



Concise Review

Dentist Job Satisfaction: A Systematic Review and Meta-analysis

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ABSTRACT

Objectives: Because of the heterogeneous nature of the evidence regarding dentists' job satisfaction, an overview was necessary to examine dentists' level of job satisfaction and to determine related work environmental factors.

Materials and methods: A literature search was conducted using preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidelines. Electronic database searches of PubMed/MEDLINE, EMBASE, and Web of Science were performed until March 1, 2020. Two independent authors collected data and assessed the methodological quality of primary studies using the Newcastle Ottawa Scale.

Results: Nine studies were included from the 1987 initially retrieved. Among the included studies, 5 exhibited a neutral level of satisfaction and originated from China, South Korea, Egypt, and the United States, and 3 studies from Canada, Lithuania, and the United States showed a high level of satisfaction. Only 1 study did not report the mean job satisfaction score. According to bias evaluation, 9 studies were considered low risk.

Conclusion: The findings showed that dentists were satisfied with their jobs at a moderate to high level, and specialists were more satisfied than general dentists. Regarding work environmental factors, the 6 most satisfied factors were patient relationships, respect, delivery of care, staff, professional relationship, and professional environment. Five of the least satisfied factors were personal time, stress, income, practice management, and professional time. However, longitudinal studies would be required to identify changes in these factors. Further studies should be performed in middle- and low-income countries using the Dentist Satisfaction Survey, including stress evaluation.

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Introduction

Job satisfaction is known as “the positive emotional state resulting from the appraisal of one's job or job experiences,”¹ or “the extent to which people like or dislike their job.”² This could be their attitudes towards their job in general or those towards specific aspects such as colleagues, income, or

working conditions. Recently, some studies examined overall job satisfaction and whether work environment factors affect dentists' job satisfaction (DJS).³⁻⁵

Dentistry is a desirable career but not a simple one. The community's prevailing impression is that dentists have a high-income and authoritative occupation. Consequently, according to the public's understanding, dentists may have a good quality of life. However, being a dentist is a demanding and difficult career.⁶ Financial issues, patient phobia and sensitivity, employment difficulties, poor working environments, and repetitive tasks are typical stressors for dentists.⁷⁻⁸

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To assess DJS, several questionnaires were designed and developed.⁹⁻¹² In 1990, Shugars et al completed the Dentist Satisfaction Survey (DSS),¹³ which has since been the most generally comprehensive instrument. In many countries, modified DSS versions have been designed following specific conditions to evaluate DJS.^{3-4,14-16}

Based on the DSS, several studies have investigated DJS and work environmental factors. However, these studies have shown heterogeneous results in the level of DJS and many related factors such as patient relationships, delivery of care, respect, staff, personal time, professional environment, income, and stress.^{3-5,13-16} Furthermore, it is difficult to create a hierarchy because of differences in socioeconomic factors, health care policy, study period, and demographic characteristics.

Because of the heterogeneity of the available evidence, an overview of DJS is necessary to identify problems or issues that dentists have about their daily work, to cover ways to improve dentists' working environment, to counsel policy makers about the current level of job satisfaction among dentists, and to guide health care reform. In addition, it could allow an assessment of DJS and related factors through meta-analysis. In this study, we aimed to systematically review and analyse the impact of work environmental factors on DJS. Such a review allows for the identification of gaps and weakness in the current knowledge or methods used for DJS.

Materials and methods

This study was carried out following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.¹⁷

Review question

In this systematic review, the focused questions were as follows: "How satisfied are dentists?", "What are the main factors influencing DJS?", and "Does the general or specialist dentist have a higher job satisfaction?"

Inclusion criteria and exclusion criteria

The cross-sectional studies using DSS or modified DSS to determine DJS and related factors were included regardless of publication date. Studies were composed of dentists who were trained or not trained in specialties without age restriction.

Reviews, opinions, letters, dissertations and theses, studies without dentists, and studies not written in English were excluded.

Outcomes

The outcomes were overall job satisfaction and related factors assessed by DSS.

Search strategy and study selection

We searched databases of PubMed/MEDLINE, EMBASE, and Web of Science from the earliest date to March 1, 2020. First, the search strategy was conducted across databases to include text contained in abstracts and titles. Second, the complete search strategy combined medical subject headings (MeSH) terms and text words and is shown in [Appendix 1](#), available online. Additionally, manual searches of other sources were performed. The description of the flow of information through different phases of the study is presented in [Figure 1](#).

Two authors (VNTL and DWL) independently screened the titles and abstracts to remove duplicate references using the EndNote X8 program (Thomson Reuters). The first 100 studies were reviewed preliminarily by screening titles and abstracts to verify that the 2 authors understood the eligibility criteria, followed by a discussion between the 2 authors before conducting a full review. Full texts of the studies were retrieved if the information was not available. In cases of disagreement, a third author (YMY) was brought in for further discussion, and a decision was made by consensus.

Data collection

Data items were manually collected independently by 2 authors (VNTL and DWL). Discrepancies were resolved by discussion. The following data were collected in Microsoft Word.

(A) Study characteristics: author names, country, journal name, study design, number of respondents, response rate, sample types, assessment tool, and overall score of job satisfaction.

(B) Work environmental factors related to DJS.

Assessment of methodological quality

Two authors (VNTL and DWL) independently evaluated the methodological quality of the primary studies using a modified version of the Newcastle Ottawa Scale (NOS) ([Appendix 2](#), available online).¹⁸ NOS uses 8 items to evaluate the methodological quality of the study. For each item, 1 point is given for each "yes" response, with a maximum possible score of 8. Discrepancies were resolved by discussion.

Summary measurements and data synthesis

Data from included studies that reported overall job satisfaction and work environmental factors in the form of means and standard errors was tabulated. All items were assessed using a 5-point Likert scale. DJS was classified into low (1.0-2.5), moderate (>2.5 but <3.5), and high (3.5-5.0).

Meta-analysis of all the items was conducted in Comprehensive Meta-Analysis software v2 (Biostat). Among the

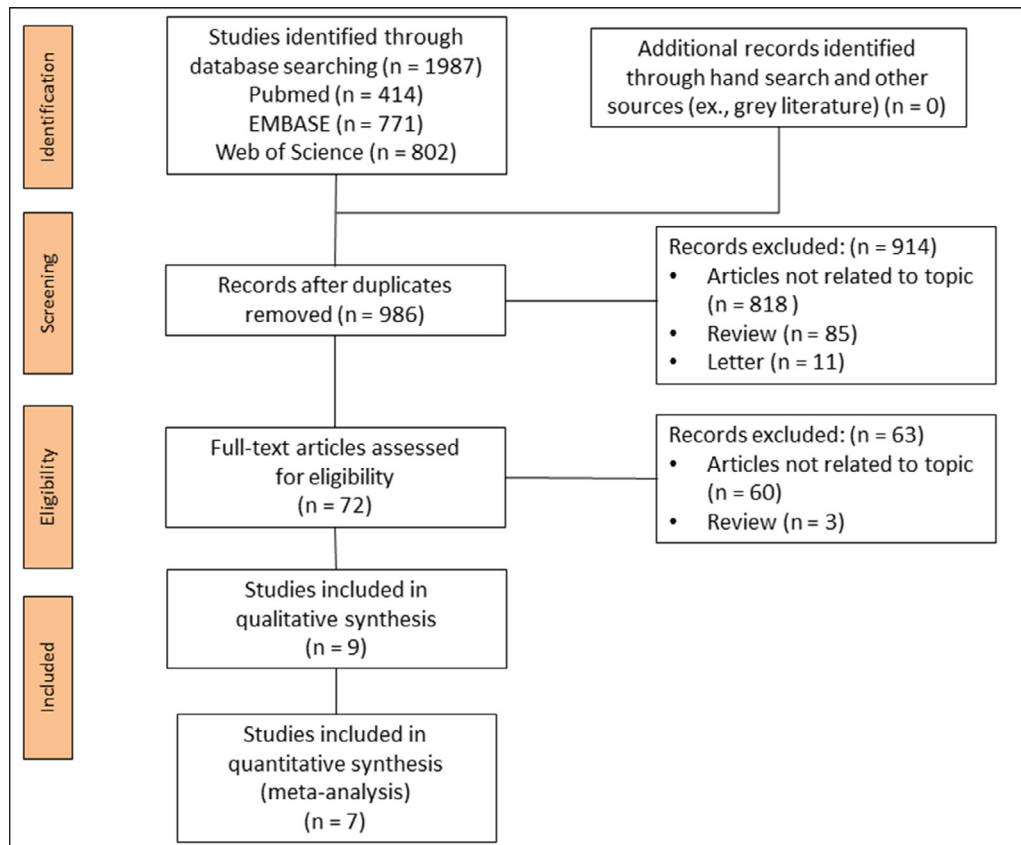


Fig. 1 – Flow diagram of the included studies.

included studies, the mean and standard error (SE) for each item were extracted. Forest plots were created to illustrate the meta-analysis results. In addition, the I^2 test and the Q statistic were used to examine whether all effected sizes of samples were from the same population.¹⁹ If a P value was lower than .05, heterogeneity was assigned. Furthermore, an I^2 test result higher than 40% was considered an indicator of heterogeneity.

Results

Study selection and characteristics

The literature results consisted of 1987 articles (Figure 1). After removing 1001 duplicates, 914 articles were excluded by screening the titles and abstracts. The remaining 72 articles were read in full text, and 63 articles were excluded for the following reasons: 60 articles were not related to the topic and 3 were review articles. A final total of 9 articles was included for analysis.

As presented in Table 1, the included articles were published from 1990 to 2017. Following the World Bank criteria, all the articles were cross-sectional observational studies, 4 were carried out in 4 high-income countries (United States, Canada, South Korea, and Lithuania), 2 in an upper-middle-income country (China), and 2 in a lower-

middle-income country (Egypt).^{3-5,13-16,20-22} Four studies included general dentists,^{13,16,20-21} 3 studies included specialists,^{3-4,14} and 3 studies included general dentists and specialists.^{5,15}

Exposure types

All studies evaluated DJS by a survey method. Among the included studies, 8 studies^{3-5,14-16,20-21} (89%) used modified version of DSS. Some additional tools, such as the Myers Briggs Type Indicator (MBTI), the Maslach Burnout Inventory (MBI),²⁰ occupational stress scale,¹⁴ and professional environment and stress indicators, were used.⁴

Outcome measurements

In the results of overall job satisfaction score, 5 studies from China (3.18),³ South Korea (3.24),¹⁵ Egypt (3.24),⁵ and the United States (2.48 and 3.15)^{13,20} exhibited a neutral level of DJS, and 3 studies from Canada (4.02),¹⁴ Lithuania (4.06),¹⁶ and the United States (4.06)⁴ showed a high level of DJS. Only 1 study did not report this result.²¹

Work environmental factors found to impact DJS in the included studies (Table 2) were patient relationships ($n = 7$, 78%),^{3-5,13-16} income ($n = 7$, 78%),^{3-5,13-16} personal time ($n = 7$, 78%),^{3-5,13-16} staff ($n = 6$, 67%),^{3-5,13-15} professional time ($n = 6$, 67%),^{3-5,13-15} delivery of care ($n = 6$, 67%),^{3-5,13-15} professional

Table 1 – Study characteristics of the included cross-sectional studies.

#	Author (Country)	Year	Journal	Respondent	Response rate	Assessment tool	Sample type	Overall job satisfaction score
1	Cui et al ³ (China)	2017	Journal of Healthcare Leadership	170	47.4%	CDSS (38 items)	Specialist	3.28
2	Fahim ⁵ (Egypt)	2013	International Journal of Occupational Medicine and Environmental Health	277	61.7%	Modified DSS (29 items)	Combination	3.24
3	Bates et al ⁴ (USA)	2013	Pediatric Dentistry	1351	Mail: 39% E-mail: 26%	Modified DSS (39 items) Professional environment indicator	Specialist	4.06
4	Puriene et al ¹⁶ (Lithuania)	2007	Stomatologija	1670	68.2%	Stress indicator	General dentist	4.06
5	Jeong et al ¹⁵ (South Korea)	2006	Community Dent Oral Epidemiol	615	62.2%	Modified DSS	Combination	3.24
6	Baran ²⁰ (USA)	2005	General Dentistry	202	79.5%	Modified DSS (14 items) MBTI	General dentist	2.48
7	Roth et al ¹⁴ (Canada)	2003	AJODO	319	48.8%	Modified DSS (52 items) Occupational stress scale	Specialist	4.02
8	Well and Winter ²¹ (USA)	1999	Journal of Dental Education	1572	63%	Modified DSS (64 items)	General dentist	NR
9	Shugars et al ¹³ (USA)	1990	Journal of Dental Education	408	75.1%	DSS (54 items)	General dentist	3.15

AJODO = American Journal of Orthodontics and Dentofacial Orthopedics. CDSS = Chinese Dentist Satisfaction Survey; DSS = Dentist Satisfaction Survey; KDSS = Korean Dentist Satisfaction Survey; MBTI = Maslach Burnout Inventory; MBTI = Myers Briggs Type Indicator.

relationships ($n = 5, 56\%$),^{3-4,13-14,16} professional environment ($n = 4, 44\%$),^{3,13-14,16} practice management ($n = 4, 44\%$),^{4,13-14,16} respect ($n = 4, 44\%$),^{3-4,13-14} stress ($n = 2, 22\%$),^{3,13} recognition of one's strengths and skills ($n = 1, 11\%$),¹⁶ work organization ($n = 1, 11\%$),¹⁶ possibility to improve and qualify ($n = 1, 11\%$),¹⁶ professional evaluation and appreciation ($n = 1, 11\%$),¹⁶ work load ($n = 1, 11\%$),¹⁶ time for family ($n = 1, 11\%$),¹⁶ social security ($n = 1, 11\%$),¹⁶ and overall quality of life ($n = 1, 11\%$).¹⁴

Risk of bias

All 9 of the observational studies were at low risk of bias and are summarised in Table 3. The sample size was calculated across all the studies. Sample representation was considered appropriate in 4 studies (44%). DSS and modified DSS conducted in all the included studies were considered adequate. A response rate was reported for all the studies. Age and sex were considered confounding factors. In the included studies, the outcomes were assessed, and 8 studies (89%) performed adequate statistical adjustments. None of the studies were blinded to independent assessments and evaluations of DJS issues.

Synthesis of the results

Overall job satisfaction

Among the 9 studies, 8 presented overall job satisfaction as a continuous variable. Seven studies, which used similar questionnaires in a total of 4810 respondents, comprised the meta-analysis. After pooling the results, the random effect size of job satisfaction score was 3.83, 95% CI: 3.81-3.84, $I^2 = 99.9\%$, $Q = 528843.2$ (Figure 2).

Work environmental factors

Analyses of the work environmental factors were performed in the meta-analysis. The factors associated with the most satisfaction were patient relationships (4.05, 95% CI: 4.03-4.07, $I^2 = 99.5\%$, $Q = 1311.7$), respect (3.98, 95% CI: 3.95-4.01, $I^2 = 98.6\%$, $Q = 210$), delivery of care (3.87, 95% CI: 3.85-3.89, $I^2 = 99.6\%$, $Q = 1133.9$), staff (3.65, 95% CI: 3.62-3.68, $I^2 = 99.1\%$, $Q = 535.2$), professional relationships (3.61, 95% CI: 3.59-3.63, $I^2 = 98.9\%$, $Q = 387.7$), and professional environment (3.52, 95% CI: 3.49-3.55, $I^2 = 98.9\%$, $Q = 296.8$). Conversely, the factors associated with the least satisfaction were personal time (3.02, 95% CI: 2.99-3.04, $I^2 = 99.2\%$, $Q = 762.9$), stress (3.12, 95% CI: 3.03-3.21, $I^2 = 98.1$, $Q = 53.1$), income (3.19, 95% CI: 3.17-3.22, $I^2 = 99.5\%$, $Q = 1145.6$), practice management (3.26, 95% CI: 3.24-3.29, $I^2 = 94.7\%$, $Q = 57.3$), and professional time (3.36, 95% CI: 3.34-3.38, $I^2 = 99.6\%$, $Q = 1386.1$) (Figure 2).

Discussion

This review examined overall job satisfaction and factors associated with DJS reported in 9 good-quality studies. The accumulated results exhibited consistency in definition and job satisfaction measurements. Despite the lack of

Table 2 – Work environmental factors found in the included cross-sectional studies.

	Cui et al ³	Fahim ⁵	Bates et al ⁴	Puriene et al ¹⁶	Jeong et al ¹⁵	Baran ²⁰	Roth et al ¹⁴	Well and Winter ²¹	Shugars et al ¹³	Result
Work environ- mental factors	Professional relationship Staff Respect Professional time Professional environment Delivery of care Patient relationship Stress Income Personal time	Patient relationship Delivery of care Staff Income Professional time Personal time	Patient relationship Delivery of care Respect Staff Professional time Income Personal time Professional relationship Practice management	Professional relationship Patient relationship Possibility to realize one's capabilities and talents Work environment Work organization Possibility to improve and qualify Practice management Professional evaluation and appreciation Work load Time for family Personal time Income Social security	Patient relationship Delivery of care Staff Income Professional time Personal time	NR	Patient relationship Overall quality of life Respect Delivery of care Professional relationship Staff Professional environment Income Professional time Practice management Personal time	NR	Patient relationship Professional relationship Delivery of care Respect Stress Staff Professional time Practice management Personal time Income Professional environment	Patient relationship (7/9) Income (7/9) Personal time (7/9) Staff (6/9) Professional time (6/9) Delivery of care (6/9) Professional relationship (5/9) Professional environment (4/9) Practice management (4/9) Respect (4/9) Stress (2/9) Possibility to realize one's capabilities and talents (1/9) Work organization (1/9) Possibility to improve and qualify (1/9) Professional evaluation and appreciation (1/9) Work load (1/9) Time for family (1/9) Social security (1/9) Overall quality of life (1/9)

Table 3 – Quality of the studies based on the modified Newcastle-Ottawa Quality Assessment Scale for observational studies.

Author, year (Country)	Selection				Confounding factor Item	Outcome			Total score (%)
	1	2	3	4	5	6	7	8	
Cui et al, ³ 2017 (China)	1	0	1	1	1	1	1	0	6 (75)
Fahim, ⁵ 2013 (Egypt)	1	0	1	1	1	1	1	0	6 (75)
Bates et al, ⁴ 2012 (USA)	1	1	1	1	1	1	1	0	7 (88)
Puriene et al, ¹⁶ 2007 (Lithuania)	1	0	1	1	1	1	1	0	6 (75)
Jeong et al, ¹⁵ 2006 (South Korea)	1	1	1	1	1	1	1	0	7 (88)
Baran, ²⁰ 2005 (USA)	1	1	1	1	1	1	0	0	6 (75)
Roth et al, ¹⁴ 2003 (Canada)	1	0	1	1	1	1	1	0	6 (75)
Well and Winter, ²¹ 1999 (USA)	1	0	1	1	1	1	1	0	6 (75)
Shugars et al, ¹³ 1990 (USA)	1	1	1	1	1	1	1	0	7 (88)
	9 (100)	4 (44)	9 (100)	9 (100)	9 (100)	9 (100)	8 (89)	0 (0)	
Methodological appraisal score (%)									
Bad	Satisfactory					Good			
0-33	34-66					67-100			

Criteria: (1) Sample size calculation. (2) Representativeness of the study sample. (3) Ascertainment of the assessment tool for the dentist satisfaction survey. (4) Response rate. (5) Consideration of important confounding factors at the start of the study. (6) Ascertainment of the assessment tool for overall job satisfaction and related factors. (7) Performance of statistical adjustment. (8) Independent blind assessment for overall job satisfaction and related factors.

NA = not applicable.

Items with NA were not included when calculating percentages in each item.

consistency in socioeconomic background, health care policy, study period, and demographic characteristics related to DJS, we found that dentists were satisfied with their jobs at a moderate to high level. In addition, we considered 11 factors that were assessed in multiple studies. Among these factors, we concluded that the 6 associated with the most satisfaction were patient relationships, respect, delivery of care, staff, professional relationships, and professional environment. Conversely, the 5 factors associated with the least satisfaction were personal time, stress, income, practice management, and professional time.

In the meta-analysis, 76.6% of dentists were satisfied with their career. This may have been the result of 78% of studies conducted in high-income countries that typically offer a high level of quality of life.^{14,23-25} This finding was similar to that of a previous review.²⁶ However, that review included only 2 studies and was conducted in low- and middle-income countries. Our study was conducted using 9 studies evaluating dentists, which helped to better understand DJS.

Geographical region may influence DJS because of cultural and dental care setting differences. Therefore, modified versions of DSS were created with geographic-specific items. Using similar questionnaires from the included studies, we analysed associated factors by meta-analysis to clarify the influences of work environments on DJS and provided more valuable findings on DJS. However, stress was only examined in 2 studies. Further studies should use the questionnaires based on DSS including stress to improve the significance of the findings.

In an analysis of overall job satisfaction score, specialists (more than 65% satisfied) had higher overall job satisfaction compared with general dentists.^{3-5,13-16,20} Indeed, paediatric dentists were more satisfied with many aspects of their job. According to the American Dental Association, paediatric dentists see almost twice as many patients per week as

general dentists (excluding hygiene visits).²⁷ This finding was contrary to previous findings among general dentists.^{24,28-29} Compared with general dentistry, paediatric dentistry is a fast-paced environment. In another study, Canadian orthodontists had higher overall job satisfaction compared with general dentists because of memberships in professional associations.¹⁴ Fahim reported that specialists had higher job satisfaction than general dentists.⁵ In another aspect, the lowest level of specialist satisfaction was related to stress, which is consistent with previous research among general dentists.²⁹

Strengths and limitations

Our study is the first to systematically investigate the level of DJS and the effects of environmental factors at work without limitations of specific periods and geographical areas. DSS is used as a standardized instrument to create homogeneous findings. In addition, even though NOS has some limitations,³⁰ it is widely used to assess the quality of the study. Furthermore, we made a comparison between general dentists and specialists based on similar questionnaires. These can help policy makers implement changes to improve the quality of life for dentists.

This study also has several limitations. First, despite using a comprehensive questionnaire, the majority of studies has been carried out in high-income countries, which resulted in a lack of evidence from middle- and low-income countries. Further studies should be conducted to examine the DJS in middle- and low-income countries. Second, the findings are limited within cross-sectional studies. Therefore, longitudinal studies are required to identify the change of work environmental factors. Third, public and private dental settings, age, and sex were not analysed to

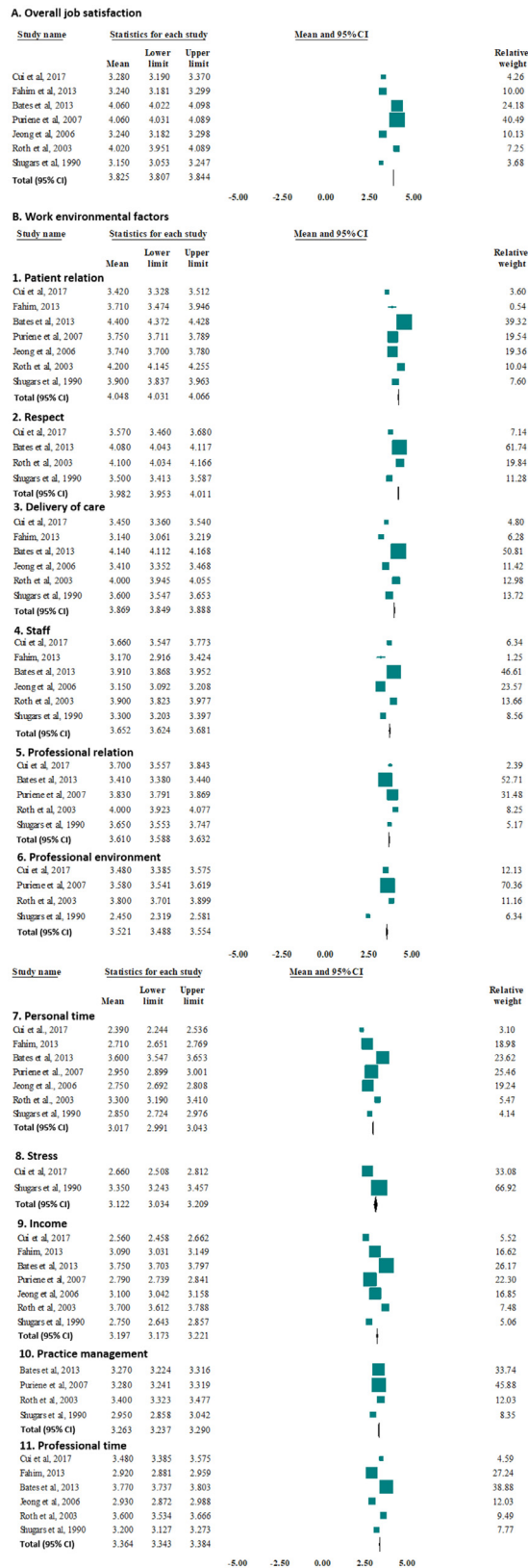


Fig. 2 – Forest plot of meta-analysis for dentists' job satisfaction.

determine the impact on DJS. Finally, stress was not evaluated in most studies. To analyse this factor in more detail, further studies should include stress as a work environmental factor.

Policy implications

Job satisfaction is an important factor for career decisions.³¹ Recently, migration of dentists is an emerging policy issue.³²⁻³⁴ Therefore, high job satisfaction among dentists is important. The findings of our review suggest that this could be achieved through regulation of working hours, improvement of recognition for work regarding salary, and clinical skills development.

With regard to education, comparison between general dentists and specialists may provide valuable evidence for design of dental school curriculum according to specialisation as well as provide undergraduate students an educational orientation before graduation. The influence of education on students is important for suitable field choice and a high job satisfaction.

Conclusion

Despite a limitation in the number of included studies, there is a consistent finding that dentists were satisfied with their jobs at a moderate to high level. In addition, specialists are more satisfied than general dentists. The 6 work environmental factors that most affected satisfaction were patient relationships, respect, delivery of care, staff, professional relationships, and professional environment. The 5 factors that provided the least satisfaction were personal time, stress, income, practice management, and professional time. However, longitudinal studies are required to identify changes in these factors over time. Further studies should be performed in middle- and low-income countries using DSS including stress evaluation.

Author contributions

Design and implementation of the systematic review: Van Nhat Thang Le and Dae-Woo Lee. Writing of the manuscript: Van Nhat Thang Le. All authors discussed the results and commented on the manuscript.

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Conflicts of interest

None disclosed.

Appendix 1. Detailed search strategies for each database. MeSH terms, search terms, and combinations of the two were used for each database search

Database	Detailed search strategies	Records found
MEDLINE/PUBMED	("job satisfaction"[MeSH Terms] OR Job Satisfaction[Text Word]) AND ("dentists"[MeSH Terms] OR Dentists[Text Word]) 385	
EMBASE	"job satisfaction" AND dentist	411
Web of Science	ALL FIELDS:(job satisfaction) AND ALL FIELDS:(dentist)	143

MeSH = Medical Subject Headings.

Ultimately, 939 records were found, 385 from MEDLINE/PubMed, 411 from EMBASE, and 143 from the Web of Science. Studies were further selected according to the inclusion criteria listed in the Material and Methods (Figure 1).

Appendix 2. Methodological Quality Appraisal Tool

Selection		
1	Did the authors present their reasons for selecting or recruiting the number of people included or analysed? 0. No 1. Yes	
2	Was the study sample likely to be representative of the study population? 0. Nonprobability sampling (including purposive, quota, convenience, and snowball sampling) 1. Probability sampling (including simple random, systematic, stratified random, cluster, two-stage, and multistage sampling)	
3	Was the dentist satisfaction survey valid and reliable? 0. No 1. Yes	
4	Was a response rate proper? 0. No 1. Yes	
Confounding factors		
5	Were there any considerations for important disturbance variables, such as age or sex, related to dental job satisfaction? 0. No 1. Yes	
Outcome		
6	Was the measurement tool used for assessment of outcome (overall job satisfaction and related factors) valid and reliable? 0. No 1. Yes	
7	Was the statistical adjustment adequately performed? (ie, The effect of confounders when evaluating the influence of independent variables on dental job satisfaction) 0. No 1. Yes	
8	Was the evaluation performed independently by 2 raters blinded to each other? 0. No 1. Yes	
Methodological Appraisal Score		
Bad	Satisfactory	Good
0%-33 %	34%-66 %	67-100 %

0 = no or not reported; 1 = yes.

Note. Scoring: Total score divided by total number of items multiplied by 100.

Quality appraisal score: weak: 0%-33.9%, moderate: 34%-66.9%, and strong: 67%-100%.

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