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Author(s): Niskala, Jenni; Kanste, Outi; Tomietto, Marco; Miettunen, Jouko; Tuomikoski, Anna-Maria; Kyngäs, Helvi; Mikkonen, Kristina

Title: Interventions to improve nurses' job satisfaction : a systematic review and meta-analysis

Year: 2020

Version: Final draft

Please cite the original version:

Niskala, J., Kanste, O., Tomietto, M., Miettunen, J., Tuomikoski, A.-M., Kyngäs, H. & Mikkonen, K. (2020). Interventions to improve nurses' job satisfaction: a systematic review and meta-analysis. *Journal of Advanced Nursing*, 04 March 2020.

<https://doi.org/10.1111/jan.14342>



Article type: Review Article

Title: Interventions to improve nurses' job satisfaction: A systematic review and meta-analysis

A short running title: Nurses' job satisfaction

Running head: NISKALA ET AL.

Authors:

First author: JENNI NISKALA, Student, Research Unit of Nursing Science and Health Management, University of Oulu, Oulu, Finland, Email: jeniskal@student.oulu.fi, ORCID: <https://orcid.org/0000-0001-5599-9016>

Second author: OUTI KANSTE, Adjunct professor, Research Unit of Nursing Science and Health Management, University of Oulu, Oulu, Finland, Email: outi.kanste@oulu.fi, ORCID: <https://orcid.org/0000-0001-8634-0628>

Third author: MARCO TOMIETTO, post-doctoral researcher, Research Unit of Nursing Science and Health Management, University of Oulu, Oulu, Finland. Azienda per l'Assistenza Sanitaria n. 5 "Friuli Occidentale", Pordenone, Italy. Twitter: @marco_tomietto
ORCID: <https://orcid.org/0000-0002-3813-1490>

Forth author: JOUKO MIETTUNEN, professor; Center for Life Course Health Research, University of Oulu, and Medical Research Center Oulu, Oulu University Hospital and University of Oulu, Oulu, Finland, Email: jouko.miettunen@oulu.fi, ORCID: <https://orcid.org/0000-0003-0575-2669>

Fifth author: ANNA-MARIA TUOMIKOSKI, researcher,; Nursing Research Foundation; The Finnish Centre for Evidence-Based Health Care; WHO Collaborating Centre for Nursing, Helsinki, Finland; Research Unit of Nursing Science and Health Management, University of Oulu, Oulu, Finland, Email: annukka.tuomikoski@hotus.fi

This article has been accepted for publication and undergone full peer review (not applicable for Editorials) but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as [doi: 10.1111/JAN.14342](https://doi.org/10.1111/JAN.14342)

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Sixth author: HELVI KYNGÄS, professor, Research Unit of Nursing Science and Health Management, University of Oulu, Oulu, Finland, Part-time Nursing Chief Officer, Northern Ostrobothnia Hospital District, Finland, Email: helvi.kyngas@oulu.fi, ORCID; <https://orcid.org/0000-0002-5723-3484>

Seventh author (corresponding author): KRISTINA MIKKONEN, post-doctoral researcher,; Research Unit of Nursing Science and Health Management, University of Oulu, Oulu, Finland

Mailing Address:

Research Unit of Nursing Science and Health Management

Faculty of Medicine

P.O. Box 5000

FI- 90014 University of Oulu

Tel.: +358 40 4113913

Email: kristina.mikkonen@oulu.fi

Twitter: @Kristinamikkon

ORCID: <https://orcid.org/0000-0002-4355-3428>

Acknowledgements

We would like to acknowledge librarian information specialist Sirpa Grekula from University of Oulu for her guidance in data search strategy. We would like to acknowledge Sees-Editing Ltd (<http://www.seesediting.co.uk>) service for improving the language and helping us to communicate our findings to readers of the journal.

Conflict of interest

No conflict of interest has been declared by the authors.

Funding

This study has not any external funding.

MRS OUTI ILONA ILONA KANSTE (Orcid ID : 0000-0001-8634-0628)

DR MARCO TOMIETTO (Orcid ID : 0000-0002-3813-1490)

DR KRISTINA MIKKONEN (Orcid ID : 0000-0002-4355-3428)

Article type : Review

Interventions to improve nurses' job satisfaction: A systematic review and meta-analysis

Abstract

Aims: To identify current best evidence on the types of interventions that have been developed to improve job satisfaction among nurses and on the effectiveness of these interventions.

Design: The systematic review is a quantitative systematic review and meta-analysis following a profile-likelihood random-effects model.

Data Sources: CINAHL, Medic and Pubmed (Medline).

Review Methods: PICOS eligibility criteria were used to select original studies published between 2003-2019. The articles were screened by title (n=489), abstract (n=61) and full-text (n=47). A total of 20 articles remained after the full-text screening process and further assess on risk of bias. The screening process was conducted by two authors independently and finally agreed together. A meta-analysis was performed to determine how the identified interventions influence nurses' job satisfaction.

Results: The interventions were primarily educational and consisted of workshops, educational sessions, lessons and training sessions. The post-intervention differences between intervention and control groups in meta-analysis revealed that two interventions significantly improved nurses' job satisfaction. Notably, the spiritual intelligence training protocol and Professional Identity Development Program were found to be effective in improving job satisfaction.

Conclusion: Healthcare organizations and managers should consider implementing effective interventions to improve nurses' job satisfaction and reduce turnover. The results reported in this study highlight that nurse managers should focus on organizational strategies that will foster the intrinsic motivation of employees.

Impact: The current nursing shortage and increased turnover intentions are proving to be a global problem. For this reason, it is imperative that nurse managers plan strategies to improve nurses' job satisfaction. The effective interventions detected in this study are a first step for developing human resource strategies for healthcare organizations. These findings propose that extrinsic factors (e.g., salary and rewards) will never be as effective in maintaining job satisfaction as intrinsic factors (e.g., spiritual intelligence, professional identity and awareness).

Keywords: interventional study, job satisfaction, meta-analysis, nurses, systematic review

1 INTRODUCTION

The nursing shortage has become a global problem. The World Health Organization has predicted that there will be a shortage of 12.9 million healthcare workers in 2035 (World Health Organization, 2013). Furthermore, it has been predicted that the nursing shortage will get worse because the demand for nursing services will continue to increase (Roelen et al., 2013). Nowadays, the World Health Organization estimated a shortage of 590.000 nurses in Europe and compared with other healthcare professionals, nurses' organizational turnover is a major concern (Bauman et al., 2019; World Health Organization, 2016). Health care organizations in diverse countries are experiencing difficulties in recruiting and retaining nurses (Halcomb et al., 2018). High turnover intentions, an aging workforce and the decreased motivation of new nurses have been identified as the main causes of the current nursing shortage (Roelen et al., 2013). Job satisfaction, especially in nursing, is critical for the functioning of health care organizations as workforce costs are high and shortages in staff are common (Zangaro & Soeken, 2007). Job satisfaction has been shown to be negatively related to nurses' turnover intentions (Han & Jekel, 2011; Masum et al., 2016), where turnover intentions are the most reliable proxy to detect actual turnover when quit data are not available (Hom et al., 2017). Furthermore, job satisfaction was found to positively correlate with quality of care, i.e., the quality of care was highest in units with the highest levels of job satisfaction (Kvist et al., 2013). The aim of this systematic review was to identify current best evidence on the types of interventions that have been developed to improve job satisfaction among nurses and on the effectiveness of these interventions.

2 BACKGROUND

Traditionally, job satisfaction is defined as the perception that an individual has about his or her job (Lu et al., 2012; Szecsenyi et al., 2011). However, the extent to which the actual work environment meets individual expectations of the ideal work situation also actively shapes job satisfaction (Lu et al., 2012) as well as attitudes related to work (Utriainen & Kyngäs, 2009). A systematic review by Lu et al. (2012) identified several components of job satisfaction, namely, working conditions, interaction, relationship with patients, co-workers and managers, work itself, work load, remuneration, self-growth and promotion,

opportunities of advancement/ personal achievement, psychological rewards, control and responsibility/autonomy, job security and leadership styles. Stamps (1997) had earlier defined job satisfaction through six components: salary; independence; job requirements; organizational culture; professional status; and interaction (Ahmad et al., 2017; Cheung & Ching, 2014). In this study, we considered both approaches when defining job satisfaction.

Identifying the factors that affect job satisfaction is a major issue for healthcare management and several interventions that focus on this theme have been investigated. For example, Uys et al. (2005) tested two supervisory models but did not achieve an effective outcome regarding job satisfaction. DiMeglio et al. (2005) studied team-building interventions and found that tailored interventions can improve job satisfaction. Porter et al. (2010) investigated how a nursing labor-management partnership influences job satisfaction; the results demonstrated that this approach can significantly increase nurses' satisfaction and significantly decrease nurses' turnover.

Nursing science research should consider how interventions that noticeably improve the quality of care affect both patients and nurses, as the provision of high-quality patient care is influenced by how actively an organization fosters the employees' satisfaction and intention to stay in the organizational environment (Aiken et al., 2012). Various systematic reviews have focused on nurses' job satisfaction (for example, Al Maqbali, 2015; Lu et al., 2012; Utriainen & Kyngäs, 2009). The systematic reviews have examined factors related to nurses' job satisfaction, which were suggested to be used to target actions to improve the job satisfaction of nurses. To the best of our knowledge, no previous systematic review or meta-analysis has covered interventions that promote nurses' job satisfaction.

3 THE REVIEW

3.1 Aim

The aim of this systematic review was to identify current best evidence on the types of interventions that have been developed to improve job satisfaction among nurses and on the effectiveness of these interventions.

3.2 Design

The systematic review is a quantitative systematic review and meta-analysis following a profile-likelihood random-effects model (Kontopantelis and Reeves, 2010). This systematic review was guided by Cochrane Effective Practice and Organisation of Care (EPOC) guidelines (Higgins et al., 2019). The PICOS format (P = population; I = interventions; C = comparator; O = outcome; S = study design) was adopted to formulate inclusion criteria (Centre for Reviews and Dissemination, 2009). The inclusion and exclusion criteria are described in Table 1.

3.3 Search methods

A search was conducted in three databases - CINAHL, Medic and Pubmed (Medline) - in November 2018. Search terms and keywords for the database search were initially formulated by the researchers (JN, OK, KM), who then consulted the librarian information specialist to ensure that the terms and keywords were relevant. The search terms were divided in to four groups: population; intervention; outcome; and quantitative versus qualitative studies (see Supplementary file 1). Both English and Finnish search terms were used when searching the Finnish Medic database.

3.4 Search outcomes

The database search yielded a total of 513 original studies. After duplicate removal, 489 studies remained (see Supplementary file 2). The articles were screened by title (n=489), abstract (n=61) and full-text (n=47). A total of 20 articles remained after the full-text screening process and manual search of reference list of the full-text articles. The screening process was independently conducted by two of the authors (JN, OK), after which they came to an agreement while discussing their respective results. In case of any uncertainty, a third author was included in the process to make a final decision (KM). Supplementary file 2

shows the review's flow in PRISMA flow diagram (Moher et al., 2009), while Table 1 clarify the inclusion criteria adopted.

3.5 Risk of bias assessment

The 20 original studies were assessed for risk of bias with the Cochrane risk of bias tool (Cochrane Effective Practice and Organisation of Care (EPOC) by three authors (JN, OK, KM) (see Figure 1 and in Supplementary file 3). All of the selected studies, but one (Pryce et al., 2006), were assessed to include a high risk of selection bias due to a lack of random sequence generation. Deficient concealment of allocation (selection bias) was found in 15 of the selected studies, all of which showed a high risk of bias. The research presented by Heydari et al. (2017) was characterized by a low risk of selection bias, while the degree of selection bias in the four remaining studies was judged as unclear (Fillion et al., 2009; Kim et al., 2011; Levin et al., 2011; Pryce et al., 2006). Baseline characteristic similar was assessed as low only in one study (Levin et al., 2011), while other studies showed high risk for this aspect of bias due to vague descriptions of the participants. The risk of selective outcome reporting bias was high in five studies (Allen & Vitale-Nolen, 2005; Jones, 2017; Rickard et al., 2012; Spiva & Johnson, 2012; Verbeek et al., 2012) and unclear in five studies (Aitken et al., 2011; Amos et al., 2005; Leiter et al., 2011; Sabanciogullari & Dogan, 2015; Yurumezoglu & Kocaman, 2012).

Insert Figure 1. about here

3.6 Data abstraction

Data extracted from the selected articles included publication reference, country of origin, purpose, participants, type of intervention, applied instruments, data analysis and key findings (see Table 2 & Supplementary file 4). The data extraction was conducted by two authors (JN, KM).

3.7 Meta-analysis and data synthesis

The effect sizes of interventions and heterogeneity indices were calculated using Stata v12 (StataCorp., 2011). According to suggestions by Kontopantelis & Reeves (2010), the “metaan” package was applied in these analyses (Kontopantelis & Reeves, 2010). The random-effects models incorporated an estimation of heterogeneity in the weighting (Harris et al., 2008), as has been suggested in recent literature (Kontopantelis & Reeves, 2010; Veroniki et al., 2019). The profile-likelihood approach in the “metaan” package was chosen as a more advanced version of random-effects model, while incorporating both the maximum likelihood and the DerSimonian-Laird approaches (Kontopantelis & Reeves, 2010). Cohen’s *d* was adopted as the measure of effect size (Cohen, 1992). Effect sizes of 0.2, 0.5 and 0.8 were interpreted as small, medium and large, respectively (Lakens, 2013). The Q-statistic was calculated to assess the homogeneity of the estimated effect sizes (according to a Chi-squared distribution). A significant p-value was interpreted to mean that heterogeneity could affect the results. As the Q-statistic should be interpreted with caution, especially when it is not significant, the I-squared value was also calculated to explore heterogeneity (Higgins & Green, 2008). According to the Cochrane standards, heterogeneity is not important if the I-squared value is between 0% and 40%, moderate if the value is between 30% and 60%, substantial if the value is between 50% and 90% and considerable if the value is between 75% and 100% (Higgins & Green, 2008). The tau-squared statistic was also calculated to determine the amount of variation between the included studies. Five of the included studies did not include a control group post-intervention (Allen & Vitale-Nolen, 2005; Amos et al., 2005; Jones et al., 2017; Kim et al., 2017; Yurumezoglu & Kocaman, 2012) whereas one (Chen et al., 2010) did not report standard deviations; hence, these studies – although they met the inclusion criteria - were not included in the meta-analysis. A narrative approach was used to conduct data synthesis of such studies (CRD, 2009) according to reporting guideline of synthesis without meta-analysis (SWiM) in systematic reviews (Campbell et al., 2020).

4 RESULTS

4.1 Characteristics of the included studies

The original studies chosen for the systematic review were conducted in Australia (Aitken et al., 2011; Rickard et al., 2012; Tran et al., 2010), Canada (Fillion et al., 2009; Leiter et al., 2011), Iran (Heydari et al., 2017), Netherlands (Verbeek et al., 2010), Taiwan (Chen et al., 2010), Turkey (Sabanciogullari & Dogan, 2015; Yurumezoglu & Kocaman, 2012), United States (Allen & Vitale-Nolen, 2005; Amos et al., 2005; DiMeglio et al., 2005; Jones, 2017; Kim et al., 2011; Kim et al., 2017; Levin et al., 2011; Porter et al., 2010; Spiva & Johnson, 2012) and United Kingdom with Denmark (Pryce et al., 2006). Out of the identified interventional studies, 16 studies applied a quasi-experimental study design (Aitken et al., 2011; Allen & Vitale-Nolen, 2005; Amos et al., 2005; Chen et al., 2010; DiMeglio et al., 2005; Jones, 2017; Kim et al., 2011; Kim et al., 2017; Leiter et al., 2011; Porter et al., 2010; Rickard et al., 2012; Sabanciogullari & Dogan, 2015; Spiva & Johnson, 2012; Tran et al., 2010; Verbeek et al., 2010; Yurumezoglu & Kocaman, 2012) while four studies used randomized controlled trials (Fillion et al., 2009; Heydari et al., 2017; Levin et al., 2011; Pryce et al., 2006).

The participants in the selected studies were mostly nurses. However, two of the included studies also involved participants other than nurses, more specifically, nursing assistants, secretaries, monitor technicians (Amos et al., 2005), ward clerks, physicians and licensed practical nurses (Leiter et al., 2011). Nevertheless, in both of these studies nurses represented most participants (over 50% of the total study sample).

4.2 Interventions of selected studies

4.2.1 Type and length of interventions

Twelve of the selected studies included a control group (Aitken et al., 2011; Chen et al., 2010; DiMeglio et al., 2005; Fillion et al., 2009; Heydari et al., 2017; Kim et al., 2011; Leiter et al., 2011; Levin et al., 2011; Pryce et al., 2006; Sabanciogullari & Dogan, 2015; Tran et al., 2010; Verbeek et al., 2010), while eight studies only included intervention groups (Allen & Vitale-Nolen, 2005; Amos et al., 2005; Jones, 2017; Kim et al., 2017; Porter et al., 2010; Rickard et al., 2012; Spiva & Johnson, 2012; Yurumezoglu & Kocaman, 2012). The length of interventions varied from one month to 12 months. However, four of the studies did not specify the intervention length (Allen & Vitale-Nolen, 2005; Amos et al., 2005; Spiva & Johnson, 2012; Porter et al., 2010). All of the studies included pre- and post-measurements,

but only eight studies arranged second follow-up measurements (Allen & Vitale-Nolen, 2005; Amos et al., 2005; Fillion et al., 2009; Heydari et al., 2017; Levin et al., 2010; Sabanciogullari & Dogan, 2015; Verbeek et al., 2010; Yurumezoglu & Kocaman, 2012).

4.2.2 Educational interventions

In most of the selected studies, the interventions applied educational methods (Allen & Vitale-Nolen, 2005; Amos et al., 2005; Chen et al., 2010; Fillion et al., 2009; Heydari et al., 2017; Kim et al., 2011; Kim et al., 2017; Sabanciogullari & Dogan, 2015; Levin et al., 2011; Pryce et al., 2006; Tran et al., 2010). The research from Allen and Vital-Nolen (2005) and Tran et al. (2010) included interventions that were based on staff workshops. Allen and Vitale-Nolen (2005) studied the effects of the Nurse Practice Enhancement Project, where the organized workshops focus on nurses' professional roles and job satisfaction. The educational interventions conducted in the identified studies included educational sessions (Amos et al., 2005; Sabanciogullari & Dogan, 2015), educational lessons (Fillion et al., 2009; Kim et al., 2017) and training sessions (Chen et al., 2010; Heydari et al., 2017). Kim et al. (2011) tested several educational models that included diverse pedagogical strategies and participant activities. In an interventional study by Chen et al. (2005), participants took part in a program every other week that included movies, literature reviews, discussion and practical training. Another interventional study tested how mentor-mentee education (Nurse Mentor Program) influences job satisfaction and nurses' intent to stay (Jones's 2017). This program included one support session every month to improve the interaction between mentor and mentee.

4.2.3 Organizational interventions

The team-building intervention investigated by Amos et al. (2005) and DiMeglio et al. (2005) focused on communication, stress management, review of personalities and team-building performance and effectiveness of it. On the other hand, participants in the interventional study by Heydari et al. (2017) either attended seven weekly sessions of Spiritual Intelligence Training (intervention group) or participated in a lecture of psychiatric signs and symptoms (control group). Aitken et al. (2011) studied how the introduction of nursing rounds would affect nurses' perceptions of practice environment and work satisfaction. In another study, Leiter et al. (2011) studied how a CREW (Civility, Respect, Engagement in the Workplace) intervention, where employees meet co-workers once per week to discuss effective interpersonal interactions at work, influences nurses' attitudes. In this study, trained

facilitators assisted the groups by guiding meetings and sharing knowledge of effective communication at work. Porter et al. (2010) developed an intervention to enhance collaboration between leadership and patient care of clinical nurses. Yurumezoglu and Kocaman (2012) conducted research to study how evidence-based nursing management practices influence job satisfaction. In their study, charge nurses attended weekly management practices.

4.3 Outcome measures

All of the interventions measured job satisfaction as either a primary or secondary outcome. Together with job satisfaction, other primary outcomes were nurses' expectations, perceptions of the practice environment (Aitken et al., 2011). In other studies, job satisfaction was related to communication (Amos et al. (2005), potentiality (Chen et al., 2010), joy enjoyment (DiMeglio et al., 2005), quality of life (Fillion et al.,2009), organizational commitment, nurses' retention (Jones, 2017; Yurumezoglu & Kocaman, 2012), perceptions of therapeutic alliance, family empowerment and quality of care (Kim et al., 2011). Evidence-based practice (EBP) beliefs, EBP implementation (Levin et al., 2011), group cohesion and group attractiveness were also considered as primary outcomes (Kim et al., 2017). Other studies included multiple outcomes, namely, civility, experienced incivility, instigated incivility, respect, trust in management, burnout, turnover intentions, professional efficacy, organizational commitment, absenteeism (Leiter et al., 2011), professional identity, burnout (Pryce et al., 2006; Rickard et al., 2012; Sabanciogullari & Dogan, 2015), stress, job tension and aspects of the nurse role (Tran et al., 2010).

4.4 Meta-analysis and overall effectiveness of the interventions

A meta-analysis was conducted to estimate the effects of post-interventions on nurses' job satisfaction between intervention and control groups. Out of the 20 studies included in this review, only ten could be included in the analysis (Aitken et al., 2011; Fillion et al., 2009; Heydari et al., 2017; Kim et al., 2011; Leiter et al., 2011; Pryce et al., 2006; Rickard et al., 2012; Sabanciogullari & Dogan 2015; Tran et al., 2010; Verbeek et al., 2010). The pooled

effect size (95% CI), which considered the post-intervention measurements for control and intervention groups, was moderate 0.35 (CI 95%=-0.06 to 0.80; $\tau^2=0.33$) and showed considerable heterogeneity ($I^2= 93\%$, $Q=57.43$, $p<0.01$) (see Figure 2). Out of the total ten studies included in this analysis, two studies (Heydari et al., 2017; Sabanciogullari & Dogan, 2015) achieved significant post-intervention effects. Heydari et al. (2017) reported the largest effect size, 2.26 (1.58 to 2.94), of the seven studies included in the analysis. Heydari et al. (2017) detected a statistical significance both in the pre- post-tests and in the effect size post-intervention between the intervention and control groups (Figure 2). Sabanciogullari and Dogan (2015) did not detect a pre-post- statistical effect, while in the post-intervention meta-analysis a significant effect size was detected between the intervention and control groups (EF=0.98, CI95%=0.47-1.48) (Figure 2).

5 DISCUSSION

The improvement of nurses' job satisfaction, which will reduce turnover intention, is critical to relieving the current nursing shortage (Chan et al., 2013; Fasbender et al., 2019; Gillet et al., 2018). Job satisfaction has been the focus of numerous systematic reviews (Al Maqbali, 2015; Lu et al., 2012; Utriainen & Kyngäs, 2009). However, to the best of our knowledge, there is a lack of evidence regarding the effectiveness of interventions. This is pivotal when designing organizational strategies to improve healthcare outcomes and the quality of care. Our study addresses this issue and provides evidence that can be leveraged to improve nurses' job satisfaction. In this way, managers could better guide human resource management to implement effective interventions that will enhance job satisfaction and, subsequently, improve organizational stability.

In this systematic review, we synthesized different reports of interventions aimed at improving job satisfaction to identify which approaches are the most effective. Ten studies reported significant improvement in general job satisfaction (Allen & Vitale-Nolen, 2005; Chen et al., 2010; Dimeglio et al., 2005; Heydari et al., 2017; Kim et al., 2017; Leiter et al., 2011; Porter et al., 2010; Pryce et al., 2006; Rickard et al., 2012; Spiva & Johnson, 2012; Yurumezoglu & Kocaman, 2012) while two studies reported noticeable improvement on one subscale of job satisfaction (Aitken et al., 2011; Jones, 2017). Allen and Vitale-Nolen (2005)

and Chen et al. (2010) also reported improvements in job satisfaction but did not include any statistical information for the observed changes.

Two of the studies that included post-interventional analyses identified interventions that can effectively improve job satisfaction (Heydari et al., 2017; Sabanciogullari et al., 2015). Heydari et al. (2017) define job satisfaction as a positive and emotional state which is derived from each individual's assessment of their job and results of their interventional study suggest that managers should consider spiritual intelligence training to increase nurses' job satisfaction. These findings address the importance of fostering meaning at work and to support employees' belongingness to the organization by considering their inner needs. In the same vein, a pilot study by Sabanciogullari and Dogan (2015) found that staff members with a strong professional identity have higher levels of job satisfaction and lower levels of turnover. Both studies address managerial strategies for raising awareness about and improving, job satisfaction. However, the pooled effect size determined through our meta-analysis of intervention effectiveness did not achieve statistical significance.

Out of the 11 studies which could be included in a meta-analysis of job satisfaction pre- and post-intervention, five studies (Heydari et al., 2017; Jones, 2017; Leiter et al., 2011; Sabanciogullari & Dogan, 2015; Yurumezoglu and Kocaman, 2012) showed that the intervention significantly influenced job satisfaction based on pre- and post-intervention measurements. Only two of the 13 selected studies conducted randomization (Fillion et al., 2009; Heydari et al., 2017). Randomized controlled trials include methodological elements that strengthen the causal evidence for the studied phenomenon. In contrast, non-randomized trials may attract bias, which may make it difficult to identify interventional effects (Thiese, 2014). Clear evaluations of the risk of bias should be included whenever reporting the results of an interventional study. Most of the studies included in this systematic review included control groups, but only five studies had an intervention group (Allen & Vitale-Nolen, 2005; Amos et al., 2005; Jones, 2017; Kim et al., 2017; Yurumezoglu & Kocaman, 2012). Control groups are necessary for discriminating treatment outcomes from the other factors which may have influenced the observed outcomes. Interventional studies should include a control group because comparisons of the results for the control and intervention groups will strengthen the validity of the changes observed for the intervention (Kisner & Robins, 2013).

All of the selected studies implemented post-intervention measurements. However, only eight of the 20 selected studies included a follow-up measurement in the post-intervention period (Allen & Vitale-Nolen, 2005; Amos et al., 2005; Fillion et al., 2009; Heydari et al., 2017; Levin et al., 2011; Sabanciogullari & Dogan, 2015; Verbeek et al., 2010; Yurumezoglu & Kocaman, 2012). Present reporting guidelines do not require follow-up measurements, but the validity of reported results is largely affected by the replicability of measured outcomes (von Allmen et al., 2015). Research should be carried out to determine whether an intervention that was found to be effective is also beneficial in another environment. The current nursing shortage, along with the results of the presented meta-analysis, demonstrate that new interventions for improving job satisfaction among health care staff should be developed.

The current nursing shortage and increased turnover intentions are proving to be a global problem. For this reason, it is imperative that nurse managers plan strategies to improve nurses' job satisfaction. The effective interventions detected in this study are a first step for developing human resource strategies for healthcare organizations. Notably, the spiritual intelligence training protocol (Heydari et al., 2017) and Professional Identity Development Program (Sabanciogullari et al., 2015) were found to be effective in improving job satisfaction. These findings are in line with what was earlier proposed by Stamps (1997), that is, extrinsic factors (e.g., salary and rewards) will never be as effective in maintaining job satisfaction as intrinsic factors (e.g., spiritual intelligence, professional identity and awareness). The self-determination theory adopts a similar type of logic (Gagne' & Deci, 2005). The results reported in this study highlight that nurse managers should focus on organizational strategies that will foster the intrinsic motivation of employees. To better support intrinsic motivation it is necessary to develop meaning at work and value-driven strategies in the workplace: when employees develop a fit between their personal and professional values and the organizational values, their motivation is inner driven and they better live job satisfaction and fulfillment at work with positive outcomes on well-being and physical health conditions (Nie et al., 2015). The person-environment fit is a pivotal strategy to support meaningful work, together with employees' job satisfaction (Duffy et al., 2015).

5.1 Limitations

Our findings are affected by considerable heterogeneity. However, previous research has suggested that similar levels of variation between studies are usual when the meta-analysis includes psycho-social and/or organizational variables (Faragher et al., 2005; West et al., 2016). Random-effects models perform better in the presence of heterogeneity (Panagioti et al., 2017); in this way, we chose methods that could handle the degree of heterogeneity between studies (Panagioti et al., 2017).

6 CONCLUSION

The systematic review and meta-analysis performed to contribute to designing effective interventions for employees' job satisfaction. Nurse and healthcare managers can use our outcomes to focus on specific strategies which have the potential to improve organizational stability, employees' wellbeing and retention. The interventions detected in the systematic review were primarily educational and organizational and consisted of workshops, educational sessions, mentoring programs, interpersonal interactions improvement program and evidence-based nursing management practices. More specifically, the meta-analysis recommends improving interventions based on professional identity development, together with the spiritual intelligence of the employees. Both interventions focus on building a professional and a workplace meaning at work to fostering job satisfaction. This study supports healthcare organizations to face the major managerial challenges connected to the nursing shortage.

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Table 1. Inclusion criteria (PICOS format).

Inclusion criteria	
Population	Nurses (more than 50% of total participants)
Intervention	Interventions to promote nurses' job satisfaction
Comparator	Pre-post single group or control group
Outcome	Job satisfaction
Study type	Randomized controlled trial (RCT) or quasi-experimental design; original peer-review study; English or Finnish language; published between 2003-2019

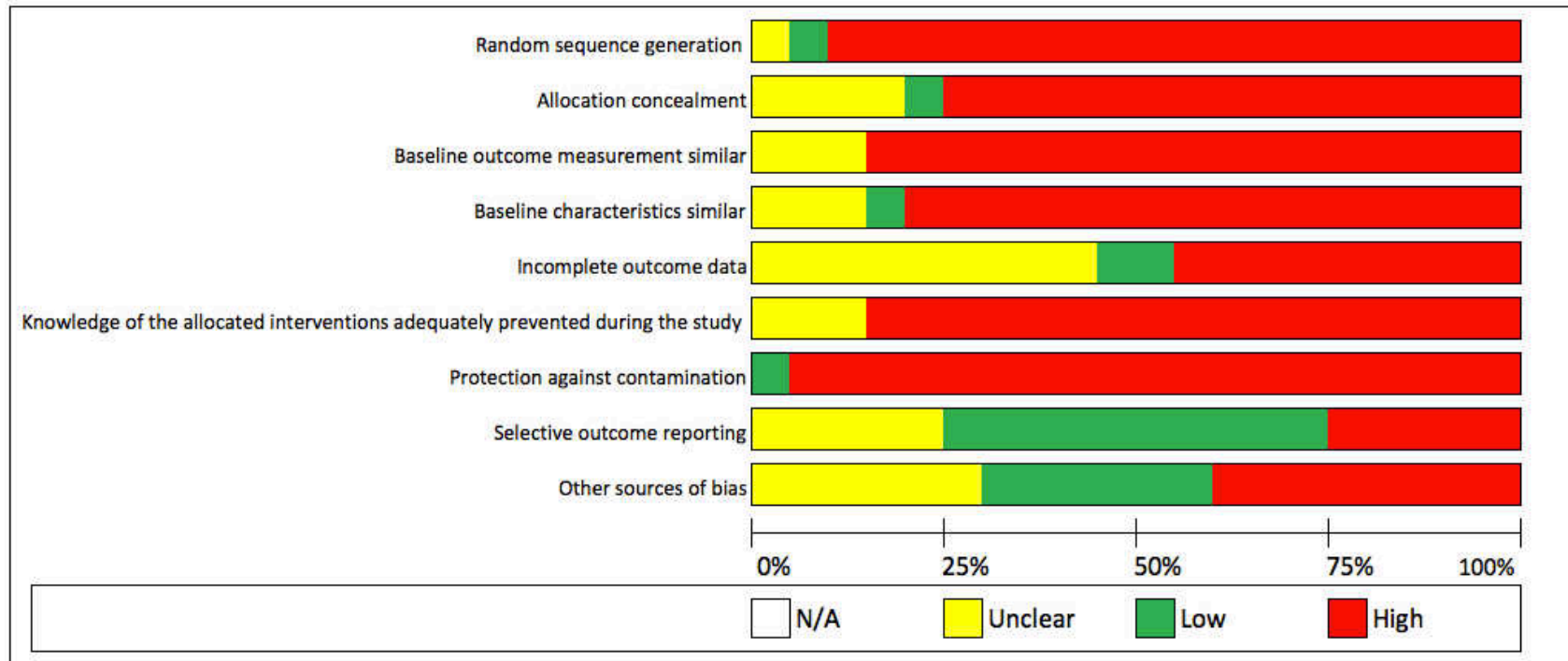
Table 2. Extracted data from the selected original studies.

Original studies, country	Purpose	Intervention	Key findings
Aitken et al. 2011	To determine the effect of a Nursing Rounds intervention on patient care and nurses' perceptions of the environment and satisfaction.	Intervention of 12 months with 249 nurses was conducted on improvement of nursing care with a special focus on evidence optimizing care plans.	Total work satisfaction scores were similar before and after the intervention, so there was not an improvement on total work satisfaction.
Allen et al. 2005	To evaluate the effectiveness of nursing interventions influenced by patient care delivery model design.	Intervention was conducted as a workshop with 149 nurses during 3 days with a focus on finding professional roles, and satisfaction.	Nurses' job satisfaction improved significantly during the intervention. There were significant improvements in all component mean scores.
Amos et al. 2005	To examine the impact of team-building activities on staff communication and job satisfaction.	Intervention with 44 nurses was conducted of 2 sessions (16h) of education on communication, conflict resolution, and stress management.	There were no statistically significant differences in the total job satisfaction scores between the baseline and 3-month post-test.
Chen et al. 2010	To evaluate the effects of a potentiality education program on potentiality and job satisfaction.	59 psychiatric nurses participated in lessons 4 times on topics of organization ability, intention and cultivation of stability and coping ability.	The intervention had a significant influence on total job satisfaction and the interaction subcomponent.
DiMeglio et al. 2005,	To determine the impact of team-building intervention on group cohesion, nurse satisfaction, and turnover rates.	Intervention with 43 447 nurses of 12 months identified those elements that create high-performing teams.	Intervention increased registered nurses' job satisfaction. Every other subscale increased except the autonomy subscale decreased slightly.
Fillion et	To test the efficiency of meaning-centered	One month intervention training program with	The intervention had no impact on general job

al.2009	interventions in improving job satisfaction and quality of life.	109 palliative care nurses included 4 weekly sessions of finding meaning and values.	satisfaction. Small decreases in satisfaction were noted in both groups.
Heydari et al. 2017	To determine the impact of teaching spiritual intelligence on job satisfaction.	2 months of intervention with 54 psychiatric nurses included 7 weekly sessions for groups with spiritual intelligence sessions.	There were significant job satisfaction score differences between interventional and control groups.
Jones et al. 2017	To evaluate the effects of the Nurse Mentor Program on nurse satisfaction and intent to stay.	Intervention with 4 nurses was a mentor-mentee education program and had 1 support session per month for 3 months to promote interaction.	There were no statistically significant differences in three subscales of job satisfaction, but one subscale, praise and recognition.
Kim et al. 2011	To evaluate the effects of Family-Provider Alliance Program on nurses' perceptions of a therapeutic alliance, and job satisfaction.	Intervention with 497 nurses of 2 months contained 3 components, a 4-hour session, and Shared Partnership Agreement.	The intervention did not improve job satisfaction in either group. Neither group showed a statistically significant increase in job satisfaction.
Kim et al. 2017	To evaluate whether a regional EBP fellowship program improves participants' EBP beliefs, EBP implementation, and job satisfaction.	On 9 months intervention with 120 nurses and educators EBP fellowship program educated and assisted EBP projects in various units.	The EBP implementation did not directly improve job satisfaction, group cohesion, or group attractiveness.
Leiter et al. 2011	To examine the effectiveness of an organizational, unit-level intervention aimed at improving social relationships and civility.	In 6 months intervention, 2 080 nurses and other healthcare staff met their co-workers every week to work on effective interpersonal interactions.	The intervention group showed significantly higher job-satisfaction scores than the control group.
Levin et al. 2011	To determine the preliminary effects of implementing the ARCC model on nurses' EBP behaviors and job satisfaction.	16 weeks intervention with 46 nurses provided didactic content on EBP basics, an EBP toolkit, environment prompts and an EBP mentor.	There was no significant difference in nurses' job satisfaction between the intervention and control group.
Porter et al. 2010	To examine the effects of a nursing labor-management partnership on nurse turnover and nurse satisfaction.	The NLMP model was co-led by chief nursing officer and president of the nursing union with 2 009 nurses.	There was a significant increase in nurse satisfaction after the NLMP intervention.

Pryce et al. 2006	To evaluate the impact of an open-rota scheduling system on the health, work-life balance and job satisfaction of nurses.	Intervention groups of 177 nurses had a 1-day workshop in which case studies of work scheduling interventions were presented.	There was a significant increase in nurses' job satisfaction when compared intervention group to the control group.
Rickard et al. 2012	To evaluate the impact of an organisational intervention which aimed to reduce occupational stress and turnover rates of nurses.	12 months intervention with 484 nurses included implementation of a nursing professional development support tools and mentoring.	There was a significant improvement of registered nurses' job satisfaction across both hospitals.
Sabancio et al. 2015	To evaluate the effects of the Professional Identity Development Program on professional identity, job satisfaction and burnout levels.	The intervention with 205 nurses had 10 sessions, with one session held every week. Topics were aiming to increase professional satisfaction.	No significant differences in job satisfaction levels on the general or subscales were noticed.
Spiva et al. 2012	To implement and evaluate the admission and discharge process on nursing and patient satisfaction and retention of older nurses.	On the intervention with 135 nurses were trended to determine peak hours of the admissions and discharges.	Using the admission and discharge (AD) method significantly improved nurse satisfaction.
Tran et al. 2010	To compare nurse outcomes between the shared care in nursing (SCN) and patient allocation (PA) models of care.	Intervention of 6 months with 178 nurses compared outcomes of SCN and PA models of care.	Neither group showed significant differences in the outcomes across the baseline and postintervention time points.
Verbeek et al. 2010	To evaluate the effects of small-scale living facilities in dementia care residents, family caregivers, and staff.	Intervention with 642 nurses of 12 months compared to small-scale living facilities and regular psychogeriatric nursing homewards.	There were no significant differences in nursing staff job satisfaction between intervention and control group.
Yurumez oglu et al. 2012	To analyze the effect of evidence-based nursing management practices on staff nurses' job satisfaction and intent to leave organization.	58 charge nurses had weekly face-to-face discussions for 10 weeks to provide recommendations to nurse managers.	There were statistically significant differences in intrinsic, extrinsic, and total job satisfaction.

Figure 1. Overall risk of bias using the Cochrane Risk of Bias Tool.



Accepted Article

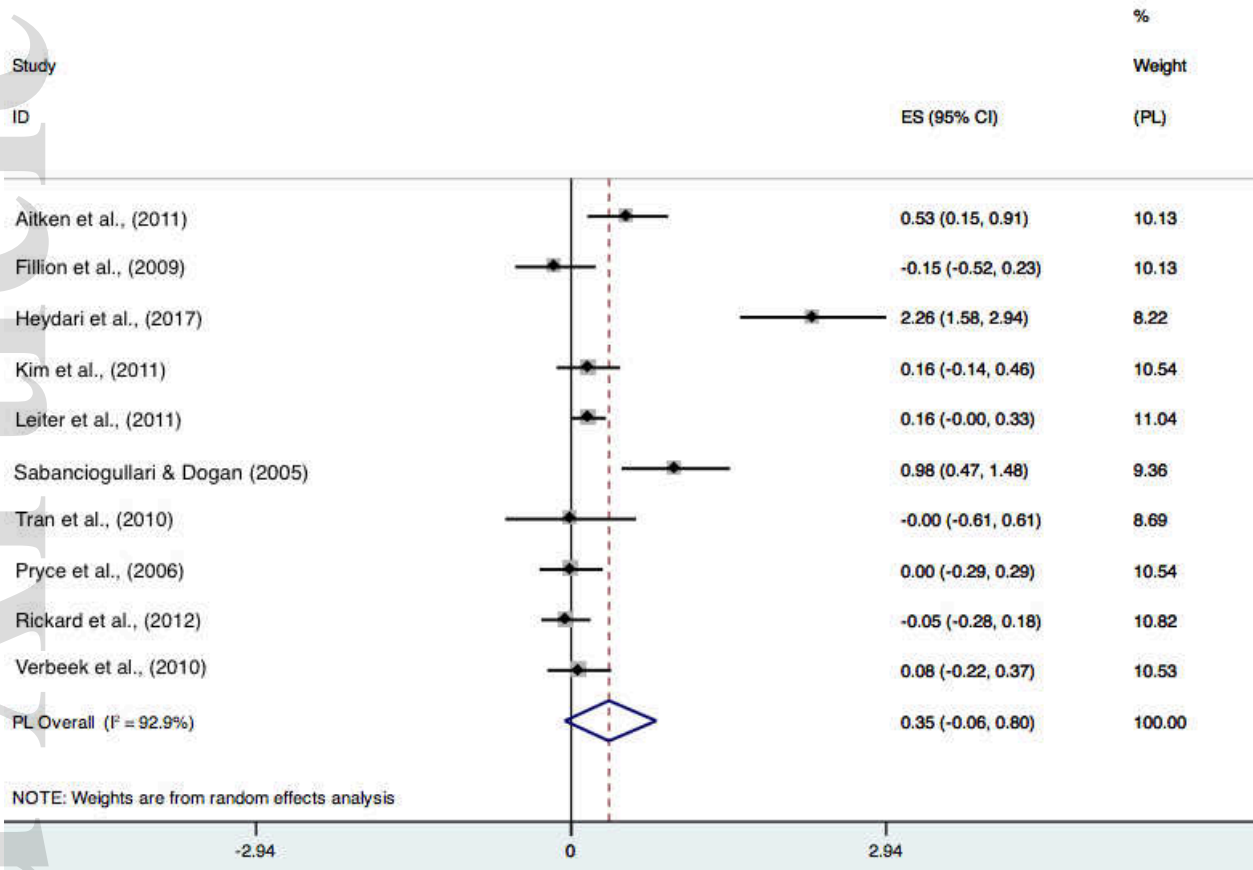


Figure 2. Meta-analysis on the effectiveness of the interventions developed to improve job satisfaction among nurses.