



Prevalence of Depression and Pain Among Patients with Spinal Cord Injury in Iran: A Systematic Review and Meta-Analysis

Masoud Hatefi¹, Alireza Abdi², Asma Tarjoman³  and Milad Borji^{2, *} 

¹Department of Neurosurgery, Faculty of Medicine, Ilam University of Medical Sciences, Ilam, Iran

²Department of Nursing, Faculty of Nursing and Midwifery, Kermanshah University of Medical Sciences, Kermanshah, Iran

³Student Research Committee, Kermanshah University of Medical Sciences, Kermanshah, Iran

*Corresponding author: Department of Nursing, Faculty of Nursing and Midwifery, Kermanshah University of Medical Sciences, Kermanshah, Iran. Tel: +98-9183404704, Email: borji_milad@yahoo.com

Received 2018 December 13; Revised 2019 February 23; Accepted 2019 March 03.

Abstract

Context: Spinal cord injury (SCI) is a malignant disorder that causes several adverse effects on all aspects of the individual's life and disrupts the normal routine of life.

Objectives: The present study aimed at evaluating the prevalence of depression and pain among patients with SCI through a systematic review and meta-analysis.

Methods: The present systematic review was conducted on Iranian literature. The study population included all articles available on Iranian and international databases as well as Google Scholar search engine. For this purpose, databases including SID, Magiran, IranMedex, IranDoc, Scopus, PubMed, ScienceDirect, Web of Science, and ProQuest were searched. The quality of published articles was assessed by two highly qualified researchers; the primary search was also performed separately. The data were analyzed with comprehensive meta-analyses (CMA) statistical package.

Results: According to the findings, the prevalence of mild depression in the studied patients was 22.6% (95% confidence interval (CI): 17.50 - 28.8), moderate depression was 19.6% (95% CI: 14.7% - 25.7%), and severe depression was 12.1% (95% CI: 8.3% - 17.3%); in addition, 46.5% of the patients had no depression (95% CI: 26.7% - 67.6%), and 65.9% of the subjects complained of pain (95% CI: 53.9% - 76.1%).

Conclusions: Because of high prevalence of pain and depression among patients with SCI, it is essential to take appropriate measures to prevent depression and pain in such patients in order to improve their health status and quality of life.

Keywords: Spinal Cord Injury, Pain, Depression, Meta-Analysis

1. Context

Spinal cord injury (SCI) is a malignant disorder that causes several adverse effects on all aspects of the individual's life and disrupts the normal routine of life (1). Car accidents and other causes of spinal cord injuries are among the most dangerous physical harms and even life threatening events (2). Several factors lead to SCI, i.e., earthquake, car accident, and war (3, 4). According to released statistics, the SCI has a high rate in the developing countries; in other words, about 25.5 million people are added to the affected population every year (5), which emphasizes the need to pay more attention to such patients (6).

According to previous studies, chronic diseases are important (7-11); for example, trauma is associated with many complications (12, 13). Patients with SCI undergo changes in their health status due to developed diseases, which can be attributed to the reduced quality of life (QoL) (14), increased pain (15), and increased depression (16) that all

make reviewing their general prevalence very beneficial. The QoL of patients with SCI is lower than that of the general population (17). Although SCI affects the life condition of the patient as well as his/her family members- i.e., the spouse, parents, and children, improving the QoL in such patients can be targeted as a rehabilitation goal (18).

Pain management is one of the critical factors in the improvement of patients' health status (19, 20). People with SCI may experience one or more types of pain simultaneously including neuropathic and musculoskeletal pain (21-23). In patients with SCI, in addition to pain, self-care and mobility, due to moving in a wheelchair, are disrupted, which causes significant anxiety and depression in such patients (16, 24-26). The study of pain prevalence can indicate the issues of patients with SCI, although its prevalence varies in different studies; thus, the study of the general prevalence of pain is of great importance (27).

2. Objectives

Considering the importance of evaluating depression and pain in patients with SCI, the present study aimed at determining the level of depression and pain among patients with SCI through a systematic review and meta-analysis.

3. Methods

3.1. Study Protocol

The current study was conducted based on the protocol of systematic review and meta-analysis (PRISMA) (28). The present systematic review was conducted on Iranian literature from the first article published on 28 August 2018 until the study time.

3.2. Search Strategy

Databases including SID, Magiran, IranMedex, IranDoc, Scopus, PubMed, ScienceDirect, Web of Science, and ProQuest were searched using the keywords such as depression, pain, patients with spinal cord injury, spinal cord injury, trauma, and Iran, and the references of recovered articles were also searched in order to ensure the recovery of all utilized articles. The Persian keywords were utilized for Persian language articles.

3.3. The Study Population

The patients with SCI in Iran were considered as the study population in the current systematic review and meta-analysis.

3.4. Inclusion and Extraction Criteria

The primary inclusion criteria were: being a descriptive analysis and availability of the full text. Review articles and letters to the editor were excluded, and ultimately, the eligible articles were enrolled (Figure 1).

The quality of evaluated articles was assessed by two highly qualified researchers; the primary search was performed separately, and in case of disagreements, the validity of the article was assessed by a third researcher. In addition, all the researchers reported their findings in a joint meeting and the results were approved by all parties.

3.5. Data Extraction

The data were collected by a checklist including the name of the author, year of the publication, sampling, sample attributes, data collection method, and conclusions.

3.6. Statistical Analysis

In the present study we analyzed data using comprehensive meta-analysis software. For evaluating the heterogeneity of delirium disease, Cochran's Q test and I² were used (the diversities of the studies were in three section; less than 25% (low heterogeneity), 25 - 75% (moderate heterogeneity) and more than 75% (high heterogeneity). Regarding to studies heterogeneity (I² = 94.88, Q = 430.02, P < 0.001), we have applied DerSimonian and Laird's random effects model for combining the studies. Also, we used Kendal's tau in Begg and Manzumdar test and Funnel plot to examine publication bias.

4. Result

The features of eligible articles are shown in Tables 1 and 2. According to Table 1, five articles on depression were included in the current systematic review. All studies enrolled in the current review were descriptive or descriptive-analytical.

The findings of Table 2 show the features of seven articles on pain entered into the current systematic review. The overall prevalence of pain was reported in four studies including Azma and Etefaghe (33), Modirian et al. (34), Khazaeipour et al. (35), and Matin et al. (31), and meta-analysis of pain outcomes was performed in four studies (Table 2).

The findings of Figure 2 show the prevalence of mild depression in patients with SCI (Q = 2.126, I² = 5.91, P = 0.345). According to the findings, the prevalence of depression was 22.6% (95% confidence interval, CI: 17.5% - 28.8%).

The findings of Figure 3 show the prevalence of moderate depression in patients with SCI (Q = 4.941, I² = 59.51, P = 0.085). According to the findings, the prevalence of moderate depression was 19.6% (95% CI: 14.7% - 25.7%).

The findings of Figure 4 show the prevalence of severe depression in patients with SCI (Q = 2.55, I² = 21.81, P = 0.27). According to the findings, the prevalence of severe depression was 12.1% (95% CI: 8.3% - 17.3%).

The findings of Figure 5 show the prevalence of no-depression in patients with SCI (Q = 14.15, I² = 85.86, P = 0.001). According to the findings, the prevalence of no-depression was 46.5% (95% CI: 26.7% - 67.5%).

Figure 6 shows the amount of publication bias in articles on depression entered into the meta-analysis phase. As shown in the figure, there was no publication bias (Z value for tau = 0.52, P = 0.5).

The findings of Figure 7 show the prevalence of pain in patients with SCI (Q = 22.58, I² = 86.70, P < 0.001). According to the findings, the prevalence of pain was 65.9% (95% CI: 53.9% - 76.1%).

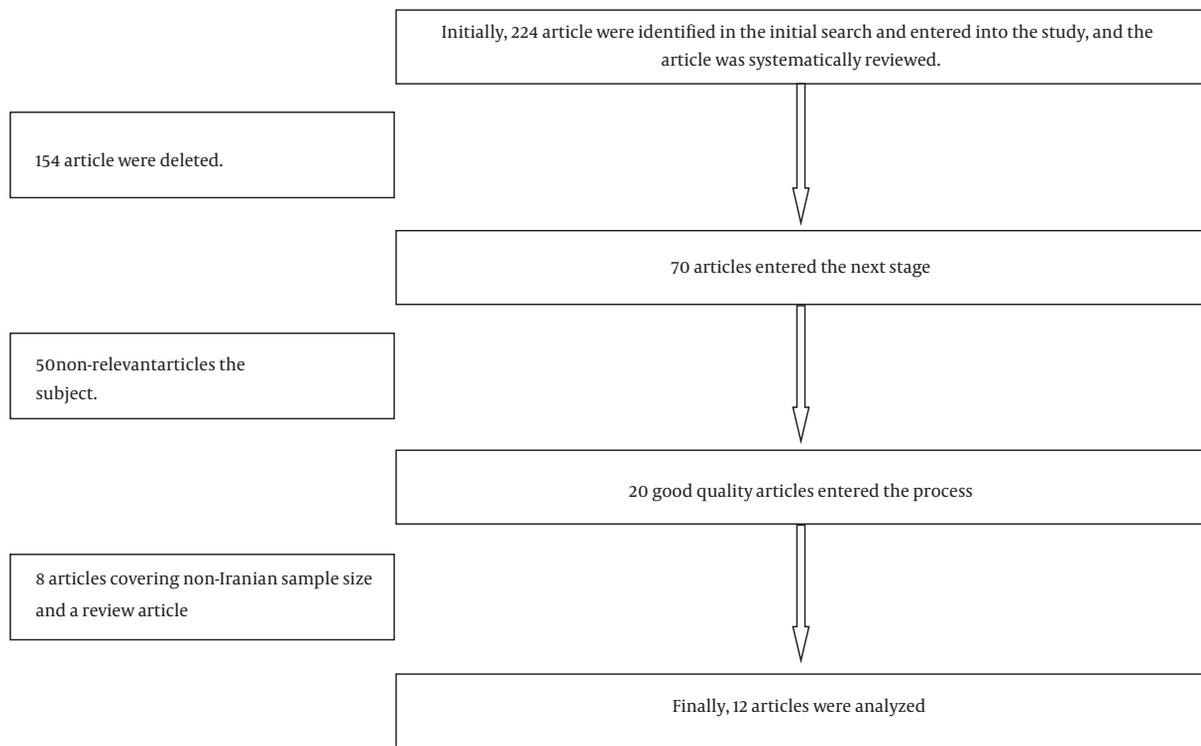


Figure 1. Flowchart of systematic review and meta-analysis

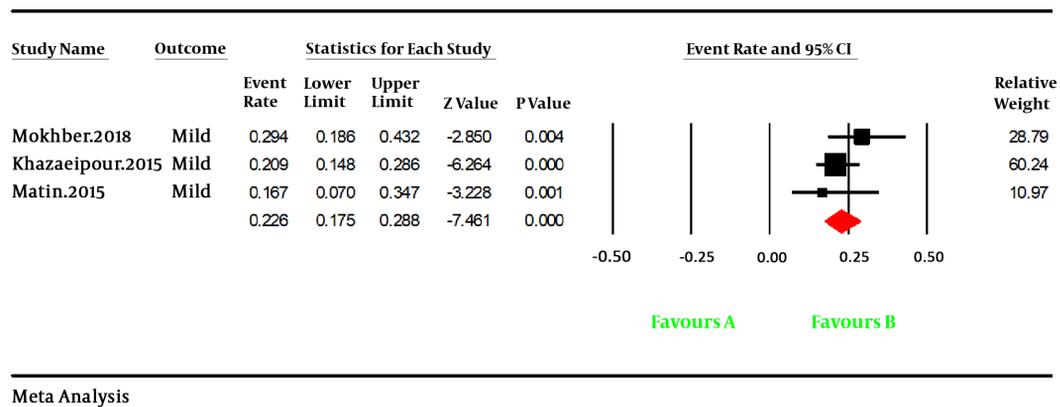


Figure 2. Prevalence of mild depression in patients with SCI

Figure 8 shows the amount of publication bias in articles on pain entered into the meta-analysis phase (Z value for tau = 0.000, P = 0.5).

5. Discussion

Trauma leads to patients' hospitalization and causes neurological problems (36, 37), which may lead to hospitalization of patients in intensive care units and to create delirium (38). The present systematic review and meta-analysis was conducted on the prevalence of depression

Table 1. Features of Eligible Articles on Depression

Author's Name	Objective	Sample Attributes	Data Collection Method	Conclusion
Mohammadi et al. (29)	Relationship between fatigue, depression, and functional level of patients with SCI	108 patients with SCI	Questionnaire with 20 items about the Zang depression	The mean score of depression in patients was 6.63% (N = 2)
Mokhber Dezfoly et al. (16)	Depression in patients with SCI	51 patients with SCI	Beck depression inventory	N = 9 (17.6%), severe; N = 14 (27.5%), moderate; N = 15 (29.4%), mild; N = 13 (25.5%), no depression
Khazaeipour et al. (30)	Depression in patients with SCI	134 participants with SCI	Beck depression inventory II, Persian version	Frequency of depression was 49.3% (N = 66); N = 68 (50.7%), minimal; N = 28 (20.9%), mild; N = 24 (17.9%), moderate; N = 14 (10.4%), severe
Matin et al. (31)	Depressive mood and fatigue in patients with SCI	30 patients with SCI	Beck depression inventory	66.7% had normal mood (BDI < 10) and only 30.3% had severe depression (BDI: 31 - 40); N = 20 (66.7%) normal; N = 5 (16.7%) mild mood disturbances; N = 2 (6.7%) borderline clinical depressive mood; N = 2 (6.7%) moderate depressive mood; N = 1 (3.3%) severe depression
Rahnama et al. (32)	Relationship between spirituality and religious coping with depression	93 male patients with SCI	Hospital anxiety and depression scale (HADS)	14 (15%) patients had depression

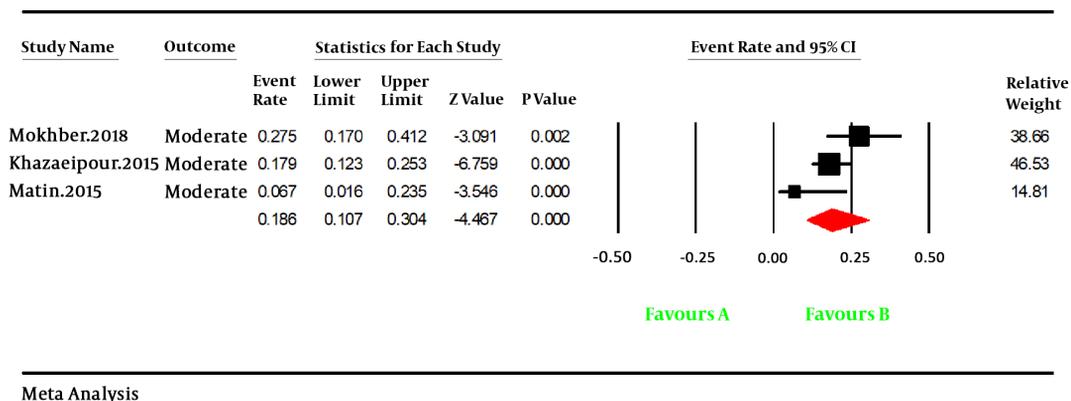


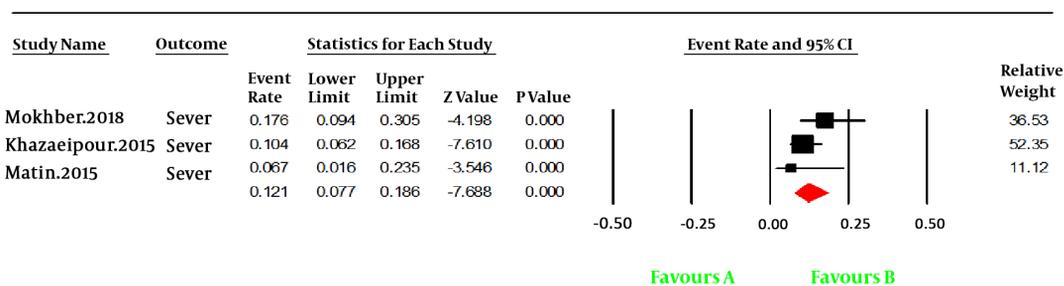
Figure 3. The prevalence of moderate depression in patients with SCI

and pain among patients with SCI in Iran. Depression and pain are in adverse relationship with the QoL and can negatively affect it. Thus, paying more attention to depression and pain in such patients is of great importance (39-41). The findings of the current study showed that of the five articles published in Iran on the prevalence of depression in patients with SCI, three had inclusion criteria for meta-analysis. According to the findings, the prevalence of

mild depression in patients was 22.6% (95% CI: 17.50 - 28.8); the prevalence of moderate depression was 19.6% (95% CI: 14.7% - 25.7%), and the prevalence of severe depression was 12.1% (95% CI: 8.3% - 17.3%), and 46.5% of patients (95% CI: 26.7% - 67.6%) had no depression. In a meta-analysis by Williams and Murray on the prevalence of depression in 19 articles on patients with SCI, the results indicated the general prevalence of depression as 22.2% (95% CI: 18.7% - 26.3%)

Table 2. Features of Eligible Studies on Pain

Author Name	Objective	The Cause of SCI	Sample Attributes	Data Collection Method	Conclusion
Sedghi Goyaghaj et al. (23)	Prevalence and severity of pain in patients with SCI	The incidence of war, vehicle collision, height fall, and spinal cord tumors	248 patients with SCI referring to Khatam-ol-Anbia Hospital, Tehran	International pain inventory for patients with SCI	The prevalence of neuropathic pain was 82.3% (N = 204), musculoskeletal pain 81% (N = 201), visceral pain 41.1% (N = 102), and other pain 1.2% (N = 2)
Emami Razavi et al. (15)	Different types of pain in SCI	Accident, fall, falling of a heavy object on the patient, violence and diving	89 patients with SCI	Short-form McGill pain questionnaire (SF-MPQ-2)	The mean prevalence of neuropathic pain was 20.14% ± 12.21%, affective 4.19% ± 6.21%, intermittent 12.23% ± 11.03%, and continuous 15.50% ± 14.52%
Hassanijirdehi et al. (17)	Evaluation of pain and its effect on QoL and functioning in patients with SCI	Male veterans with SCI	58 patients with SCI	EuroQoL questionnaire and general health questionnaire	The prevalence of pain in the lumbar regions was 63.8%, the cervical region 39.7%, and 51.7% in the shoulder regions. According to the findings, there was a significant and direct relationship between the prevalence of pain and low QoL, high anxiety, and depression
Azma and Ettefaghe (33)	The prevalence of chronic pain and factors affecting it	Traumatic SCI resulted from the Bam earthquake	80 patients developed SCI after Bam earthquake	-	Generally 66 (82.5%) patients complained of pain of them 38 were female (86.4%) and 28 (77.8%) male
Modirian et al. (34)	Chronic pain after SCI	Patients in 26 provinces affected by the Iran-Iraq war	1295 patients with SCI resulted from war	Data consisting of type and site of pain, and exacerbating or palliative factors	The general prevalence of pain was 65.7%. The prevalence of pain was 83% in the lumbosacral region, 62.3% in the thoracic cavity, and 45.4% in the cervical region
Khazaeipour et al. (35)	The prevalence of chronic pain and its correlation with social support and socioeconomic indices	Crash injuries, falling, sport injuries, occupational injuries, etc.	140 individuals with SCI	Brief pain inventory	The general prevalence of pain was 50.7%. The majority of pain sites included knees (50%), shins (45.7%), calves (42.9%), feet (41.4%), ankles (38.6%), and lower back (31.4%)
Matin et al. (31)	Depressive mood and fatigue in patients with SCI	Traumatic SCI	30 patients with SCI	Numerical rating scale	No pain: 11 (36.7%); mild pain: 5 (16.7%); moderate pain: 3 (10.0%); severe pain: 11 (36.7%); general prevalence pain: 19 (63.33%)



Meta Analysis

Figure 4. The prevalence of severe depression in patients with SCI

(42). In the study by Tzanos et al. (25), in Greece, 18.2% of patients were diagnosed with depression, of which 45.7% had minimal, 36% mild, 12.8% moderate, and 3.7% experienced moderately severe depression (25).

The current study findings showed that seven articles,

conducted on the prevalence of pain in patients with SCI, also investigated different types of pain in different parts of the body. Out of the seven articles, four addressed the general prevalence of pain as 65.9% (95% CI: 53.9% - 76.1%). In a study by Mahnig et al., conducted on the prevalence of

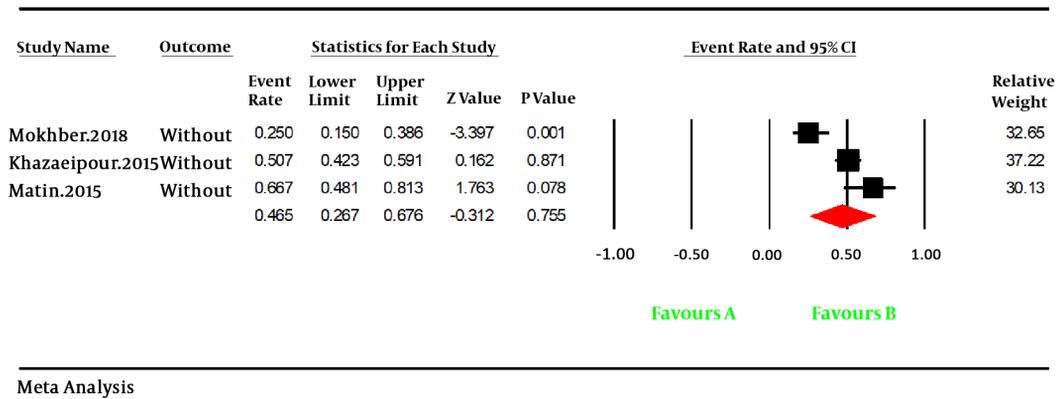


Figure 5. Prevalence of no-depression in patients with SCI

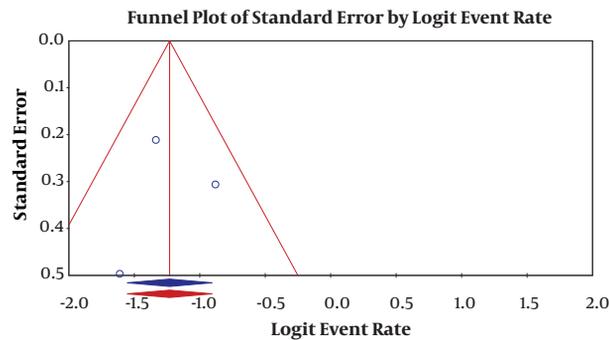


Figure 6. Publication bias in studies on depression

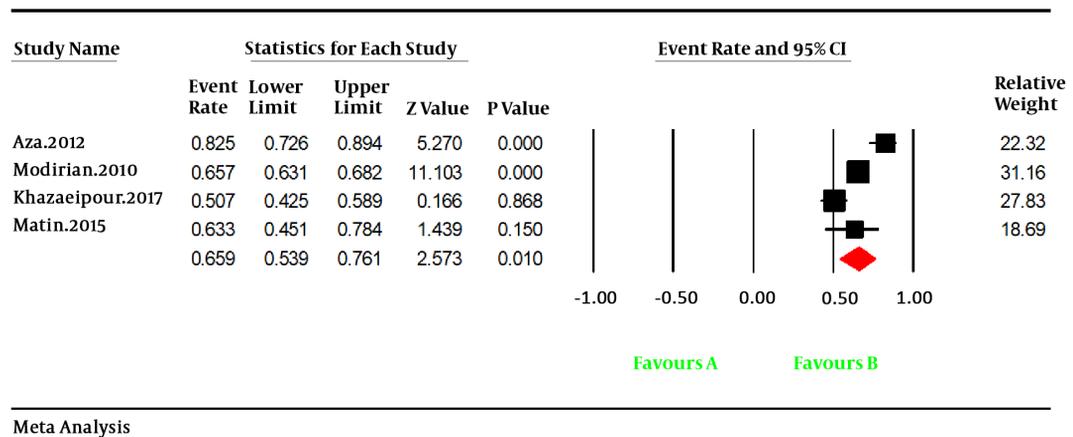


Figure 7. The prevalence of pain in patients with SCI

pain in patients with SCI, the findings indicated that 58% of the patients experienced musculoskeletal pain (43). The

systematic review and meta-analysis performed by Burke et al., indicated that the general prevalence of neuropathic

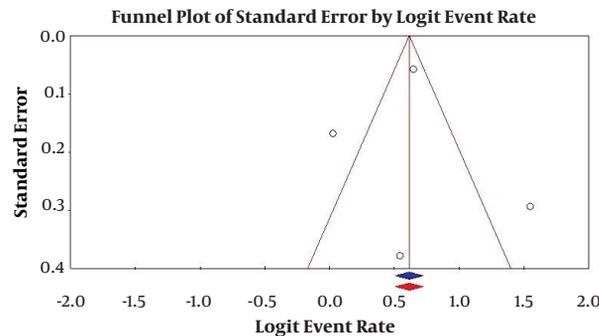


Figure 8. Publication bias in studies on pain

pain was 53% (95% CI: 38.58% - 67.47%) (44). Among the studies investigated pain in such patients, the study by Muller et al., indicated the prevalence of pain in the last week of follow-up as 68.9% and the chronic pain as 73.5% (45).

One of the limitations of the study was that the enrolled articles did not utilize the demographic questionnaire, which led to the small number of quantitative articles eligible to enter the meta-analysis phase. In addition, one of the strengths of the current study was its nobility, to such an extent that no study was conducted in this regard so far.

5.1. Conclusions

Considering the high prevalence of pain and depression among patients with SCI, it is essential to take appropriate measures to prevent depression and pain in such patients in order to improve their health status and QoL.

Footnotes

Conflict of Interests: Authors declared no conflict of interest.

Ethical Approval: IR.KUMS.REC.1397.821.

Funding/Support: The study was granted by the Student Research Committee, Kermanshah University of Medical Sciences, Kermanshah, Iran (grant No.: 3007220).

References

- Liu CW, Attar KH, Gall A, Shah J, Craggs M. The relationship between bladder management and health-related quality of life in patients with spinal cord injury in the UK. *Spinal Cord*. 2010;**48**(4):319-24. doi: [10.1038/sc.2009.132](https://doi.org/10.1038/sc.2009.132). [PubMed: [19841636](https://pubmed.ncbi.nlm.nih.gov/19841636/)].
- Yuan S, Shi Z, Cao F, Li J, Feng S. Epidemiological features of spinal cord injury in China: A systematic review. *Front Neurol*. 2018;**9**:683. doi: [10.3389/fneur.2018.00683](https://doi.org/10.3389/fneur.2018.00683). [PubMed: [30186222](https://pubmed.ncbi.nlm.nih.gov/30186222/)]. [PubMed Central: [PMC6113592](https://pubmed.ncbi.nlm.nih.gov/PMC6113592/)].
- Abdolah M. [Evaluation of quality of life in patients with spinal cord injury following the Bam earthquake in 2003]. *Iran J Rehabil Res Nurs*. 2017;**3**(2):1-7. Persian.
- Pickett GE, Campos-Benitez M, Keller JL, Duggal N. Epidemiology of traumatic spinal cord injury in Canada. *Spine (Phila Pa 1976)*. 2006;**31**(7):799-805. doi: [10.1097/01.brs.0000207258.80129.03](https://doi.org/10.1097/01.brs.0000207258.80129.03). [PubMed: [16582854](https://pubmed.ncbi.nlm.nih.gov/16582854/)].
- Rahimi-Movaghar V, Sayyah MK, Akbari H, Khorramirouz R, Rasouli MR, Moradi-Lakeh M, et al. Epidemiology of traumatic spinal cord injury in developing countries: A systematic review. *Neuroepidemiology*. 2013;**41**(2):65-85. doi: [10.1159/000350710](https://doi.org/10.1159/000350710). [PubMed: [23774577](https://pubmed.ncbi.nlm.nih.gov/23774577/)].
- van der Scheer JW, Martin Ginis KA, Ditor DS, Goosey-Tolfrey VL, Hicks AL, West CR, et al. Effects of exercise on fitness and health of adults with spinal cord injury: A systematic review. *Neurology*. 2017;**89**(7):736-45. doi: [10.1212/WNL.0000000000004224](https://doi.org/10.1212/WNL.0000000000004224). [PubMed: [28733344](https://pubmed.ncbi.nlm.nih.gov/28733344/)].
- Tavan H, Azadi A, Veisani Y. Return to work in cancer patients: A systematic review and meta-analysis. *Indian J Palliat Care*. 2019;**25**(1):147-52. doi: [10.4103/IJPC.IJPC_114_18](https://doi.org/10.4103/IJPC.IJPC_114_18). [PubMed: [30820118](https://pubmed.ncbi.nlm.nih.gov/30820118/)]. [PubMed Central: [PMC6388592](https://pubmed.ncbi.nlm.nih.gov/PMC6388592/)].
- Mehrpoya A, Jalali R, Jalali A, Namdari M. Patient experiences of living with coronary stent. *J Vasc Nurs*. 2018;**36**(4):181-5. doi: [10.1016/j.jvn.2018.07.002](https://doi.org/10.1016/j.jvn.2018.07.002). [PubMed: [30458939](https://pubmed.ncbi.nlm.nih.gov/30458939/)].
- Sepahvand E, Jalali R, Mirzaei M, Kargar Jahromi M. Association between short sleep and body mass index, hypertension among acute coronary syndrome patients in coronary care unit. *Glob J Health Sci*. 2014;**7**(3):134-9. doi: [10.5539/gjhs.v7n3p134](https://doi.org/10.5539/gjhs.v7n3p134). [PubMed: [25948448](https://pubmed.ncbi.nlm.nih.gov/25948448/)]. [PubMed Central: [PMC4802147](https://pubmed.ncbi.nlm.nih.gov/PMC4802147/)].
- Shahrabaki PM, Nouhi E, Kazemi M, Ahmadi F. Family support as a reliable resource for coping in patients with heart failure. *Acta Medica Mediterr*. 2016;**32**:873-8.
- Mangolian Shahrabaki P, Nouhi E, Kazemi M, Ahmadi F. Spirituality: A panacea for patients coping with heart failure. *Int J Community Based Nurs Midwifery*. 2017;**5**(1):38-48. [PubMed: [28097177](https://pubmed.ncbi.nlm.nih.gov/28097177/)]. [PubMed Central: [PMC5219564](https://pubmed.ncbi.nlm.nih.gov/PMC5219564/)].
- Sepahvand E, Jalali R, Mirzaei M, Ebrahimzadeh F, Ahmadi M, Amraei E. Glasgow coma scale versus full outline of unresponsiveness scale for prediction of outcomes in patients with traumatic brain injury in the intensive care unit. *Turk Neurosurg*. 2016;**26**(5):720-4. doi: [10.5137/1019-5149.JTN.13536-14.0](https://doi.org/10.5137/1019-5149.JTN.13536-14.0). [PubMed: [27476914](https://pubmed.ncbi.nlm.nih.gov/27476914/)].
- Jalali R, Rezaei M. A comparison of the glasgow coma scale score with full outline of unresponsiveness scale to predict patients' traumatic brain injury outcomes in intensive care units. *Crit Care Res Pract*. 2014;**2014**:289803. doi: [10.1155/2014/289803](https://doi.org/10.1155/2014/289803). [PubMed: [25013727](https://pubmed.ncbi.nlm.nih.gov/25013727/)]. [PubMed Central: [PMC4071859](https://pubmed.ncbi.nlm.nih.gov/PMC4071859/)].

14. Rivers CS, Fallah N, Noonan VK, Whitehurst DG, Schwartz CE, Finkelstein JA, et al. Health conditions: Effect on function, health-related quality of life, and life satisfaction after traumatic spinal cord injury. A prospective observational registry cohort study. *Arch Phys Med Rehabil*. 2018;**99**(3):443-51. doi: [10.1016/j.apmr.2017.06.012](https://doi.org/10.1016/j.apmr.2017.06.012). [PubMed: 28732686].
15. Emami Razavi SZ, Kazemi S, Azadvari M, Ghajarzadeh M. Evaluation of different types of pain in patients with spinal cord injury. *Arch Neurosci*. 2017;**4**(3). doi: [10.5812/archneurosci.13971](https://doi.org/10.5812/archneurosci.13971).
16. Mokhber Dezfoly R, Rezaee M, Kalantari M, Akbarzadeh Baghban A, Kohan AH. Depression in patients with spinal cord injury referred to the specialized centers in Tehran, Iran. *Arch Neurosci*. 2018;**5**(3). doi: [10.5812/archneurosci.66718](https://doi.org/10.5812/archneurosci.66718).
17. Hassanijirdehi M, Khak M, Afshari-Mirak S, Holakouie-Naieni K, Saadat S, Taheri T, et al. Evaluation of pain and its effect on quality of life and functioning in men with spinal cord injury. *Korean J Pain*. 2015;**28**(2):129-36. doi: [10.3344/kjp.2015.28.2.129](https://doi.org/10.3344/kjp.2015.28.2.129). [PubMed: 25852835]. [PubMed Central: PMC4387458].
18. Lynch J, Cahalan R. The impact of spinal cord injury on the quality of life of primary family caregivers: A literature review. *Spinal Cord*. 2017;**55**(11):964-78. doi: [10.1038/sc.2017.56](https://doi.org/10.1038/sc.2017.56). [PubMed: 28653672].
19. Cong X, Ramesh D, Perry M, Xu W, Bernier KM, Young EE, et al. Pain self-management plus nurse-led support in young adults with irritable bowel syndrome: Study protocol for a pilot randomized control trial. *Res Nurs Health*. 2018;**41**(2):121-30. doi: [10.1002/nur.21862](https://doi.org/10.1002/nur.21862). [PubMed: 29388674]. [PubMed Central: PMC6415297].
20. Hatefi M, Tarjoman A, Borji M. Do religious coping and attachment to god affect perceived pain? Study of the elderly with chronic back pain in Iran. *J Relig Health*. 2019;**58**(2):465-75. doi: [10.1007/s10943-018-00756-9](https://doi.org/10.1007/s10943-018-00756-9). [PubMed: 30610514].
21. Finnerup NB, Bastrup C. Spinal cord injury pain: Mechanisms and management. *Curr Pain Headache Rep*. 2012;**16**(3):207-16. doi: [10.1007/s11916-012-0259-x](https://doi.org/10.1007/s11916-012-0259-x). [PubMed: 22392531].
22. Votrubec M, Thong I. Neuropathic pain: A management update. *Aust Fam Physician*. 2013;**42**(3):92-7. [PubMed: 23529516].
23. Sedghi Goyaghaj N, Monjamed Z, Ghorbani S, Akbarnejhad M, Khosrozadeh M. [Prevalence and intensity of different types of pain in spinal cord injury patients]. *Iran J War Public Health*. 2016;**8**(2):105-10. Persian.
24. Kahrazei F, Mirshekar T. [Effect of wives group training on activities of daily living and quality of life in male patients with spinal cord injury]. *Med Surg Nurs J*. 2015;**4**(1):54-9. Persian.
25. Tzanos IA, Mavrogenis A, Gioti K, Papagelopoulos P, Panagiotopoulos E. Depressive mood in individuals with spinal cord injury (SCI) living in Greece. *Spinal Cord*. 2018;**56**(9):883-9. doi: [10.1038/s41393-018-0093-z](https://doi.org/10.1038/s41393-018-0093-z). [PubMed: 29581518].
26. Graupensperger S, Evans MB. Associations between obesity and psychological morbidity of depression and anxiety in spinal cord injury patients. *Arch Physic Med Rehabil*. 2017;**98**(12):e166-7. doi: [10.1016/j.apmr.2017.09.056](https://doi.org/10.1016/j.apmr.2017.09.056).
27. van Gorp S, Kessels AG, Joosten EA, van Kleef M, Patijn J. Pain prevalence and its determinants after spinal cord injury: A systematic review. *Eur J Pain*. 2015;**19**(1):5-14. doi: [10.1002/ejp.522](https://doi.org/10.1002/ejp.522). [PubMed: 24824334].
28. Moher D, Liberati A, Tetzlaff J, Altman DG; PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med*. 2009;**6**(7). e1000097. doi: [10.1371/journal.pmed.1000097](https://doi.org/10.1371/journal.pmed.1000097). [PubMed: 19621072]. [PubMed Central: PMC2707599].
29. Mohammadi S, Tajabadi A, Roshanzadeh M. [Relation fatigue and depression with performance level of patients with spinal cord injury]. *J Nurs Physic War*. 2018;**5**(17):28-35. Persian.
30. Khazaeipour Z, Taheri-Otaghsara SM, Naghdi M. Depression following spinal cord injury: Its relationship to demographic and socioeconomic indicators. *Top Spinal Cord Inj Rehabil*. 2015;**21**(2):149-55. doi: [10.1310/sci2102-149](https://doi.org/10.1310/sci2102-149). [PubMed: 26364284]. [PubMed Central: PMC4568096].
31. Matin M, Latifi S, Koushki D, Norouzi Javidan A, Laleh L, Soltani Z, et al. Depressive mood and fatigue in Iranian patients with spinal cord injury and spared walking ability. *Arch Neurosci*. 2014;**2**(3). doi: [10.5812/archneurosci.20180](https://doi.org/10.5812/archneurosci.20180).
32. Rahnama P, Javidan AN, Saberi H, Montazeri A, Tavakkoli S, Pakpour AH, et al. Does religious coping and spirituality have a moderating role on depression and anxiety in patients with spinal cord injury? A study from Iran. *Spinal Cord*. 2015;**53**(12):870-4. doi: [10.1038/sc.2015.102](https://doi.org/10.1038/sc.2015.102). [PubMed: 26123206].
33. Azma K, Etefaghe L. [Pain prevalence and its contributing factors in patients with traumatic spinal cord injury 4 years after earthquake in Bam, Iran]. *Iran J War Public Health*. 2012;**4**(3):40-3. Persian.
34. Modirian E, Pirouzi P, Soroush M, Karbalaei-Esmaeili S, Shojaei H, Zamani H. Chronic pain after spinal cord injury: Results of a long-term study. *Pain Med*. 2010;**11**(7):1037-43. doi: [10.1111/j.1526-4637.2010.00865.x](https://doi.org/10.1111/j.1526-4637.2010.00865.x). [PubMed: 20492574].
35. Khazaeipour Z, Ahmadipour E, Rahimi-Movaghar V, Ahmadipour F, Vaccaro AR, Babakhani B. Association of pain, social support and socioeconomic indicators in patients with spinal cord injury in Iran. *Spinal Cord*. 2017;**55**(2):180-6. doi: [10.1038/sc.2016.160](https://doi.org/10.1038/sc.2016.160). [PubMed: 27922624].
36. Khajavikhan J, Vasigh A, Kokhazade T, Khani A. Association between hyperglycaemia with neurological outcomes following severe head trauma. *J Clin Diagn Res*. 2016;**10**(4):PC11-3. doi: [10.7860/JCDR/2016/17208.7686](https://doi.org/10.7860/JCDR/2016/17208.7686). [PubMed: 27190880]. [PubMed Central: PMC4866178].
37. Khajavikhan J, Vasigh A, Khani A, Jaafarpour M, Kokhazade T. Outcome and predicting factor following severe traumatic brain injury: A retrospective cross-sectional study. *J Clin Diagn Res*. 2016;**10**(2):PC16-9. doi: [10.7860/JCDR/2016/16390.7294](https://doi.org/10.7860/JCDR/2016/16390.7294). [PubMed: 27042518]. [PubMed Central: PMC4800584].
38. Khalighi A, Tarjoman A, Abdi A, Borji M. *The prevalence of delirium in patients in Iran: A systematic review and meta-analysis*. 2019.
39. Casida JM, Abshire M, Ghosh B, Yang JJ. The relationship of anxiety, depression, and quality of life in adults with left ventricular assist devices. *ASAIO J*. 2018;**64**(4):515-20. doi: [10.1097/MAT.0000000000000681](https://doi.org/10.1097/MAT.0000000000000681). [PubMed: 29028692].
40. Wilson CS, Forchheimer M, Heinemann AW, Warren AM, McCullumsmith C. Assessment of the relationship of spiritual well-being to depression and quality of life for persons with spinal cord injury. *Disabil Rehabil*. 2017;**39**(5):491-6. doi: [10.3109/09638288.2016.1152600](https://doi.org/10.3109/09638288.2016.1152600). [PubMed: 27109856].
41. Riiskjaer M, Forman A, Kesmodel US, Andersen LM, Ljungmann K, Seyer-Hansen M. Pelvic pain and quality of life before and after laparoscopic bowel resection for rectosigmoid endometriosis: A prospective, observational study. *Dis Colon Rectum*. 2018;**61**(2):221-9. doi: [10.1097/DCR.0000000000000970](https://doi.org/10.1097/DCR.0000000000000970). [PubMed: 29337778].
42. Williams R, Murray A. Prevalence of depression after spinal cord injury: A meta-analysis. *Arch Phys Med Rehabil*. 2015;**96**(1):133-40. doi: [10.1016/j.apmr.2014.08.016](https://doi.org/10.1016/j.apmr.2014.08.016). [PubMed: 25220943].
43. Mahnig S, Landmann G, Stockinger L, Opsommer E. Pain assessment according to the international spinal cord injury pain classification in patients with spinal cord injury referred to a multidisciplinary pain center. *Spinal Cord*. 2016;**54**(10):809-15. doi: [10.1038/sc.2015.219](https://doi.org/10.1038/sc.2015.219). [PubMed: 26754471].
44. Burke D, Fullen BM, Stokes D, Lennon O. Neuropathic pain prevalence following spinal cord injury: A systematic review and meta-analysis. *Eur J Pain*. 2017;**21**(1):29-44. doi: [10.1002/ejp.905](https://doi.org/10.1002/ejp.905). [PubMed: 27341614].
45. Muller R, Brinkhof MW, Arnet U, Hinrichs T, Landmann G, Jordan X, et al. Prevalence and associated factors of pain in the Swiss spinal cord injury population. *Spinal Cord*. 2017;**55**(4):346-54. doi: [10.1038/sc.2016.157](https://doi.org/10.1038/sc.2016.157). [PubMed: 27845355].