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# Prevalence and Risk Factors of Low Back Pain Related to Health Cost Among Health Workers: A Cross Sectional Study

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**Abstract**
**Objective:** Healthcare workers (HCWs) experience more individual and occupational health problem than other professional groups, the most common being low back pain (LBP). Furthermore, nurses are the majority of victims who worked in different aspects at hospital which have experience with LBP. The aim of this study is to find out the prevalence of low back pain related to health cost and its associated risk factors among healthcare workers at hospitals.
**Methods:** Cross sectional study, a convenience sampling technique was used comprising of 302 of hardcopy questionnaires that were distributed to healthcare workers in two tertiary hospitals in Erbil, Kurdistan Region of Iraq between March 2021 to June 2021. The data were analyzed by using descriptive analytical method and Chi-square.
**Results:** The result showed that most of the respondents (59.3%) had experienced low back pain, with (47%) reporting LBP in present and (55.3%) revealed LBP in past 12 months. The highest prevalence was reported by nurses and the lowest amongst physiotherapist. Prolonged bad posture and lifting heavy weights were the most contributing factors of LBP. Furthermore, cost of treatment (direct cost) was significantly association with LBP.
**Conclusion:** Preventive and control measures should be taken to reduce the risk of lower back pain, and also taking forward steps to diminish the incidence of occupational hazards. Therefore, our findings can help to establish policies, strategies, and appropriate interventions aimed to reduce the risk onset of LBP among health care professionals.
**Keywords:** Low back pain, risk factors, health cost, health workers

## Introduction

Healthcare workers (HCWs) are people who are engaged in actions whose primary intent is to enhance health. They make important contributions and are critical to the functioning of the most health system. Health care workers face a vast range of occupational hazard including needle stick injuries, back injuries, latex allergy, violence, and stress. HCWs are often viewed as "immune" to injury or illness. Their patients come first and they are often expected to sacrifice their own well-being for the sake of their patients. Indeed, health protecting health-care workers has the added benefit to contribute to quality patient care and health system strengthening.[1] As the health sector is one of the most unsafe sectors with regards to occupational accident and illness, the World Health Organization has stressed on the fact that home care is the main priority when it comes to preventing workplace risks.[2] A cost-of-illness (COI) study is regarded to be the most common method for estimating the burden pertaining to a specific disease on a society, COI studies can help identify as well as measure all the costs associated with a disease: indirect, direct and intangible cost.[3]

## Methods

### *Study Design and Participant*

A cross sectional study, the convenient sampling method was conducted of 302 health workers in two tertiary hospitals in Erbil city, Iraq. The study was carried out from 15th March to 1st of June 2022. The population of study consisted health workers who were currently working at Erbil cardiac center and PAR hospital included nurses, lab technicians, physiotherapist, radiology technicians, and anesthesia technicians).

### *Data Collection*

A structured questionnaire was used for data collection by using hard copies were distributed by hand delivery to study participants who were met study inclusion criteria. The 302 hardcopy questionnaires were collected within few days then the participants had been measured their height and weight with SECA scale. The questionnaire consisted of three parts; the first part was related to demographic characteristics of HCWs, the second part was related to LBP and its associated factors and third was related to health cost. Once the questionnaires were collected from two tertiary hospitals, then questionnaires were merged togethers and entered to SPSS.

### *Statistical Analysis*

Data analysis was carried out by using SPSS (Version 25.0) and the data was entered, coded, and checked for normality and categorized. Descriptive analysis was carried out to measure percentages and frequencies for dependent variables, Chi square was used for statistical analysis to test the relationship between dependent and independent variables.

### *Ethical Consideration*

The study was approved from University of Kurdistan-Hawler (UKH) research ethic committee. Respondents were also informed of the objective of study and participation is voluntary and their answers will be used for the purpose of this study only.

## Results

The total of 302 healthcare workers who worked the selected tertiary hospitals were included in this study. One hundred fifty-two (50.3%) of HCWs were in the age group 30–39 years old. One hundred seventy-seven (58.6%) HCWs were male. Two hundred six (68.2%) of participants were married. One hundred sixty-five (54.6%) of participants were completed medical institute. One hundred sixty-nine (56%) were suffering obese, and more than half of HCWs (69.9%) had 500,000 to 1,000,000 IQD monthly income, as shown in Table 1.

The majority of HCWs were ward nurses (24.5%) followed by operation nurse (20.9%) and ICU nurse (15.6%). More than half of HCWs (53.3%) were permanent employee. One hundred ten (36.4%) had more than 10 years of work experience. In terms of working hours per day, the highest percentage (88.7) were working more 8 hours a day, as shown in Table 2.

Based on Figure 1, it was shown that among 302 self-administered questionnaires respondents. The overall prevalence of low back pain among healthcare workers was 179 (59.3%), and 123 (40.7%) did not complain having low back pain. Therefore, one hundred forty-two (47%) of HCWs were suffering LBP in present while one hundred sixty-seven (55.3%) were complained LBP in last 12 months, as shown in Table 3.

The HCWs reported different causes of low back pain in present, prolonged bad posture (37.3%) was the major cause of LBP among HCWs. Lifting heavy weights (22.5%) was the second major cause of LBP followed by sudden movement (10.6%), lifting heavy weights and prolonged bad posture (10.6%), as depicted in Table 4. Therefore, Pain (45.8%) was the major characteristics of LBP in present among HCWs, cramps/spasm and pain/stiffness were the second and third characteristics (9.9%), (9.9%) respectively, showed in Table 5.

The association of prevalence of LBP and socio-demographic characteristics was summarized in Table 6, Age groups were more likely to complain LPB among HCWs, there was a statistically significant association found LBP in present and last 12 months ($P$ = 0.003), ($P$ = 0.008) respectively. Male HCWs were having LBP more than female; however, this was not statistically significant. The result also showed that married HCWs are more affected, it was statistically significant ($P$ = 0.001) LBP in present ($P$ = 0.003) LBP last 12 month. Although obese was more influenced than those who were normal, there was not a statistically significant ($P$ = 0.419), ($P$ = 0.202). Moreover, there was not statistically significant regarding the Level of education and income as well.

Although nurses were the majority of healthcare workers who worked in hospitals seemed to be more affected by LBP, there was no statistically significant found. Study also showed that permanent employee had higher proportion of LBP but both type of employee had a significant relationship with LBP in present and last 12 months ($P$ = 0.003), ($P$ = 0.004) respectively. Moreover, the duration of employee had a great influence amongst HCWs specially those who worked more than 5 years and above, the highest statistically significant was found in both time period ($P$ = <0.001). Therefore, three quarters of HCWs had worked 8 hours and less, there was not significant relationship detected, as demonstrated in Table 7.

As clearly shown in Table 8, even though the majority 57 (31.8%) of healthcare workers did not spend expenditure for their back pain in present but there was a significant associated observed between cost treatment and LBP. Meanwhile, there was no statistically significant association found between cost of treatment and LBP in the last 12 months ($P$ = 0.364). However, majority of health workers with LPB in present 119 (66.5%), and LBP in last 12 months 144 (80.4%) from total of 179 HCWs had lost no expenditure due to low back pain. Statistical analysis showed no significant association was found between cost of absenteeism and LBP.

Table 1. **Sociodemographic characteristics of HCWs**

| Variables | No. | (%) |
|---|---|---|
| **Age groups (years)** | | |
| 20–29 | 109 | (36.1) |
| 30–39 | 152 | (50.3) |
| 40–49 | 32 | (10.6) |
| 50 and older | 9 | (3.0) |
| **Gender** | | |
| Male | 177 | (58.6) |
| Female | 125 | (41.4) |
| **Marital Status** | | |
| Single | 96 | (31.8) |
| Married | 206 | (68.2) |
| **Level of Education** | | |
| Nursing high school | 8 | (2.6) |
| Medical institute | 165 | (54.6) |
| Bachelor degree | 119 | (39.4) |
| Postgraduate degree | 10 | (3.3) |
| **Body Mass Index** | | |
| Non-obese (≤ 24.9 kg/m$^2$) | 133 | (44) |
| Obese (≥ 25 kg/m$^2$) | 169 | (56) |
| **Monthly Income (IQD)** | | |
| < 500,000 | 40 | (13.2) |
| 500,000–1,000,000 | 210 | (69.9) |
| 1,000,001–1,500,000 | 48 | (15.9) |
| > 1,500,000 | 3 | (1.0) |
| **Total** | **302** | **(100)** |

Exchange rate 136,000 IQD = 100$.

Table 2. **Distribution of working status of HCWs**

| Variables | No. | (%) |
|---|---|---|
| **Nature of Job** | | |
| Ward nurse | 74 | (24.5) |
| Operation nurse | 63 | (20.9) |
| ICU nurse | 47 | (15.6) |
| Laboratory staff | 36 | (11.9) |
| Catheter Lab. nurse | 21 | (7) |
| Anesthesia technician | 20 | (6.6) |
| Radiology staff | 14 | (4.6) |
| Physiotherapy staff | 5 | (1.7) |
| Others | 22 | (7.3) |
| **Type of Employees** | | |
| Permanent | 161 | (53.3) |
| Contract | 141 | (46.7) |
| **Duration of Employment** | | |
| < 5 years | 102 | (33.8) |
| 5–10 years | 90 | (29.8) |
| > 10 years | 110 | (36.4) |
| **Working Hours/day** | | |
| ≤ 8 hours | 268 | (88.7) |
| > 8 hours | 34 | (11.3) |
| **Total** | **302** | **(100)** |

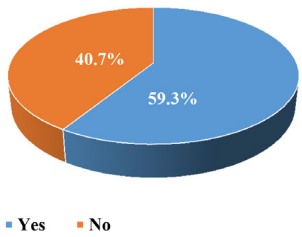


Fig. 1 **Total prevalence of low back pain among HCWs ($n = 302$).**

Table 3. **Prevalence of low back pain**

| The Characteristics | Subgroups | No. | (%) |
|---|---|---|---|
| Low back pain (Present) | Yes | 142 | (47) |
| | No | 160 | (53) |
| **Total** | | **302** | **(100)** |
| Low back pain (last 12 months) | Yes | 167 | (55.3) |
| | No | 135 | (44.7) |
| **Total** | | **302** | **(100)** |

Table 4. **Common causes of LBP in present**

| Causes of Back Pain | No. | (%) |
|---|---|---|
| Prolonged bad posture | 53 | (37.3) |
| Lifting heavy weights | 32 | (22.5) |
| Sudden movement | 15 | (10.6) |
| Lifting heavy weights & prolonged bad posture | 15 | (10.6) |
| Diseases | 8 | (5.6) |
| Sudden movement & lifting heavy weights | 7 | (4.9) |
| Sudden movement & prolonged bad posture | 5 | (3.5) |
| Trauma | 4 | (2.8) |
| Sudden movement, lifting heavy weights & prolonged bad posture | 2 | (1.4) |
| Others factors | 1 | (4.9) |
| **Total** | **142** | **(100%)** |

Table 5. **Common characteristics of LBP**

| Characteristics of LBP | No. | (%) |
|---|---|---|
| Pain | 65 | (45.8) |
| Cramps/Spasm | 14 | (9.9) |
| Pain/Stiffness | 14 | (9.9) |
| Stiffness | 13 | (9.2) |
| Numbness | 11 | (7.7) |
| Tingling | 4 | (2.8) |
| Loss of Strength | 7 | (4.9) |
| Pain and Tingling | 1 | (0.7) |
| Pain and Numbness | 3 | (2.1) |
| Numbness and Tingling | 1 | (0.7) |
| Stiffness and Cramps/spasm | 1 | (0.7) |
| Pain and loss of strength | 2 | (1.4) |
| Pain, Stiffness and Cramps/spasm | 4 | (2.8) |
| Stiffness, Numbness and Tingling | 2 | (1.4) |
| **Total** | **142** | **(100%)** |

## Discussions

In the current study, the present prevalence and last 12 months prevalence of LBP were found 47% and 55.3%, respectively, which was similarly to another study that was conducted by Khudhir et al at Koya Technical Institute, reported that the prevalence of LBP was slightly higher among staff during the past 12 months was 61.4%, and another study is also reported the prevalence of LBP is much higher among nurses (73.5%) in Nigeria; as well as annual prevalence of LBP was 56.9% and life time prevalence was 72.5% in Malaysia.[4,5] Furthermore, the study indicated that the prevalence of lifetime LBP was 51% among adults in Afyon region in Turkey.[6] However, the result of study reported that the prevalence of LBP among hospital employees in South Africa was much lower 47%, compare to present study and prevalence of LBP among teachers in China was reported as 45.6%.[7,8] Similarly, the prevalence of LBP in past 12 months was quite lower 41.4 % among Adam Hospital Medical College employees in Ethiopia.[9]

In this study, the prevalence of LBP in male was higher compare to female with no significance association, this finding was contrary with another study reported the gender-associated risk of LBP.[10] While a survey demonstrated that LBP has been shown to be more common among female than male among public office workers in Greek with significance associated, and also in UK which showed the incidence of LBP in female were much higher than male.[11,12] Age in this study, 30–39 had more likely to have LBP compare to other age groups with significance associated similar to another study which was performed, noted that LBP was common among younger age group.[5] In contrast, in US reported that LBP were more common among older age groups. in this survey married workers were the most popular participants to have back pain with significant association while another study reported that single persons were significantly more likely than those married persons to report LBP.[13] In support to current study in Iran showed that married respondents were significantly higher than unmarried respondents to have LBP.[14] Level of education showed that medical institute graduation and bachelor degree were more likely to have backache with close to current study reported the majority of nurses (91%) had completed bachelor's degree, while another study revealed that lower educations were significantly more disabled due to back pain than people with high education backgrounds.[15,16]

This study also found no significant association between BMI and LBP, though the majority of respondents were obese. In comparison, the study reported that obesity positively associated with presence of LBP in adult.[14] Likewise, a researcher have revealed that obesity is a risk dominant risk factor for LBP.[17] Similarly, another study indicated that obesity has been shown as risk factor for disc degeneration and may increase the prevalence of LBP.[18] Regarding to monthly income, in present study most of the HCWs received low to middle income per month with no significant association to LBP, in parallel with another study done in Japan showed that lower socioeconomic were more likely to suffer from LBP compared with that for the highest.[19]

Nurses in this survey were the majority of HCWs with a significant associated with LBP similar to a study, showed

Table 6. **Association between socio-demographic characteristics and LBP**

| Variables | Total | LBP in Present | *P* value | LBP last 12 months | *P* value |
|---|---|---|---|---|---|
| | No. (%) | Yes (%) No (%) | | Yes (%) No (%) | |
| **Age groups (years)** | | | | | |
| 20–29 | 109 (36.1) | 36 (12.0) 73 (24.1) | | 46 (15.2) 63 (20.8) | |
| 30–39 | 152 (50.3) | 83 (27.5) 69 (22.8) | | 95 (31.4) 57 (18.8) | |
| 40–49 | 32 (10.6) | 17 (5.6) 15 (5.0) | **0.003** | 20 (6.6) 12 (4.0) | **0.008** |
| ≥ 50 | 9 (3.0) | 6 (1.2) 3 (1.0) | | 6 (2.0) 3 (1.0) | |
| **Gender** | | | | | |
| Male | 177 (58.6) | 84 (27.8) 93 (30.7) | | 93 (30.8) 84 (27.8) | |
| Female | 125 (41.4) | 58 (19.2) 67 (22.2) | **0.907** | 74 (24.5) 51 (16.9) | **0.291** |
| **Marital Status** | | | | | |
| Single | 96 (31.8) | 32 (10.6) 64 (21.1) | | 41 (13.6) 55 (18.2) | |
| Married | 206 (68.2) | 110 (36.4) 96 (31.7) | **0.001** | 126 (41.7) 80 (26.4) | **0.003** |
| **Level of Education** | | | | | |
| Nursing high school | 8 (2.6) | 2 (0.6) 6 (2.0) | | 3 (1.0) 5 (1.6) | |
| Medical institute | 165 (54.6) | 82 (27.1) 83 (27.4) | | 93 (30.7) 72 (23.8) | |
| Bachelor degree | 119 (39.4) | 55 (18.2) 64 (21.2) | **0.358** | 67 (22.1) 52 (17.2) | **0.553** |
| Postgraduate degree | 10 (3.3) | 3 (1.0) 7 (2.3) | | 4 (1.3) 6 (2.0) | |
| **BMI** | | | | | |
| Non-Obese | 133 (44%) | 59 (19.5) 74 (24.5) | | 68 (22.5) 65 (21.5) | |
| Obese | 169 (56%) | 83 (27.5) 86 (28.5) | **0.419** | 99 (32.8) 70 (23.2) | **0.202** |
| **Income (IQD)** | | | | | |
| < 500,000 | 40 (13.2) | 15 (5.0) 25 (8.3) | | 20 (6.6) 20 (6.6) | |
| 500,000–1,000,000 | 211 (69.9) | 101 (33.4) 110 (36.4) | | 117 (38.7) 94 (31.1) | |
| 1,000,000–1,500,000 | 48 (15.9) | 25 (8.3) 23 (7.6) | **0.525** | 28 (9.2) 20 (6.6) | **0.851** |
| > 1,500,000 | 3 (1.0) | 1 (0.3) 2 (0.6) | | 2 (0.6) 1 (0.3) | |
| **Total** | **302 (100%)** | **142 (47) 160 (52.9)** | | **167 (55.3) 135 (44.7)** | |

Table 7. **Association between working status and LBP**

| Variables | Total | LBP in Present | *P* value | LBP last 12 months | *P* value |
|---|---|---|---|---|---|
| | No. (%) | Yes (%) No (%) | | Yes (%) No (%) | |
| **Nature of Job** | | | | | |
| Intensive care nurse | 47 (15.6) | 26 (8.6) 21 (6.9) | | 28 (9.2) 19 (6.2) | |
| Operation nurse | 63 (20.9) | 32 (10.5) 31(10.2) | | 42 (13.9 ) 21 (6.9) | |
| Ward nurse | 74 (24.5) | 29 (9.6) 45 (14.9) | **0.370** | 27 (8.9) 47 (15.5) | **0.032** |
| Cath. lab nurse | 21 (7.0) | 11 (3.6) 10 (3.3) | | 13 (4.3) 8 (2.6) | |
| Laboratory staff | 36 (11.9) | 13 (4.3) 23 (7.6) | | 21 (6.9) 15 (4.9) | |
| Physiotherapist | 5 (1.7) | 4 (1.3) 1 (0.3) | | 4 (1.3) 1 (0.3) | |
| Radiology staff | 14 (4.6) | 8 (2.6) 6 (1.9) | | 9 (2.9) 5 (1.6) | |
| Anesthesia assistant | 20 (6.6) | 8 (2.6) 12 (3.9) | | 12 (3.9) 8 (2.6) | |
| Others | 22 (7.3) | 11 (3.6) 11 (3.6) | | 11 (3.6) 11 (3.6) | |
| **Type of Employees** | | | | | |
| Permanent | 161 (53.3) | 89 (29.4) 72 (23.8) | | 102 (33.7) 59 (19.5) | |
| Contract | 141 (46.7) | 53 (17.5) 88 (29.r 1) | **0.003** | 65 (21.5) 76 (25.1) | **0.004** |
| **Duration of Employment** | | | | | |
| < 5 years | 102 (33.8) | 30 (9.9) 72 (23.8) | | 41(13.5) 61 (20.1) | |
| 5–10 years | 90 (29.8) | 46 (15.2) 44 (14.5) | **< 0.001** | 50 (16.5) 40 (13.2) | **<0.001** |
| > 10 years | 110 (36.4) | 66 (21.8) 44 (14.5) | | 76 (25.1) 34 (11.2) | |
| **Working hours/day** | | | | | |
| ≤ 8 hours | 268 (88.7) | 130 (43.0) 138 (45.6) | | 151 (50.0) 117 (38.7) | |
| > 8 hours | 34 (11.3) | 12 (4.0) 22 (7.3) | **0.201** | 16 (5.3) 18 (5.9) | **0.361** |
| **Total** | **302 (100%)** | **142 (47) 160 (52.9)** | | **167 (55.3) 135 (44.7)** | |

among six professional groups, the highest prevalence was in nurses, and also Omokhodion, Umar and Ogunnowo mentioned that nurses experience more LBP than other hospital workers.[20,21] Duration of employment in present study showed that workers who worked > 10 years have more likely to obtain LBP in addition with highly significant association, as well as a study by Alshahrani indicated that 58.8% of nurses had a work experience of < 10 years, whereas only 10.2% had a work experience of more than 19 years who had LBP. In contrast, based on Mukhtad and Mohamed in Libya, reported that 40% of HCWs had work experience less than or equal to 5 years related to LBP.[15,22] Working hours per a day, results of present study revealed that the majority of HCWs worked equal and less than 8 hours a day and no significant relationship was noted and likewise Atlas et al stated that 69.8% of school workers had experienced with low back pain who worked for 5–6 hours a day.[23]

Table 8. **Association between LBP in present and last 12 months with cost of illness of HCWs (*n* = 179)**

| Cost of Illness (IQD) | BP in Present Yes (%) No (%) | *P* value | BP last 12 months Yes (%) No (%) | *P* value |
|---|---|---|---|---|
| **Cost of treatment** | | | | |
| Nothing spent | 57 (31.8) 27 (15.1) | | 75 (41.9) 9 (5.0) | |
| < 100,000 | 49 (27.3) 10 (5.5) | | 55 (30.7) 4 (2.2) | |
| 100,000–500,000 | 23 (12.8) 0 (0.0) | **0.005** | 23 (12.8) 0 (0.0) | **0.364** |
| 500,000–1,000,000 | 6 (3.3) 0 (0.0) | | 6 (3.3) 0 (0.0) | |
| > 1,000,000 | 6 (3.3) 1 (0.5) | | 7 ( 3.9) 0 (0.0) | |
| **Cost of absenteeism** | | | | |
| Nothing spent | 119 (66.5) 37 (20.7) | | 144 (80.4) 12 (6.7) | |
| < 100,000 | 14 (7.8) 1 (0.5) | | 14 (7.8) 1 (0.5) | |
| 100,000–200,000 | 3 (1.7) 0 (0.0) | **0.327** | 3 (1.6) 0 (0.0) | **0.954** |
| 200,001–500,000 | 1 (0.5) 0 (0.0) | | 1 (0.5) 0 (0.0) | |
| > 500,000 | 4 (2.2) 0 (0.0) | | 4 (2.2) 0 (0.0) | |
| **Total** | **141 (78.7) 38 (21.2)** | | **166 (92.7) 13 (7.3)** | |

Although the majority of respondent had spent nothing for medication and treatment for LBP, there was significant association between LBP and cost of treatment. A study showed that direct costs were determined to back pain related to healthcare utilizations, back pain related to hospital admission, back pain related to specialty care visits, and back pain related to radiologic procedure.[24] Whilst current findings are contrary with other studies for instance, Hong et al showed that patients with chronic LBP had a significantly higher level of 12 months drug prescription compared with those without CLBP, NSAIDs and opioids were the most common prescribed medications in the treatment of CLBP.[25] Another study revealed significantly higher resources utilization among patients with CLBP in terms of hospitalization, outpatient visits, and pharmacy prescription, meantime Zemedikun et al identified that outpatient cost was the most important cost driver in the majority of the study.[26,27] Indirect cost, this study presented that majority of HCWs did not loss any expenditure due to back pain. However, another finding was disagreed with current study findings, a study done by Tymecka-Woszczerowicz et al in Switzerland revealed that 4.4% of participants were not attend from work and 19.7% of participants claimed LBP-related presenteeism, which made up an important part of production loss, in a favor of above study Baumeister, Knecht and Hutter also assessed that chronic back pain has contributed to failure of return to work, work absence, and work related to disability.[3,24]

## Limitation

In the current study, the data were self-administrated; hence, it may affect the precision of answers to the retrospective questions regarding the time and frequency of LBP. This study was conducted among healthcare workers field including nurses, laboratory staffs, anesthesia technicians and radiology staffs only, and the findings of this study may not be applicable to workers in other sectors such banking, administrative staffs and factories.

## Conclusion

Lower back pain significantly affects work performance, often results in work absence, and it is quite common amongst healthcare field. The present study concentrated on particular healthcare personnel demonstrating that LBP has affected 59.3% of them. Furthermore, statistical tests showed that there was significant association between age groups, marital status, job nature in past 12 months, type of employee, duration of employment as well as cost of treatment. The variety of factors which have contributed to the prevalence of low back pain. To reduce such prevalence, it is proposed that there be educate the workers to reduce BMI, do regular exercise, reduction of the incidence of back pain through redesigning workstation according to anthropometric measure for each worker.

## Declaration

### *Ethics Approval*

The study was approved by school of management and economics at university of Kurdistan-Hawler.

### *Conflict of interest*

The authors declare no conflict of interest.

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