy (mean $r = .38$). The homogeneity test was significant for all analyses, except for personal accomplishment, indicating the need for moderator analyses.

3.3 | Moderator analyses

Moderator analyses were conducted for outcome variables with significant heterogeneity.

3.3.1 | Categorical variables

Moderator analyses were calculated for categorical variables with at least three studies per subgroup (Table 3). Of the 17 analyses, five were significant. One type of interprofessional work was a significant moderator for the correlations with emotional exhaustion ($Q_B = 15.72$, $p < .001$), depersonalization ($Q_B = 17.83$, $p < .001$), and turnover intention ($Q_B = 9.43$, $p = .002$). Teamwork as a type of interprofessional work had higher negative mean correlations with these three outcomes than did nurse-physician collaboration. Other types of interprofessional work (i.e., other collaboration and cooperation) were not included due to the limited number of studies. The mean effect size for the correlation of interprofessional work with perceived service quality was higher for studies from the USA compared to studies from other countries ($Q_B = 5.95$, $p = .015$), and for employees working at hospitals compared to employees working at other institutions ($Q_B = 9.23$, $p = .002$).

3.3.2 | Continuous variables

Meta-regression analyses were conducted for continuous moderator variables included in least four studies. Out of the 38 analyses that were carried out, four were significant. Two moderators, publication year and overall work experience, did not predict any effect sizes.

The mean age of the employees was significantly associated with the mean effect size for interprofessional work and turnover intention ($K = 10$, $b_1 = -0.02$, $t = -2.72$, $p < .05$, R^2 analog = .60), and the relationship became stronger when one study with a large Cook's distance (Lee et al., 2015) was excluded from the analysis ($K = 9$, $b_1 = -0.03$, $t = -4.92$, $p < .01$, R^2 analog = 1.00). There was a positive relationship between the percentage of women in a sample and the correlation between interprofessional work and engagement ($K = 5$, $b_1 = 0.03$, $t = 5.13$, $p < .05$, R^2 analog = 1.00). Mean age moderated the correlation between interprofessional work and job stress ($K = 11$, $b_1 = -0.04$, $t = -2.83$, $p < .05$, R^2 analog = .56). The mean effect size for interprofessional work and autonomy was moderated by the percentage of full-time workers in the sample ($K = 4$, $b_1 = -0.01$, $t = -6.60$, $p < .05$, R^2 analog = 1.00). In this analysis, although there was one study with a large Cook's distance (Roulin, Mayor, & Bangerter, 2014), the analysis could not be conducted without it because of the small number of reports of percentage of full-time workers.

3.4 | Sensitivity analyses

The results of the one-study-removed sensitivity analyses, which estimates a mean effect size excluding one study at a time, indicated that the findings were relatively stable for the different outcomes. The biggest change in the mean effect sizes were found for the correlations between interprofessional work and engagement and interprofessional work and perceived service quality (mean $r = .33$ and .46, respectively). The range of the estimated mean r varied from .29 to .38 and from .39 to .48, respectively, depending on which study was excluded from the analysis.

The trim and fill method was used to estimate missing studies for seven of the nine outcomes. The effect sizes for interprofessional work and autonomy, depersonalization, and engagement were missing one study each, interprofessional work and emotional exhaustion and personal accomplishment two, and the effect sizes for interprofessional work and intention to leave were missing three studies. The effect size for interprofessional work and job satisfaction were missing four studies. The changes in the adjusted point estimates and corresponding confidence intervals were generally small compared to the observed estimates and did not alter the conclusions (Sutton, 2006; Sutton, Duval, Tweedie, Abrams, & Jones, 2000). As an example, the adjusted effect size for interprofessional work and job satisfaction was $r = .39$ (95%CI [.33, .45]) compared to the observed statistics of mean $r = .36$ (95%CI [.30, .42]).

4 | DISCUSSION

The aim of this meta-analysis was to examine the relationship between interprofessional work, that is, teamwork, collaboration, and cooperation, of employees in the health and social care sector and variables that are related to the Job Demands-Resources (JD-R) model. Another

TABLE 1 Characteristics of studies included in the meta-analysis

Author, date	Country	Institution	Profession (*N*)	Categorization of interprofessional work	Outcome measures
Adams and Bond (2000)	England	Hospital	Nurses (*N* = 834)	Collaboration	-Job satisfaction
Baggs and Ryan (1990)	USA	Hospital	Nurses (*N* = 68)	-Nurse–physician collaboration	-Job satisfaction
Baumgardt et al. (2015)	Switzerland	Doctor's practice	Psychiatrists (*N* = 352)	-Cooperation (quality; 1 very good to 5 unsatisfying)	-Perceived service quality (patient care) -Job satisfaction (global item) -EE, PA, and depersonalization
Begat et al. (2005)	Norway	Hospital	Nurses (*N* = 71)	-Collaboration	-Perceived service quality (patient-oriented care and the desire to provide high-quality care)
Blake, Leach, Robbins, Pike, and Needleman (2013)	USA	Hospital	Nurses (*N* = 415)	-Collaboration	-Turnover intention (intention to leave)
Bratt, Broome, Kelber, and Lostocco (2000)	USA and Canada	Hospital	Nurses (*N* = 1,728)	-Nurse-physician collaboration	-(Professional) job satisfaction -Job stress
Brunetto et al. (2013)	Australia	Hospital	Nurses (*N* = 510)	-Teamwork	-Engagement -Turnover intention
	USA	Hospital	Nurses (*N* = 718)	-Teamwork	-Engagement -Turnover intention
Byers, Mays, and Mark (1999)	USA	Army primary care clinics	Mixed (physicians and nurses, *N* = 58)	-Collaboration	-Autonomy -Job satisfaction
Caselman and Brandt (2007)	USA	School	Social workers (*N* = 48)	-Collaboration (1 = excellent to 4 = poor)	-Turnover intention (intent to stay)
Chaboyer, Najman, and Dunn (2001)	Australia	Hospital	Nurses (*N* = 555)	-Collaboration	-PA (job valuation)
Chaboyer, Williams, Corkill, and Creamer (1999)	Australia	Hospital	Nurses (*N* = 135)	-Collaboration	-Job satisfaction
Cheng et al. (2013)	Australia	Hospital	Nurses (*N* = 201)	-Teamwork	-EE -Perceived service quality (quality of care, socio and tech) -Turnover intention -Depersonalization (disengagement)
Decker (1997)	USA	Hospital	Nurses (*N* = 376)	-Mixed	-Job satisfaction
Foley, Kee, Minick, Harvey, and Jennings (2002)	USA	Hospital	Nurses (*N* = 103)	-Nurse–physician collaboration	-Autonomy
Galletta, Portoghese, Carta, D'Aloja, and Campagna (2016)	Italy	Hospital	Nurses (*N* = 1,024)	-Nurse–physician collaboration	-Job satisfaction -Turnover intention
Galletta, Portoghese, Battistelli, and Leiter (2013)	Italy	Hospital	Nurses (*N* = 832)	-Nurse–physician collaboration	-Turnover intention
Gevers, van Erven, de Jonge, Maas, and de Jong (2010)	Netherlands	Hospital	Mixed (nurses, and physicians, *N* = 48)	-Teamwork	-Job stress (chronic cognitive- and emotional demands)
Hamric and Blackhall (2007)	USA	Hospital	Physicians (*N* = 29),	-Collaboration	-Perceived service quality (satisfaction with quality of care)
	USA	Hospital	Nurses (*N* = 106)	-Collaboration	-Perceived service quality

(Continues)

TABLE 1 (Continued)

Author, date	Country	Institution	Profession (*N*)	Categorization of interprofessional work	Outcome measures
					(satisfaction with quality of care)
	USA	Hospital	Nurses (*N* = 90)	-Collaboration	-Perceived service quality (satisfaction with quality of care)
Havens, Vasey, Gittell, and Lin (2010)	USA	Hospital	Nurses (*N* = 747)	-Collaboration	-Perceived service quality (quality of patient care)
Heponiemi et al. (2014)	Finland	Mixed setting	Physicians (*N* = 2,776)	-Teamwork	-Job stress (time pressure and patient-related stress) -Autonomy (job control) -Job satisfaction
Karanikola et al. (2014)	Italy	Hospital	Nurses (*N* = 566)	-Nurse-physician collaboration	-Job satisfaction -(Overall) autonomy -Turnover intention (intention to quit)
Kivimäki et al. (2007)	Finland	Hospital	Mixed (hospital staff, *N = 5,098)*	- Teamwork	-Turnover intention (intention to leave)
Kruzich, Mienko, and Courtney (2014)	USA	Child welfare	Public child welfare workers (*N* = 1,040)	- Teamwork	-Turnover intention (intention to stay)
Kudo et al. (2006)	Japan	Hospital	Nurses (*N* = 168)	-Cooperation	-Turnover intention
Larrabee et al. (2004)	USA	Hospital	Nurses (*N* = 90)	-Nurse-physician collaboration	-Job satisfaction
Laschinger, Almost, and Tuer-Hodes (2003)	Canada	Hospital	Nurses (*N* = 233)	-Nurse-physician collaboration	-Job satisfaction
		Hospital	Nurses (*N* = 263)	-Nurse-physician collaboration	-Job satisfaction
		Hospital	Nurses (*N* = 55)	-Nurse-physician collaboration	-Job satisfaction
Laubach, Milch, and Ernst (1999)	Germany	Hospital	Nurses (*N* = 134)	-Cooperation	-Job stress (stress due to work conditions and patients)
Lee et al. (2015)	Taiwan	Hospital	Nurses (*N* = 1,283)	-Teamwork	-Autonomy (milieu of respect and autonomy) -Turnover intention (intention to leave the organization) -Perceived service quality (nursing staffing and patient care)
Leiter and Laschinger (2006)	Canada	Hospital	Nurses (*N* = 8,597)	-Nurse-physician collaboration	-EE, PA, and depersonalization -Perceived service quality (nursing model)
Manojlovich (2005)	USA	Hospital	Nurses (*N* = 284)	-Nurse-physician collaboration	-Job satisfaction
Martinussen, Kaiser, Adolfsen, Patras, and Richardsen (2016)	Norway	Different community health services	Mixed (mostly health professionals including nurses, *N* = 118–122)	-Collaboration	-Job stress (workload) -Autonomy -EE -Engagement -Perceived service quality -Job satisfaction
Martinussen, Adolfsen, Lauritzen, and Richardsen (2012)	Norway	Different community health services	Mostly health professionals with only a few nurses (*N* = 146–151)	-Collaboration	-Job stress (workload) -Autonomy -EE -Engagement -Perceived service quality
Maylone, Ranieri, Griffin, McNulty, and	USA	Mixed setting	Nurses (*N* = 99)	-Collaboration	- Autonomy

(Continues)

TABLE 1 (Continued)

Author, date	Country	Institution	Profession (*N*)	Categorization of interprofessional work	Outcome measures
Fitzpatrick (2011)					
Mijakoski et al. (2015)	Croatia	Hospital	Nurses (*N* = 138)	-Teamwork	-EE and depersonalization -Job stress (emotional- and cognitive demands)
	Macedonia	Hospital	Nurses (*N* = 185)	-Teamwork	-EE and depersonalization -Job stress (emotional- and cognitive demands)
Montgomery, Spanu, Beban, and Panagopoulou (2015)	Seven European countries	Hospital	Nurses (*N* = 1,156)	-Teamwork	-Job stress (workload and emotional demands) -EE and depersonalization -Engagement (vigor and dedication)
Nolting, Grabbe, Genz, and Kordt (2006)	Germany	Hospital	Nurses (*N* = 454)	-Nurse-physician collaboration	-Turnover intention (intention to leave the organization)
Onyett, Pillinger, and Muijen (1997)	UK	Community mental health teams	Mixed (mental health professions including nurses, *N* = 445)	-Teamwork	-EE, PA, and depersonalization -Job satisfaction
Ouzouni and Nakakis (2009)	Greece	Hospital	Nurses (*N* = 85)	-Nurse-physician collaboration	-Stress -Job satisfaction
Rafferty et al. (2001)	England	Hospital	Nurses (*N* = 5,006)	-Nurse-physician collaboration	-Autonomy -EE -Job satisfaction -Perceived service quality (perceived quality of care)
Roulin et al. (2014)	Switzerland	Mixed setting	Nurses (*N* = 1,547)	-Nurse-physician collaboration	-EE, PA, and depersonalization -Autonomy -Job satisfaction -Turnover intention (intent to leave)
Sakowski (2012)	Poland	Mixed setting	Nurses (*N* = 200)	-Cooperation	-Job satisfaction
Shannon et al. (2002)	USA	Hospital	Nurses (*N* = 518)	-Nurse-physician collaboration (assessed by nurses)	-Perceived service quality (nurses assessed views on quality and patient satisfaction) -(Nurses) job satisfaction
			Physicians (*N* = 515)	-Nurse-physician collaboration (assessed by physicians)	-Perceived service quality (physicians assessed views on quality and patient satisfaction)
So, West, and Dawson (2011)	Hong Kong	Hospital	Mixed (hospital staff, *N = 197)*	-Teamwork	-Job stress (work stress) -Autonomy -Job satisfaction
	England	Hospital	Mixed (hospital staff, *N = 273)*	-Teamwork	-Job stress (work stress) -Autonomy -Job satisfaction
van Bogaert, Kowalski, Weeks, van Heusden, and Clarke (2013)	Belgium	Hospital	Nurses (*N* = 1,201)	-Nurse-physician collaboration	-Job stress (workload) -EE, PA, and depersonalization -Perceived service quality (nurse-assessed quality of care)
van der Doef et al. (2012)	Kenya, Tanzania, and Uganda	Hospital	Nurses (*N* = 305)	-Cooperation	-Job stress (workload) -Job satisfaction -EE, PA, and depersonalization

Categorization of Interprofessional work, categories used in the moderator analyses; EE, emotional exhaustion; PA, personal accomplishment.

TABLE 2 Relationships between interprofessional work and predictors and outcomes in meta-analysis

Variable	*K*	*N*	Mean *r* interp. work	95%CI	*Q*	I^2
Demands and resources						
Job stress	13	5,841	−.13	−.23 to −.02	170.76*	92.97
Autonomy	11	9,400	.38	.31 to .45	89.46*	88.82
Worker well-being						
Emotional exhaustion	13	19,524	−.22	−.26 to −.18	51.69*	76.78
Depersonalization	10	14,250	−.17	−.22 to −.11	52.60*	82.89
Personal accomplishment	6	12,447	.15	.13 to .17	3.47	0.00
Engagement	5	2,775	.33	.22 to .42	28.46*	85.94
Organizational outcomes						
Job satisfaction	25	15,321	.36	.30 to .42	372.97*	93.57
Turnover intention	14	13,904	-.21	−.25 to −.17	60.97*	78.68
Perceived service quality	15	18,984	.46	.33 to .57	1,127.69*	98.76

K, number of samples; *N*, total sample size; interp. work, interprofessional work; 95%CI, 95% confidence interval; *Q*,test for homogeneity; I^2, percent of true heterogeneity.
*$p < .001$.

aim was to explain some of the variation between studies using moderator analyses.

The literature search lead to 45 articles with a total of 53 independent samples that were included in the meta-analysis. Most were studies of nurses working in hospitals. Only seven samples did not include nurses. Other health and social care professionals, such as physicians and psychologists or social workers and child protection workers, rarely were studied, perhaps because those professions are less likely to work in groups, as nurses do in a hospital unit. It may also be that professionals working in other services outside hospitals, like doctor's practices or family's houses, are more difficult to recruit. However, because those professions often depend on or complement each other in their work, examining how they experience interprofessional work might be important in order to improve our overall understanding of the role they play as a job resource and in treatment outcomes. Therefore, more research about the importance of interprofessional work for professions other than nurses and workers in other settings than hospitals is clearly needed.

4.1 | Primary outcomes

Overall, the direction and strength of the relationship between interprofessional work and the outcome variables was in accordance with the JD-R model. In general, the mean correlations between interprofessional work and positive personal outcomes were stronger than between interprofessional work and negative outcomes. Interprofessional work was weakly negatively associated with job stress, burnout, and turnover intention, and moderately positively correlated with autonomy, engagement, perceived service quality, and job satisfaction.

The strongest positive relationship was between interprofessional work and how the employees evaluated the quality of the service they provided. Interprofessional work appears to be important for both patients or clients of health care services and for the professionals who deliver those services. Job resources are "physical, social, or organizational aspects of the job that may do any of the following: (a) be functional in achieving work goals; (b) reduce job demands at the associated physiological and psychological costs; and (c) stimulate personal growth and development" (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001, p. 501). The current meta-analysis suggests that interprofessional work is linked to important individual and organizational outcomes for professionals and that interprofessional work should be recognized as a job resource.

As we stated in the introduction, cooperation, collaboration, or teamwork have not explicitly been identified as job resources (Schaufeli & Taris, 2014). It would have therefore been ideal to examine the impact of these concepts individually on the study outcomes, but we could not run these as separate analyses due to the small number of studies of some concepts. As a result, we chose to rely on the general concept of interprofessional work, with the understanding that these results are open to further refinement in the future. That said, the measures assess aspects of the same construct, that is, how professionals evaluate their work relationship with other professionals in order to fulfill work-related tasks. Although it remains to be seen which is most important for improving outcomes, these results support efforts to increase cooperation, collaboration, and teamwork by training health care professionals and ensure that there are time and systems in place to promote effective interprofessional work.

The second strongest correlation was the positive relationship between interprofessional work and autonomy. Rafferty, Ball, and Aiken (2001) explained the strong association between teamwork and autonomy as a synergistic effect between the two variables. It could be that people with a higher degree of freedom to make decisions and shape their daily work consult with, and receive advice from,

TABLE 3 Categorical moderators of correlations between interprofessional work and predictors and outcomes

Variable	Q_B	*K*	*N*	Mean *r* interp. work	95%CI	*Q*	I^2
Demands and resources							
Job stress							
Interprof. work	0.01						
Nurse-physician		3	3,014	−.18	−.42 to −.09	84.16****	97.62
Teamwork		6	2,120	−.19	−.25 to −.13	7.72	35.24
Autonomy							
Country	0.04						
Non-USA		8	9,140	.40	.33 to .46	55.84****	87.46
USA		3	260	.35	−.13 to .70	31.30****	93.61
Institution	0.00						
Non-hospital		3	326	.40	.21 to .55	6.53**	69.36
Hospital		6	7,428	.39	.35 to .44	13.58**	63.18
Interprof. work	0.18						
Collaboration		3	326	.40	.21 to .55	6.53**	69.36
Nurse-physician		5	7,321	.39	.27 to .49	71.67****	94.42
Teamwork		3	4,529	.36	.27 to .44	5.51	63.68
Worker well-being							
Emotional exhaustion							
Institution	0.00						
Non-hospital		4	1,065	−.23	−.40 to −.04	25.92****	88.42
Hospital		8	16,912	−.23	−.26 to −.19	23.95***	70.77
Interprof. work	15.72****						
Nurse-physician		4	16,351	−.20	−.23 to −.17	9.41**	68.11
Teamwork		5	2,248	−.30	−.34 to −.26	0.73	0.00
Depersonalization							
Interprof. work	17.83****						
Nurse-physician		3	11,345	−.14	−.18 to −.09	5.93*	66.28
Teamwork		5	2,248	−.26	−.29 to −.22	3.57	0.00
Organizational outcomes							
Job satisfaction							
Country	0.84						
Non-USA		18	12,199	.33	.28 to .38	116.78****	85.44
USA		7	3,122	.44	.20 to .62	238.92****	97.49
Institution							
Non-hospital	0.33	4	975	.41	.22 to .57	27.14****	88.94
Hospital		19	12,599	.35	.28 to .43	335.24****	94.63
Interprof. work	0.36						
Collaboration		5	1,702	.35	.27 to .42	8.55	53.23
Nurse-physician		14	11,671	.38	.28 to .46	324.89****	96.00
Teamwork		3	915	.32	.08 to .53	28.37****	92.95
Turnover intention							
Country	0.00						
Non-USA		10	11,683	−.21	−.25 to −.17	30.22****	70.22
USA		4	2,221	−.21	−.35 to −.06	30.58****	90.19

(Continues)

TABLE 3 (Continued)

Variable	Q_B	*K*	*N*	Mean *r* interp. work	95%CI	*Q*	I^2
Interprof. work	9.43***						
Nurse-physician		5	4,423	−.18	−.20 to −.15	2.01	0.00
Teamwork		6	8,850	−.26	−.30 to −.21	16.55***	69.78
Perceived service quality							
Country	5.95**						
Non-USA		9	16,979	.27	.14 to .39	448.01****	98.21
USA		6	2,005	.70	.39 to .86	438.00****	98.86
Institution	9.23***						
Non-hospital		3	620	.26	.18 to .33	0.21	0.00
Hospital		12	18,364	.50	.37 to .62	1,103.51****	99.00
Profession	0.81						
Non-nurse		4	1,044	.65	.01 to .91	389.22****	99.23
Nurse		10	17,820	.39	.27 to .50	528.25****	98.30
Interprof. work	0.50						
Collaboration		6	1,240	.49	.32 to .64	46.99****	89.36
Nurse-physician		5	15,837	.58	.37 to .74	966.15****	99.59

Q_B, test for subgroup differences; *K*, number of samples; *N*, total sample size; Mean *r* collab., mean *r* collaboration; 95%CI, 95% confidence interval; *Q*, test for homogeneity; I^2, percent of true heterogeneity; Interpr. work, interprofessional work; Nurse-physician, nurse-physician collaboration. Results are reported for categorical variables with at least three studies included in at least two subgroups.

*$p = .052$.

**$p < .05$.

***$p < .01$.

****$p < .001$.

colleagues more often. It could also be that employees who work autonomously benefit more from interprofessional work and that they try to establish good working relationships in order to exchange knowledge and get support from colleagues.

The third strongest association, and the most extensively studied, was the positive relationship between interprofessional work and job satisfaction, reported in 23 of 43 articles with 25 independent samples. The estimated effect size was the same as that found by Zangaro and Soeken (2007), whose results were based on only six studies.

The strongest negative relationship was found between interprofessional work and the main dimension of burnout: emotional exhaustion. Interest in the relationship of interprofessional work and burnout is relatively new. The first reported results for emotional exhaustion appeared in 1997, followed by two studies in 2001 and 2006, and nine articles published after 2011. The results from the present study replicate the relationship between the job resources of social support and safety climate and burnout in health care personnel, as found in a meta-analysis by Nahrgang et al. (2011). In their meta-analysis, however, Nahrgang et al. (2011) variable for burnout included depression, anxiety, health, and stress, while burnout was most often assessed using the Maslach Burnout Inventory in the current meta-analysis.

Engagement is a relatively new concept compared to burnout, and the studies of the relationship with interprofessional work were all published after 2011. None of these were conducted in the USA. Compared to other job resources examined in other meta-analyses, the strength of the relationship between interprofessional work and engagement was about the same as between engagement and social support, autonomy, or feedback (Crawford et al., 2010; Halbesleben, 2010).

4.2 | Moderators

In general, there was a high amount of true variance between the studies. This does not seem to be unusual as two out of the three meta-analyses that used the JD-R model reported comparable results (Crawford et al., 2010; Halbesleben, 2010). Unfortunately, no previous meta-analyses reported moderator analyses to examine the sources of this variation. Although we conducted multiple categorical moderator analyses, there were only five significant results; three of these were based on the different ways that interprofessional work was assessed. Effect sizes were larger for teamwork and elements of burnout (emotional exhaustion and depersonalization), and teamwork and turnover intention, compared to the effect sizes for nurse-physician collaboration. These results suggest that teamwork is more important for the prevention of burnout and turnover. The type of interprofessional work did not produce significant differences in effect sizes for the outcomes of job stress, autonomy, job satisfaction, or perceived service quality.

Attitudes and norms of interprofessional work might not only vary between different professions within a country but also between countries. For example, there may be a stronger hierarchical relationship between nurses and physicians in Germany, compared to the Scandinavian countries or the USA, as indicated by Hofstede's (1991) power distance index. Because of the limited number of studies, we could only test four of the nine outcomes (autonomy, job satisfaction, turnover intention, and perceived service quality) for differences between the USA and countries that are not the USA. Differences were only found in the mean correlation of interprofessional work and perceived service quality. The mean correlation was more than twice as high for studies from the USA compared to those not from the USA. The studies from the USA that reported this outcome were conducted using either nurse or physician samples. These findings underline the importance in the USA of interprofessional working relationships in how the employees rate the quality of service they provide.

A stronger relationship between interprofessional work and turnover intention was found for younger workers compared to older ones. Similarly, Kim and Kao (2014) found a negative, small relationship between age and turnover intention among child welfare workers but concluded that the effect of demographic predictors was small and negligible, especially when compared to the other variables they examined (e.g., emotional exhaustion).

4.3 | Limitations

The majority of included studies were of female nurses who worked in hospitals, and one could question if those findings are also valid for other health or social care professionals, such as social or child protection workers, physicians, or midwives and those working in other institutions than hospitals. The vast majority of included studies in the meta-analyses were cross-sectional. Studies with a longitudinal design would be desirable in order to explore the possible causal links and the direction of the relationship between interprofessional work and other important variables. Furthermore, the studies' findings were based on self-report measurements that were filled in by the employees, which may result in reporter bias. Another source of potential bias is the variety of questionnaires used to assess interprofessional work.

The categorization of interprofessional work in teamwork, collaboration, nurse-physician collaboration, and cooperation was sometimes problematic, as they share many key dimensions. On the homepage of the Journal of Interprofessional Care is a statement that there is an "ongoing terminological uncertainty within the interprofessional field." Authors using these concepts do not always give a clear definition of their content. As mentioned above, however, the measures do assess aspects of the same construct, that is, how professionals assess their work relationship with other professionals in order to fulfill work-related tasks.

Some moderator analyses could not be conducted because there were too few studies. It would have been interesting to examine, for example, if there are differences for different professionals in the relationship between interprofessional work and perceived service quality ratings, as indicated by Shannon, Mitchell, and Cain (2002). The moderator analyses were also based on a relatively small number of studies. This leads not only to low power and unreliable estimates but a strong influence of individual studies on the results, as shown in the meta-regression analyses (López-López, Marín-Martínez, Sánchez-Meca, Van den Noortgate, & Viechtbauer, 2014). Because of this potential for overly influential studies, the findings were reported with and without those studies included in the meta-regression. Another limitation of our approach is that the large number of analyses can increase the risk of the incorrect rejection of the null hypothesis due to chance (Bender et al., 2008; Imberger, Vejlby, Hansen, Moller, & Wetterslev, 2011).

5 | CONCLUSION

Job resources are important for the health and well-being of employees because they temper the negative effects of job demands, promote work engagement, and produce positive organizational outcomes. The results of this study suggest that interprofessional work (teamwork, collaboration, cooperation) is linked to important outcomes for employees working in the health and social care sector. As expected, interprofessional work was negatively related to job stress, burnout, and turnover intention and positively related to autonomy, engagement, job satisfaction, and perceived service quality. Treating interprofessional work as a job resource has implications for training of professionals and the organization of health and social services, in order to lead to better outcomes for employees and clients. The findings underline the importance of measures or interventions that promote interprofessional working relationships at the pre- and post-licensure levels. Additional research is needed to examine their impact on effectiveness, but in the meantime, health and social care organizations should ensure that systems are in place that promote interprofessional work.

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CONFLICTS OF INTEREST

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

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