

## Review Article

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# The Prevalence of Low Back Pain among Iranian Hospital Nurses: A Systematic Review and Meta-analysis

Masoud Mohammadi, Ali Akbar Vaisi Raiegani, Rostam Jalali, Akram Ghobadi, Nader Salari

Department of Nursing,  
School of Nursing and  
Midwifery, Kermanshah  
University of Medical  
Sciences, Kermanshah, Iran

### ORCID:

Masoud Mohammadi: <https://orcid.org/0000-0002-5722-8300>;

Ali Akbar Vaisi Raiegani:  
<https://orcid.org/0000-0002-2706-4042>;

Rostam Jalali: <https://orcid.org/0000-0003-1781-9939>;

Akram Ghobadi: <https://orcid.org/0000-0001-5289-7997>;

Nader Salari: <https://orcid.org/0000-0002-6448-5313>

### ABSTRACT

**Background:** Low back pain (LBP) is common among nurses. Yet, studies reported contradictory results about its prevalence.

**Objectives:** The aim of this study was to systematically evaluate the prevalence of LBP among Iranian hospital nurses.

**Methods:** This was a systematic review and meta-analysis. Online databases such as Scientific Information Database, MEDLINE (PubMed), Scopus, ScienceDirect, and Google Scholar were searched for studies on Iranian hospital nurses' LBP published in 2000–2017. A meta-analysis was performed using the random effects model via the Comprehensive Meta-analysis software. The heterogeneity of the studies was assessed using the Cochran's Q test and  $I^2$  statistic.

**Results:** In total, 17 studies were included. The overall prevalence of LBP among Iranian hospital nurses was 64.8% (95% confidence interval [CI]: 59.6%–69.7%). The lowest and the highest LBP prevalence rates were, respectively, 46.2% (95% CI: 43.5%–49%), among nurses in Tehran and 89.1% (95% CI: 82.2%–93.6%) among nurses in Isfahan. Meta-regression analysis revealed that increase in the sample size and the publication year of the reviewed studies were associated, respectively, with statistically significant decrease and increase in the prevalence of LBP ( $P < 0.05$ ).

**Conclusion:** With an overall prevalence of 64.8%, LBP is highly prevalent among Iranian hospital nurses. Health policymakers and hospital managers need to provide nurses with necessary educations about LBP prevention and management and make necessary modifications to their workplace in order to create an ergonomically appropriate environment for their practice.

**KEYWORDS:** Hospital, Iran, Low back pain, Meta-analysis, Nurse

## INTRODUCTION

Low back pain (LBP) is a common problem in today's world. Its prevalence is increasing, so that currently, 40% of the general population suffers from LBP in their lives.<sup>[1,2]</sup>

LBP is one of the most common causes of physical disability, the second cause of medical visits after common cold, the third cause of surgery, and the fourth cause of hospitalization. The annual cost of LBP management in the United Kingdom is estimated to be around 10,688 million pounds.<sup>[3,4]</sup>

LBP is a symptom, rather than a disease, which occurs following affliction by different systemic,

musculoskeletal, and neurological diseases. It can lead to problems such as debility, disability, invalidity, employment loss, sick leave, and unemployment compensation payment.<sup>[5,6]</sup>


LBP is mainly caused by activities that require lengthy standing or sitting, lifting heavy objects, bending, or frequent rotation because these activities cause imbalance and put heavy pressure on the lumbar region.

**Address for correspondence:** Dr. Ali Akbar Vaisi Raiegani, Department of Nursing, School of Nursing and Midwifery, Kermanshah University of Medical Sciences, Kermanshah, Iran.  
E-mail: [visi\\_akbar@yahoo.com](mailto:visi_akbar@yahoo.com)

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All these activities are common during nursing practice and hence, nurses are at great risk for LBP. Studies show that LBP is the most common musculoskeletal problem among nurses, with a prevalence of 66%–77%.<sup>[7-9]</sup>

Nurses in developed countries participate in occupational health surveillance programs, where their health and occupational safety are continuously monitored. Nonetheless, nurses in developing countries, like Iran, have no access to such programs and thus, they may be at risk for different work-related occupational problems such as LBP. However, there are no reliable data on the prevalence of musculoskeletal problems such as LBP among Iranian nurses. Of course, many cross-sectional studies examined LBP prevalence among nurses in Iran; however, their results are contradictory. For instance, studies on nurses in Tehran, Iran, reported a wide range of LBP prevalence from 46.2% to 77.9%.<sup>[8-12]</sup> Moreover, the overall prevalence of LBP among Iranian hospital nurses is still unknown.

### Objectives

The aim of this study was to systematically evaluate the prevalence of LBP among nurses in hospital settings in Iran.

### METHODS

This was a systematic review and meta-analysis. The study was conducted on articles published in national and international journals in Persian and English from April 2000 to March 2017. Accordingly, online databases such as Scientific Information Database, MEDLINE (PubMed), Scopus, ScienceDirect, and Google Scholar were searched. Search key terms were “low back pain,” “nurse,” and “Iran.” The Boolean operators “AND” and “OR” were used to combine search results. Keywords were selected from the Medical Subject Headings. Inclusion criteria were cross-sectional study on LBP prevalence among Iranian nurses and publication in Persian or English. We excluded review studies; studies on musculoskeletal disorders; studies on the relationship of LBP with other problems; studies on the causes and the risk factors of LBP; and studies with interventional, cohort, and case-control designs. Besides, in order to find gray literature—i.e., studies which had not scientifically been published—we used the Google search engine and reviewed websites on the study subject.

### Quality appraisal

After completing document search, a list was created of all documents with “LBP in nurses” in their titles. Then, the title pages of these documents (which included authors’ names and journal titles) were removed and their full-texts were blindly reviewed by two reviewers using

the Strengthening and Reporting of Observational Studies (STROB) in Epidemiology checklist. The items of the checklist were responded as “Present,” “Not present,” or “Not applicable.” For documents which were rejected, the reasons for rejection were provided. Moreover, in case of any disagreement on a document between the two reviewers, the document was judged by a third reviewer. Finally, a data collection form was used to collect data on the specifications of the included studies. The form included items on study title, authors’ names, year and place of the study, sample size, and LBP prevalence.

### Statistical analysis

The heterogeneity of the studies was assessed using the Cochran’s Q test, where  $I^2$  statistic was interpreted as follows: <25%: low heterogeneity; 25%–75%: moderate heterogeneity; and >75%: high heterogeneity. The results of the test revealed an  $I^2$  of 97%. Thus, the random effects model was used to combine the results of the included studies. Publication bias was evaluated via funnel plot and Egger’s test at a significance level of <0.05. Data analysis was done using the Comprehensive Meta-analysis software v. 3.0 (Biostat, Englewood, NJ, USA).

### RESULTS

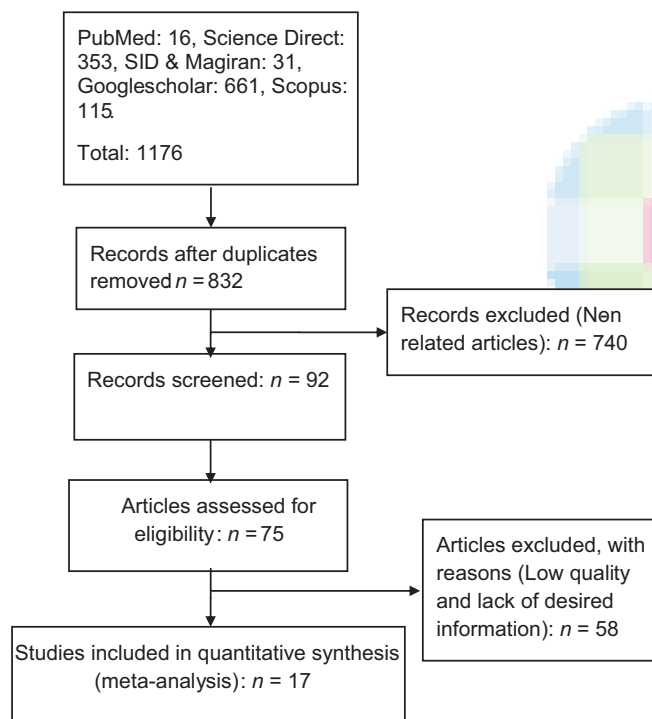
The articles of 17 studies were eligible and included in the study [Table 1 and Figure 1]. The total number of nurses in these 17 studies was 8539, while nurses’ age ranged between 20 and 53 years.<sup>[10-26]</sup> The result of the Egger’s test was not statistically significant ( $P = 0.157$ ), indicating that there was no publication bias [Figure 2]. Figure 3 shows LBP prevalence among Iranian hospital nurses based on the random effects model. In this figure, each black square and the length of the line on the square, respectively, show LBP prevalence and its 95% confidence interval (95% CI), while the black diamond shows the overall prevalence of LBP among Iranian hospital nurses, which was 64.8% (95% CI: 59.6%–69.7%). As this figure shows, the lowest LBP prevalence rate, i.e., 46.2% (95% CI: 43.5%–49%), was observed among nurses who were working in Tehran,<sup>[22]</sup> while the highest LBP prevalence rate, i.e., 89.1% (95% CI: 82.2%–93.6%), was observed among nurses in Isfahan.<sup>[25]</sup>

We used meta-regression analysis in order to investigate the effects of factors which could potentially affect heterogeneity in LBP prevalence. These factors were sample size and publication year. Accordingly, the results of meta-regression analysis illustrated that any increase in sample size was associated with statistically significant decrease in LBP prevalence. In other words, studies with larger samples reported significantly lower LBP prevalence [ $P < 0.05$ ; Figure 4]. Moreover, increase

**Table 1: The characteristics of the reviewed studies**

Prevalence of LBP (%)	Sample size	Participants' age	Place	Year	Authors	References
70.8	195	33	Tabriz	2013	Eftekharsadat <i>et al.</i>	[10]
73	174	39 ± 7.6	Birjand	2010	Aliabadi <i>et al.</i>	[11]
79.7	118	35.6 ± 7.03	Shiraz	2012	Chobineh <i>et al.</i>	[12]
55.3	244	-	Isfahan	2013	Ghasemi <i>et al.</i>	[13]
62	1226	25-35	Mazandaran	2005	Mohseni-Bandpai <i>et al.</i>	[14]
60.9	940	33.7 ± 8.07	Sari	2016	Nasiry-ZarrinGhabaee <i>et al.</i>	[15]
81	400	32.9 ± 6.2	Amol	2011	Sharifnia <i>et al.</i>	[16]
49.4	245	32 ± 7.8	Shahroud	2005	Sadeghin <i>et al.</i>	[17]
77.9	420	25-50	Tehran	2014	Faraz <i>et al.</i>	[18]
55.2	815	35.3 ± 6.4	Isfahan	2014	Aghayari <i>et al.</i>	[19]
52.7	296	20-30	Tehran	2006	Ramezanibdr <i>et al.</i>	[20]
69.5	243	-	Babol	2017	Samaei <i>et al.</i>	[21]
46.2	1246	31.2 ± 5.3	Tehran	2014	Rezaee <i>et al.</i>	[22]
58.9	246	33.7 ± 0.2	Shahroud	2014	Sadeghian <i>et al.</i>	[23]
61.8	385	-	Shiraz	2014	Barzideh <i>et al.</i>	[24]
89.2	120	34 ± 9.07	Isfahan	2012	Habibi <i>et al.</i>	[25]
50	1226	-	Mazandaran	2006	Mohseni-Bandpei <i>et al.</i>	[26]

LBP: Low back pain

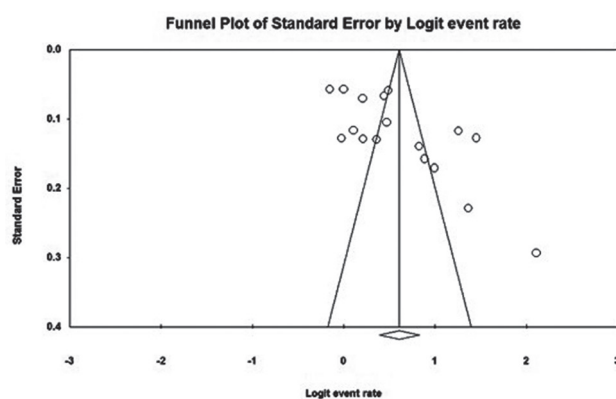


**Figure 1: The PRISMA flow diagram of the study**

in publication year of the studies was associated with significant increase in LBP prevalence, so that studies which had been published in recent years had reported significantly higher LBP prevalence compared with older studies [ $P < 0.05$ ; Figure 5].

## DISCUSSION

The results of this study showed an overall LBP prevalence of 64.8% among Iranian hospital nurses. The



**Figure 2: Funnel plot for the results of low back pain prevalence among Iranian hospital nurses**

highest and the lowest LBP prevalence rates were 89.1% among nurses in Isfahan and 46.2% among nurses in Tehran, respectively.

LBP among nurses has varying prevalence rates in different settings and countries, probably due to the variations in workplace facilities, job specifications, and work-related factors; yet, most studies reported a high prevalence.<sup>[27]</sup> For instance, a study in Japan reported that 54.7% of nurses suffered from LBP mostly due to poor body posture.<sup>[2]</sup> LBP prevalence in a study in Dutch was 36%, with lifting heavy things such as patients as the major cause.<sup>[28]</sup> A study in Turkey also reported that the total LBP prevalence was 65.8%, while LBP prevalence after 1 year of nursing practice was 85.7%.<sup>[29]</sup> Moreover, LBP rate among nurses was reported to be 90% in China,<sup>[30]</sup> 71.3% in Japan,<sup>[31]</sup> 48.4% in Saudi Arabia,<sup>[32]</sup> 78.1% in Nigeria,<sup>[33]</sup> 61.5% in Thailand,<sup>[34]</sup>

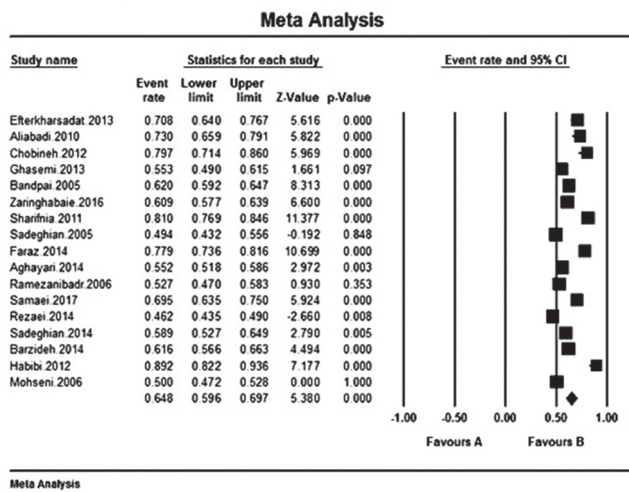


Figure 3: The prevalence of low back pain among Iranian nurses based on the random effects model

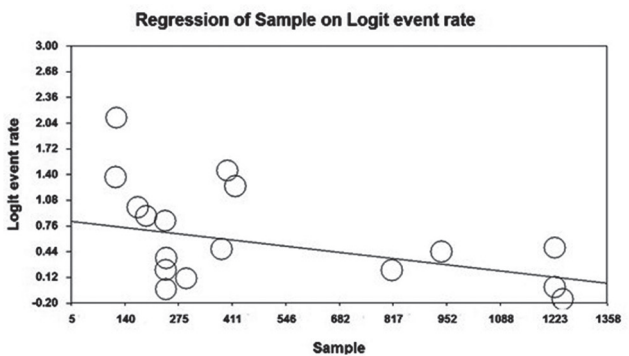


Figure 4: The meta-regression diagram for low back pain prevalence among Iranian hospital nurses based on the sample size of the reviewed studies

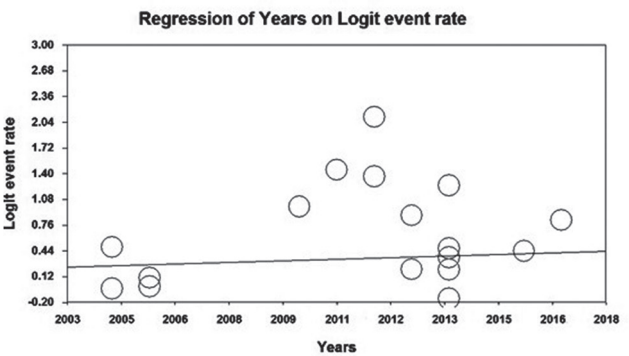


Figure 5: The meta-regression diagram for low back pain prevalence among Iranian hospital nurses based on the publication year of the reviewed studies

>90% in Australia,<sup>[35]</sup> 73%–76% in Germany,<sup>[36]</sup> and 86% in Italy.<sup>[37]</sup> All these results imply that nurses are highly susceptible to LBP. The major causes of such high LBP prevalence among nurses may be heavy workload, standing for long hours, and patient positioning.<sup>[34-38]</sup> LBP can negatively affect different aspects of life,

including quality of life.<sup>[39]</sup> Therefore, nurses need to pay special attentions to the principles of ergonomics and safety during their daily practice.

Meta-regression analysis in the present study also showed that increase in the sample size and the publication year of the reviewed studies were associated, respectively, with statistically significant decrease and increase in LBP prevalence. Significantly higher LBP prevalence in studies published in the last years can be attributed to the ineffectiveness of LPB prevention and management programs for nurses. Nurses make up 80% of health-care providers in Iran.<sup>[9]</sup> They play different roles in care delivery; counseling hospital and ward management; disease prevention; and personal, family, and public health promotion.<sup>[9]</sup> Moreover, as family members, they need to manage their household and perform a wide variety of familial roles. Such role multiplicity and heavy workload prevent them from paying adequate attention to personal health and thereby, predispose them to different health problems such as LBP. Yet, they have limited knowledge, if any, about the principles of ergonomics and proper corrective exercises for LBP management. Therefore, specific training courses are needed to improve their knowledge about LBP, its risk factors, its management strategies,<sup>[21]</sup> safe positioning and right lifting techniques, and use of proper body mechanics. Health-care managers can also reduce LBP prevalence through making environmental modifications to nurses' workplace, reducing nurses' work hours and workload, using age-appropriate work schedules, and providing nurses with easily accessible physical exercise facilities.

**Study strengths and limitations**

One of the strengths of the present study was the provision of an overall estimate for LBP prevalence among Iranian hospital nurses for the first time. Moreover, meta-regression analysis was used in this study for the two factors of sample size and publication year. On the other hand, the most important limitations of the study were related to the inaccessibility of the full text of some retrieved studies as well as the low quality of some studies due to reporting little details about LBP prevalence.

**CONCLUSION**

With an overall prevalence of 64.8%, LBP is a highly prevalent musculoskeletal problem among Iranian hospital nurses. Therefore, health policymakers and hospital managers need to pay closer attention to the health status of Iranian hospital nurses and employ strategies to prevent and manage LBP among them. Moreover, interventional studies are recommended to

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evaluate the effects of ergonomic interventions on LBP prevalence among hospital nurses.

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### Conflicts of interest

There are no conflicts of interest.

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