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REVIEW ARTICLE

Factors Affecting the General Health of Hospital Nurses in the Decade (2007-2017 in Iran): A Meta-Analysis Study

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A B S T R A C T

Background: Nurses constitute a large population of organizational workforce in the field of health. They experience a high level of job stress and workplace pressure. Therefore, paying attention to nurses' health and reducing burnout, increase productivity, job satisfaction, and organizational commitment. Relying on meta-analysis method, this study seeks to investigate the factors related to the general health of nurses and measure the effect of each factor.

Methods: The method of this research is quantitative meta-analysis, which was carried out in the period of 2007-2017 with a sample size of 14 research documents. The statistical population of the study included all the studies conducted in Iran regarding the general health of nurses which have been published in scientific and research journals as IRANDOC, NORMAGS, and SID. The purposive sampling method was based on the inclusion and exclusion criteria, as well as considering the validity and reliability of the research. Compliance with validity, reliability and quality of research; the existence of correlation coefficient, sample size and significant level of research has been the criteria for entering the research into the Comprehensive Meta-Analysis Software version 2.

Results: In this study, the lack of diffusion bias and homogeneity of the effect size were first confirmed. In terms of bias, most of the studies under review were sub-funnel, indicating no propagation error. Based on the results of the N-error-free test, 253 studies should be performed to question the results of the present study. The results of I2 also indicated that the research in this field was homogeneous. Based on the results of effect size, strengthening communication skills, followed by stress management group therapy, had the greatest role in improving the general health of nurses. Finally, it was found that the average effect size of various factors on the general health of nurses was 0.164.

Conclusion: It can be concluded that strengthening communication skills among nurses has an important role in improving their general health followed by group therapy. Stress management has the next highest effect size and is one of the most important factors related to improving the health of nurses.

Key words: General health, Nurses, Group therapy, Job stress, Meta-analysis

Introduction

Today, most experts and thinkers focus on the importance and role of human resource as the development factor of Iran and the most important capital in every organization (1). One of the bases to evaluate the health of an organization is the health of that organization's human resources. Undoubtedly, this is essential for ensuring the dynamicity and efficacy of any organization. Studying this issue is of great importance in hospitals (2). Hospital staff is influenced by various stressful factors because of providing treatment and comfort to patients (3). Nurses are the largest expertise group in the health care system. 40 % of a hospital staff are made up of nurses, and 55 % of the staff costs is allocated to them (4). In fact, health care organizations can't succeed without effective nursing personnel (5). However, this working group is dealing with a lot of stress on a daily basis. It is caused by overwork, individual conflicts, shift

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work, dealing with mortality, lack of psychological support, conflict with doctors and ambiguity in their authority in the workplace (6). It has also been demonstrated that ,compared to other members of health team, nurses experience higher levels of burnout relating to the nature of their job (7, 8).

According to Winslow, general health is defined as "the science and art of disease prevention, life extension and health promotion through organized efforts and informed choices of society, organizations, public and private societies and individuals"(9). General health promotes and protects the health of people in their communities (10). General health operates to track disease outbreaks, and prevent injuries. It also explains why some of us suffer more from poor health (11). World Health Organization experts consider general health as an organized effort carried out through public institutions to improve, promote, and maintain general health (12). The European Commission considered general health as an organized process, which is carried out to ensure health, maintain health and promote general health. From their viewpoint, general health; including the relationship between social conditions and population health; and it includes measures that are taken to improve the health of the population (13). The Karolinska Institute as a research-led medical university in Solna of Sweden states that general health is a multidisciplinary field that purposes to study and deal with determinants of health at the population level. It suggests that social structure, life habits, work life, environment and health care system affect population health and health care efficiency (14). Policy development; gathering and disseminating evidence for health policies, strategies and practices; disease prevention and control; Intersectoral action for better health; and the development of human resources and capacity building is the major functions of general health (15). Building on these identified functions, the general health functions steering committee (16), identified six general health goals as follows (1), prevent epidemics and the spread of disease, (2) protect against environmental hazards, (3) prevent injuries, (4) promote and encourage healthy behaviors, (5) respond to disasters and help communities recover, and (6) ensuring quality and access to health services. Laros (17) introduces general health as the mental talent for pleasant coordination, effective working, and flexibility in difficult situations. Kaplan (18) considers general health a constant adaptation to various situations and an attempt to achieve balance between internal conflicts and changeable environmental requirements. Abstractly, general health is related to the way of thinking and expressing feelings, behaviors and actions (19). It is the basis of social and emotional development in individuals (20).

In Iran, 80 percent of the employees in the health care system are nurses (21). They are responsible for individuals' health and life and deal with patients and their incurable diseases. Therefore, nurses always experience high level of psychological stress (22). On the one hand, these psychological pressures are because of the emotional nature of the patient's needs, long hours of working, and interpersonal involvements in the nurses' workplace (23). On the other hand, it is nurses' obligation to inform patients of their disease and different dimensions of treatment. This is because having an effective and empathetic relationship with patients is necessary (24, 25). In sum, the workload of nursing decreases general health (26). Therefore, the general health status of this group, who are very much exposed to stress, should be taken seriously (24).

According to previous studies, nursing, especially shift work, can have various negative effects on job performance, sleep, physical and mental health, social life, use of various drugs and the level of tolerance of job stress. Sleep disorders in shift nurses increase treatment errors, desire for drinking alcohol and other drugs, and decrease performance (27). Similarly, the results of other studies revealed that those who work as a nurse are at a higher risk of heartburn (28, 29). The prevalence of muscular-skeletal disorders, breast cancer and tuberculosis and the possible risk of blood diseases (HIV, hepatitis B, hepatitis C virus) are higher in nurses (30) who are

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more prone to occupational stress implications. Finally, according to the results of various studies, the amount of risk factors among nurses is higher than the general population (31, 32). It can be said that many biological, chemical, physical, ergonomic, psychological and organizational factors effect on the general health (33, 34). As research findings in this field suggest, ergonomic and psychosocial measures are effective in improving working and living conditions of this occupational group. They are important not only for the nurses' health and well-being, but also for patient outcomes. Physical and psychological demands should be reduced for nurses (35) so that they experience lower levels of stress compared to other health experts (36). Lack of attention to the general health of nurses prevents them from providing optimal care regarding physical and psychological support to patients. This increases the risk of making mistakes and occupational accident, which influences patients and nurses (37). This, in turn, exacerbates mental and physical distress (38). Another advantage of improving the general health of nurses is that it enables them to realize their place in the family, social groups and work environment correctly and can establish a constructive relationship with others (39). Hence, the continuous improvement the life quality of this group and raising their level of health is of great importance. According to aforementioned discussion, the main objective of this study is conducting a meta-analysis regarding nurses' general health and the effective factors in the decade of 2007-17 in Iran.

Materials and Methods

The research method is quantitative meta-analysis (cma2). Meta-analysis with a systematic review of previous researches; It seeks to estimate the effect size of independent variables on dependent variables. The present research method, steps: 1. Searching for the keyword “general health and hospital nurses 2. Collecting articles from Normags database, Magiran; Irandoc; Net Science and Academic Jihad Database (SID); 3. Screening and selection of articles with entry criteria conditions (correlation coefficient, sample size, significance level, validity and reliability of research, survey and use of questionnaire tools); 4. Entering the software and finally 5. Estimating the size of the research effect. It has gone through publication bias and mediating (modifying) variables. Research period from 2007 (the first published research article) to 2017 (the last article). The statistical population is 22 cases, of which 14 studies were selected by a deliberate method after methodical control and screening (having entry criteria). Finally, the final effect sizes of each study and the total final effect (effect size) have been estimated using the Fisher and Cohen formula in the meta-analysis software. To detect homogeneity or heterogeneity, the funnel plot and Q test were used, and after proving the assumption of heterogeneity between studies, the moderating (contextual) variable was used to measure its effect on the general health and hospital nurses. Meta-analysis with a research approach helps the researcher to combine contradictory and non-contradictory quantitative results in the past in a favorable way (40). This method does not have some of the limitations of the standard literature review; thus, it enables the researchers to statistically combine the results of a large number of studies and improve conflicting results bond (41). The research has provided the required statistical information. Finally, 14 papers related to the problem of the present study were selected, and meta-analysis was performed with regard to them. Therefore, many experts consider it permissible to perform meta-analysis even on a smaller number of studies compared to this study provided that the criteria and conditions are met (42, 43).

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Table 1. General specifications reviewed in meta-analysis

Row	Researcher name	Year of publication	Research method	Sample size	Significance level	Sampling method	Tools	Factors related to general health
1	Mahdad, et al.(44)	2016	Descriptive-correlational	0.182	۰.۰۵۰	Random	Questionnaire	Religious beliefs
2	Akbarizadeh et al. (25)	2011	Descriptive-cross-sectional	0.125	۰,۰۵۰	Random	Questionnaire	Spiritual intelligence, hardness
3	Gholipour et al. (45)	2012	Clinical trial	0.460	۰,۰۵۰	Random	Questionnaire	Supplementary surface
4	Soleimani et al. (37)	2008	Descriptive-analytical	0.520	0.001	Random	Questionnaire	Sleep quality, suitable management, shift work
5	Hojjati, et al. (46)	2009	Descriptive-analytical	0.124	0.050	Random	Questionnaire	Sleep quality
6	Rahmani et al. (47)	2010	Descriptive-correlational	0.059	۰,۰۵۰	Random	Questionnaire	Occupational stress
7	Amini, et al. (48)	2013	Semi-experimental	0.200	۰,۰۱۰	Random Classified	Questionnaire	Communicational skills instruction
8	Rahimaghaei, et al. (49)	2017	Descriptive-correlational	0.200	۰,۰۱۰	Random	Questionnaire	Organizational citizenship behavior and social capital
9	Rostami, et al. (50)	2015	Cross-sectional	0.335	۰,۰۰۱	Random	Questionnaire	Emotional intelligence
10	Moharrami, et al. (51)	2015	Semi-experimental	0.200	0.05	Accessible sampling	Questionnaire	Group therapy Stress management
11	Barzideh, et al. (52)	2015	Cross-sectional	0.385	0.01	Aimed sampling	Random Systematic	Occupational stress dimensions, Authority in decision making
12	Rahimpour, et al. (53)	2012	Cross-sectional	0.240	0.001	Random	Questionnaire	Sleep quality and sleep shift
13	Fatehi et al. (54)	2015	Cross-sectional	0.176	0.001	Accessible sampling	Questionnaire	Occupational stress and self-efficacy
14	Mushak et al. (55)	2015	Cross-sectional	0.780	0.484	Accessible	Questionnaire	Occupational stress

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Table 2. Criteria for inclusion and exclusion of studies in meta-analysis

1- Studies published from 2007 to 2017
2- Studies related to the general health of nurses in the health department
3- Studies that have provided necessary information for the practical extraction of the size of the work
4. Studies that examined the factors affecting the general health of nurses

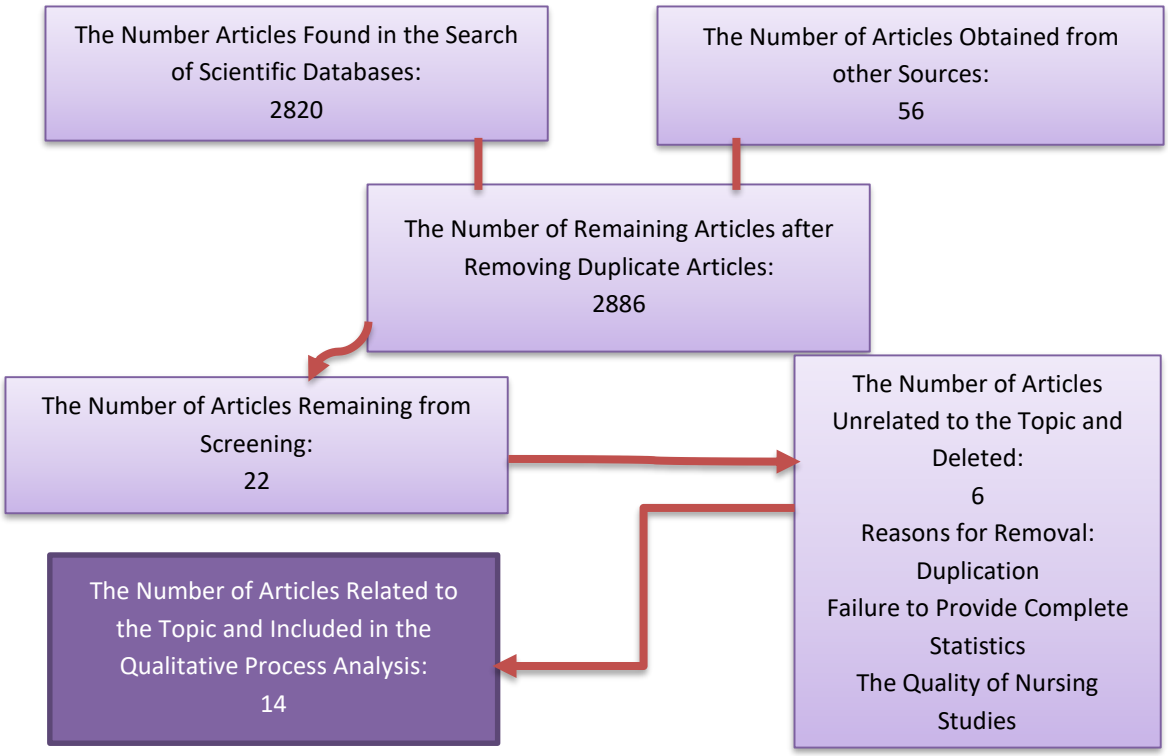

Figure 1. The process of selecting studies in systematic review and meta-analysis

Results

Effect size

The effect size is used for the rejection or acceptance of the null hypothesis as shown in Figure 2. Via calculating the effect size, researchers can find that to what extent the independent variable has affected the dependent one. In a comprehensive statistical definition, the effect size is the ratio of a meaningful testing to the study size (56). Based on Table 2, all of the reviewed studies were significant except for Mashak et al. (55), and the highest effect size was related to Amini et al.'s (48) research in 2013. The effect size of Amini et al.'s (48) research was 0.561. On the other hand, the lowest effect size was related to the research by Mashak et al. (55). However, due to the insignificance of the results of this effect size, the researchers conclude that they cannot rely on the results of this project.

Release error or release bias

Lack of attention to all the conducted studies leads to publication bias. This can be due to reasons such as poor design and implementation of studies, including sample size, data reporting method, delay, language, non-acceptance by journals, database indexing, amount of documentation and public highlights, Even this non-publication can depend on the direction and strength of the scientific findings (57). When there is a publication bias, the results of the final meta-analysis will be affected; and the final estimates will be biased and erroneous. Therefore, it is necessary to identify and correct publication bias in the early stage of meta-analysis to increase the validity of the results (58). The most common way

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of identifying publication bias is using a two-dimensional publication diagram called funnel diagram. The funnel diagram is based on the fact that the statistical weight of the study increases by increasing its sample size. (57). In the absence of any bias, the diagram looks like an inverted funnel, and in the presence of a bias, the funnel diagram becomes asymmetric. Although visual evaluation of the funnel diagram helps the analyst to gain an understanding about the nature of data, it is optimal to use statistical tests to reduce subjective evaluations of the symmetry of the funnel diagram. Thus, in this research the authors have used the Beck-Mesomorphic method and bias-free N. The results of these methods are presented in the following sections.

Funnel diagram

The following Figure is a funnel diagram of the studies reviewed in the present study in order to investigate the publication bias.

Based on the above funnel diagram, it can be said that there is a relative symmetry between the studies performed, because most studies are at the top of the funnel. However, due to the relativeness of the funnel diagram results and the fact that a definite judgment can't be made in this case, the following statistical tests (the Beck and Mesomorphic rank correlation test, and N safe from bias) are used.

Beck and mesomorphic rank correlation results

This test examines the relationship between effect size and sample variances. Based on the interpretation of this test, if the asymmetry is due to publication bias, more standard bias is expected in relation to the larger effect size. The results of this method are shown in the Table 4.

If the significance level of the Beck and Mesomorphic test is greater than 0.050, it can be said that there is no publication bias. According to the P-value amounts in the above Table, the researchers concluded that the assumption of no publication bias is confirmed.

N safe results from bias

This test indicates the number of studies that should be added to the analysis in order to reach a statistically insignificant total effect of a research and change the research result. The basic idea of bias-free is that if a small number of meaningless studies are needed to reduce a result to a significant level, the research is unreliable. The results of this method are described in the following Table. Based on Table 5, the other 253 studies should be taken into account in order that the value of the combined bilateral P does not exceed 0.050. This means that another 253 studies must be considered in order that errors in the final results of calculations and analyzes occur.

Assumptive investigation of homogeneity of studies

Q test has been used to evaluate the homogeneity of the studies. The results of the test show that Q = 11.259 and P-value = 0.589. If P-value is greater than 0.050, the null hypothesis would be confirmed. So, the null hypothesis indicating the homogeneity of the studies is accepted. In other words, the significance of the Q index indicates the existence of homogeneity in a study. However, this index is sensitive to the increase of the number of effect sizes. As the number of effects increases, its power to reject homogeneity increases as well. Therefore, the I^2 index is used. The closer this value is to 10, the higher the heterogeneity will be; and the farther from 10, the lower the heterogeneity is. The results of I^2 demonstrated that there is no heterogeneity between the studies. In other words, the results of this test suggested that the factors related to the general health of nurses are not different in terms of characteristics and specifications of the studies.

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Table 4. Results from the study of Beck and Mesomorphic rank correlation method

Statistical indicator	Kendall coefficient value	Z-value	P*	
			One domain	Two domains
Results	۰/۵۴۹	۰/۷۲۷	0.310	۰/۶۲۰

* The P-value in the table 4 confirms the non-emission bias assumption.

Table 5. Results of examining the n-safe method of error

Indicator	Value
Amount of z for observed studies	۸/۵۵
Amount of P for observed studies	0.001
Alpha	۰/۰۵۰
The rest	0.002
Z for alpha	۱/۹۵۹
The number of observed studies	0.014
The number of lost studies which reached the amount of P to alpha	0.253

Table 6. Results of Q Test

Statistical indicator of results	The amount of Q-test	Degree of freedom	Meaningful level of P-value	(I2)-Square 5
	۱۱/۲۵۹	0.013	۰/۵۸۹	۰/۰۰۰

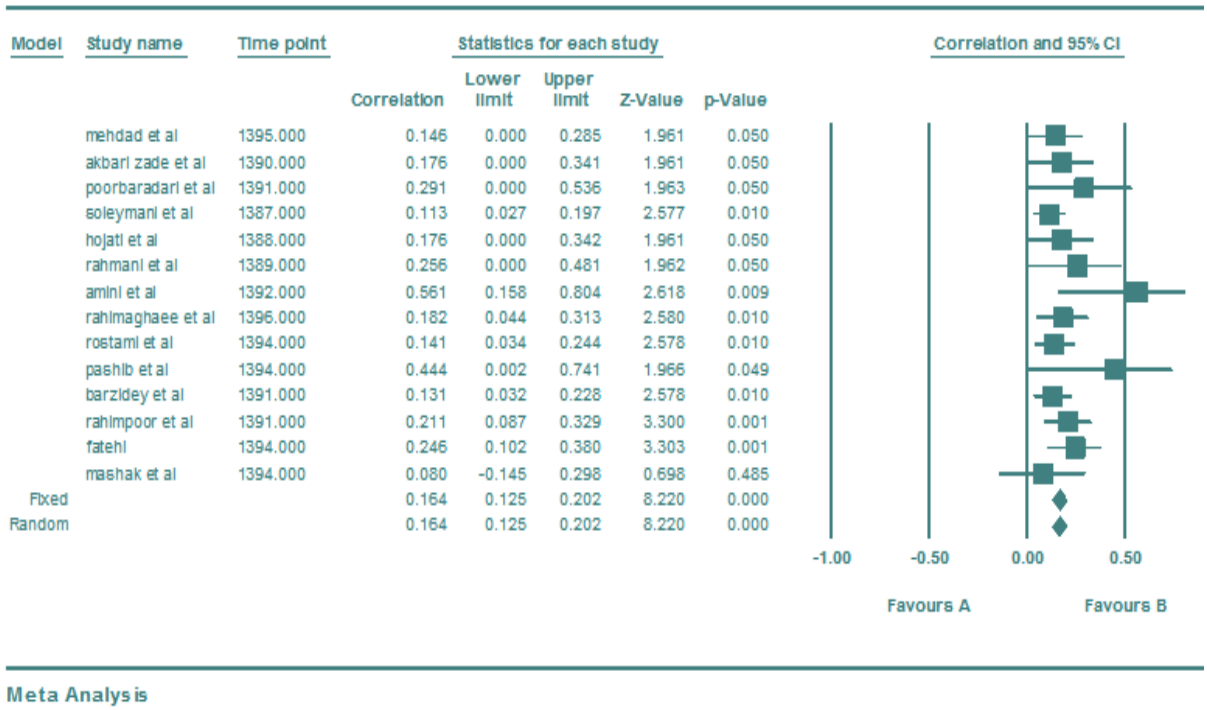

Figure 2. The size of the effect of the research entered into the meta-analysis

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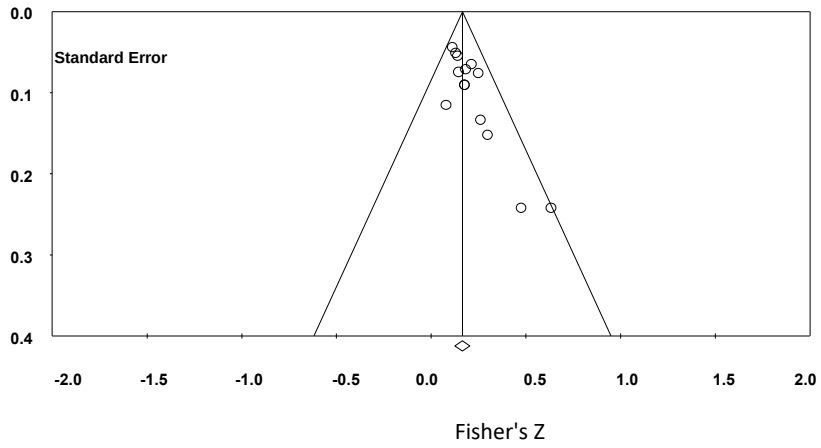

Figure 3. Funnel plot of standard error by Fisher's Z

Discussion

Public health as a basic individual factor affects various aspects of personal, professional, and family life and plays a fundamental role in justifying and explaining the quality of life of a person and satisfaction with his position in life. This concept, as an important part of the concept of health, means the ability to create balanced relationships with others and the ability to participate in changes in the social environment. Meanwhile, nurses are one of the important strata of the social health field, and a major part of their life time is spent in the hospital environment and in communication with patients. Therefore, it is important to pay attention to the public health status and the effective indicators in improving their public health. In this research, meta-analysis was used to measure related indicators and factors. Meta-analysis offers a more comprehensive view by combining the results of research conducted in a subject area. Meta-analysis also shows the overall effect size and the effect size of mediating variables of each study. The research findings show that Amini et al.'s (48), research has the highest effect size. Therefore, strengthening communication skills among nurses plays an important role in improving their general health. The research of Kohraziet al. (59) has been carried out in this field and it has shown that life and communication skills training plays an essential role in reducing nurses' depression. Soleimani's research (60), also shows that people who are unable to communicate with others suffer from depression, anxiety, and impairment in social and physical functions more than other people. Research by Lee and Crockett (61), also shows that communication skills significantly reduce the level of occupational stress of nurses and the stress management group therapy has the next highest effect size and is considered one of the most important factors related to improving the general health of nurses. The research of Mohramami et al. (62), shows that after the group therapy intervention, a statistically significant difference was observed between the average scores of occupational stress and self-efficacy of the control and experimental groups. In addition that, the implementation of stress management group therapy among nurses is associated with reducing occupational stress and increasing self-efficacy. Research by James (62), shows that the schema-based approach plays a significant role in justifying the effectiveness of schema training in reducing occupational stress.

Conclusion

The results suggested that there is no publication bias in the field of nurses' health studies. Based on the results of the funnel diagram, most of the studies are considered at the bottom of the funnel, which indicates that there is no publication bias. The significance level of Beck and Mesomorphic test also confirmed the assumption of no

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publication bias. The results of I2 illustrated that the research in this field is homogeneous. In examining the hypothesis of homogeneity of these 14 studies, Q test with 99 % confidence, and null hypothesis based on homogeneity of studies was confirmed. So, the hypothesis of heterogeneity of effect size regarding performed studies was rejected. According to the results of this research and the effect size, Amini et al.'s (48) research has the highest effect size. It can be said that reinforcing communication skills among nurses has a critical role in improving their general health. The group therapy in stress management has the next highest effect size. It is one of the most important factors which are related to the improvement of the nurses' general health.

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Conflict of interests

The authors declared no conflict of interests.

Authors' Contributions

Zolfaghari A, Niazi M, and Vahedian M designed research; Zolfaghari A and Vahedian M conducted data; Zolfaghari A, Niazi M, and Vahedian M analyzed data; and Zolfaghari A and Vahedian M wrote manuscript. All authors read and approved the final manuscript.

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