Enhancing Nurses' Competence in Spinal Cord Injury Management through Educational guidelines

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Abstract

Background: A spinal cord injury is a type of lesion to the spinal cord that can result in changes to its function, either permanently or temporarily. It produces long-term physical, psychological, and financial burden for patients. Nurses' knowledge and practice has a substantial impact on patient outcomes. **Aim of the study:** To evaluate the effect of educational guidelines on enhancing nurses' competence in spinal cord injury management**. Research Design:** A quasi-experimental design was used to achieve the study aim. **Study Settings:** The study was applied in the neurological intensive care unit and neurology unit and neurology Outpatient Clinic at Sohag University Hospital. **Subject:** A convenient sample of (50) nurses was selected from the previously selected settings. **Two tools for data collection**: **Tool I:** Self-administered questionnaire; which included two parts; (1) Nurses' demographic data and (2) Nurses' knowledge regarding spinal cord injury, and **Tool II:** An observational checklist of nurses' practices regarding spinal cord injury. **Result:** The current study revealed that there was a highly statistically significant difference in nurses' knowledge and practice post- educational guidelines implementation compared to pre- educational guidelines implementation with (P= <0.05). Also, the study demonstrated that there was a highly statistically significant correlation between nurses' knowledge and practice with (P= <0.001). **Conclusion**: The study concluded that educational guidelines implementation for nurses had a positive effect on guidelines on enhancing nurses' competence in spinal cord injury management with significant differences between pre and educational guidelines implementation. **Recommendation:** Develop a simplified illustrated and comprehensive Arabic booklet to be available for all nurses including the latest information about spinal cord injury, its therapeutic regimen, and how the patients can be managed and to improve their knowledge and practices.

Keywords: Educational guidelines, Nurses' knowledge and Practices, Patients, Spinal cord injury

Introduction:

A spinal cord injury is a form of damage to the spinal cord that may lead to alterations in its function, either temporarily or permanently. Spinal cord injury is categorized into traumatic and non-traumatic causes. This condition can lead to severe neurological damage and a reduced quality of life. Unlike non-traumatic spinal cord injury, which occurs due to external physical impacts like car accidents, falls, sports injuries, or violence, spinal cord injury arises when an acute or chronic disease process such as degenerative disc disease, a tumor, or an infection leads to the initial damage **(Skovbjerg et al., 2025).**

Since there are numerous potential causes and no single large registry that houses all the data, it is challenging to estimate the number of spinal cord injuries. It is estimated that the number of Americans with traumatic spinal cord injuries ranges from 183,000 to 230,000; however, this number is expected to more than double if nontraumatic cases are also included. Spinal cord injury instances resulting from tumors and degenerative diseases were more common in developed nations. Comparatively speaking, developing nations tended to have greater rates of infections, especially HIV and tuberculosis, while it was noteworthy that several also mentioned tumors as a primary reason **(Ding et al., 2022)**.

A spinal cord injury can cause partial or complete loss to motor and sensory functions beneath the affected area. It is a debilitating and permanent disorder that depends on the lesion severity. When a spinal cord injury results in function loss in the cervical region, it is referred to as tetraplegia; when it results in function loss in the thoracic, lumbar, or sacral regions, it is referred to as paraplegia. In addition to disabling the victims and their families, these injuries put a burden on the healthcare system and the economy because of lost production and exorbitant medical expenses (**Pruthi et al., 2021**)

There are two types of spinal cord injury aetiologies: traumatic and non-traumatic. Traumatic injuries frequently arise from car crashes, sporting events, falls, or violent acts that cause the spinal cord to be crushed, sheared, or penetrated. Numerous conditions, such as vascular diseases, cancer, and infections, can cause non-traumatic injuries. The degree of paralysis and sensory loss depends on the type and severity of the injury (**Nadeau et al., 2021)**.

Numerous side effects emerge from the damage caused, such as osteoporosis, pressure ulcers, neuropathic pain, bowel, bladder, and sexual dysfunction, as well as lung and cardiovascular disease. To improve quality of life, lessen the burden on the healthcare system, decrease secondary problems such as pressure injuries and UTIs, and promote function and independence, neuro-recovery strategies are critical (**Kaiser et al., 2020**). The quality of life and long-term neurological and functional results of individuals with spinal cord injuries can be significantly influenced by the immediate care they get. Restoring physiological equilibrium, minimizing secondary harm, keeping an eye out for early indications of developing neurologic deficits, and maintaining neurologic function are the goals of early intervention (**Mohammed & El-Fadl, 2021)**.

Spinal tumors are the primary cause of non-traumatic spinal cord injury in the United States and other industrialized nations, behind degenerative disease of the spine. In contrast, non-traumatic myelopathy is primarily caused by infections, such as HIV and tuberculosis, in many impoverished nations. Non-traumatic spinal cord injury is caused by degenerative and hereditary diseases, inflammation, malnourishment, and other vascular injuries (**Burkhart et al., 2021**).

Due to restricted innervated skeletal muscle and a diminished ability to breathe independently, spinal cord injuries impose limitations on not only the convenience of exercising but also its capacity These deficiencies also affect motor, sensory, and autonomic functions. A significant advancement in the field of spinal cord injury care has involved the identification and avoidance of chronic consequences, such as pressure sores, bladder dysfunction, and respiratory impairment, with targeted therapies **(Ram, et al., 2021).**

Nurses' performance can have a substantial impact on patients' prognosis following severe spinal cord injury; In order to provide these patients, who are very physically dependent, with holistic care; Nurses need to be educated and motivated. Because nurses assist patients live the remaining of their lives while achieving their recovery goals, it is crucial to understand patient needs and care outcomes **(Ram, et al., 2021).**

To provide good nursing care that can prevent or decrease future spinal cord injury, nurses working as a multidisciplinary team should strive for the best possible outcomes for their patients. Nurses play an important role in patient education. Along with giving medical care, nursing plans based on scientific nursing theory and evidence-based practice are implemented, patients' psychological well-being is supported, education is given, and the appropriate medical services for patients and their carers are evaluated (**Wang et al., 2022**). In order to promote the physical, psychological, and spiritual well-being of patients with spinal cord injuries and help them transition to a new way of life, nurses create and put into practice self-care practices. With the help of these activities, patients will be better prepared to accept their limitations, return to their families and communities, and look forward to the future (**Houtenville & Boege**, **2020**).

Significance of the study:

In the Middle East and North Africa region, the rate of traumatic spinal cord injuries was 23.24 per million. Annually, approximately 250,000 to 500,000 individuals experience spinal cord injuries worldwide. Violence, traffic collisions, and various avoidable elements lead to many instances of spinal cord injuries. Every year, approximately 17,000 new cases of spinal cord injury are reported in the United States. Estimates suggest that 282,000 people are living with spinal cord injury. The majority of spinal cord injuries related to sports happen in male individuals. The chance of sustaining a spinal cord injury rises for people aged 16 to 30. In Egyptians with a greater occurrence of cervical lesions, falls are the primary cause of traumatic spinal cord injuries. Men are considerably more susceptible to injuries compared to women, particularly in early adulthood. The expertise and actions of nurses

can greatly impact the enhancement of their patients' healing. Thus, it is vital to understand needs and care results **(Bennett et al., 2024).** Therefore, this study was done to evaluate the effect of educational guidelines on enhancing nurses' competence in spinal cord injury management

Aim of the study:

To evaluate the effect of educational guidelines on enhancing nurses' competence in spinal cord injury management through:

- Assessing nurses' knowledge regarding spinal cord injury pre and post- educational guidelines implementation
- Assessing nurses' practices regarding spinal cord injury pre and post- educational guidelines implementation
- Designing educational guidelines based on the nurses' actual needs.
- Implementing educational guidelines concerning nurses' actual needs.
- Determining the effect of educational guidelines implementation on improving nurses' knowledge and practices regarding spinal cord injury.

Research Hypotheses:

- H1: There will be an improvement in nurses' knowledge post-test mean scores than pretest regarding spinal cord injury.
- H2: There will be an improvement in nurses' practices post-test mean scores than pretest regarding spinal cord injury.
- H3: There will be a significant correlation between knowledge and practices in post-test.

Research Design:

To achieve the study aim a quasi-experimental design was used. To assess the unproductive relationship between intervention and outcome, this study has espoused the quasi experimental design with one group pre and post- test. It's a way of evaluating the impact of an intervention before and after it has been enforced, by comparing scores on different variables (**Thomas, 2022).**

Study Settings:

The study was applied in the neurological intensive care unit and neurology unit and neurology Outpatient Clinic at Sohag University Hospital.

Subject:

A convenient sample of (50) nurses was selected from the previously selected settings within six months.

Tools of data collection:

Two tools for data collection:

Tool I: Self-administered questionnaire; The researcher created this tool after examining the relevant literature of **(Urden et al., 2021; Hills, 2021; Ali et al., 2022; Srivastava., 2023; Koutoukidis & Stainto; 2024) which included two parts as** follow:

Part (1) Nurses' demographic data: It was used to assess the nurses' demographic **data**: It comprised eight close ended questions included (age, gender, residence, nursing qualification, experience years in the accidents ICU, and participating in training sessions regarding spinal cord injury.

Part (2) Nurses' knowledge regarding spinal cord injury: It was used to assess nurse's knowledge regarding spinal cord injury. The questionnaire included 72 multiple choice questions, divided into three subscales (Knowledge of nurses regarding spinal cord anatomy and physiology which consisted of 10 multiple choices questions, knowledge of nurses regarding spinal cord injuries which consisted of 29 multiple choice questions, and knowledge of nurses regarding nursing care for the patients suffering from spinal cord injuries which composed of 33 question.

Scoring system

Nurses' responses were graded as one for correct answer and zero for incorrect answer. The total score is 72 grades. These scores were totaled and translated to percentage. It was graded into two categories:

satisfactory (score ≥ 80%). and unsatisfactory if score below 80%.

Tool II: An observational checklist of nurses' practices regarding spinal cord injury:

It was utilized to evaluate practices of nurses **regarding** care provided for the patients suffering from spinal cord injuries. It had 113 items in the form of done correctly or not done correctly questions and was divided into four subscales: **neurological assessment** (21 items), **head to toe assessment** (28 items), **general assessment** (9 items), **and nursing interventions** (55 items). It was adopted from **(Ahmed et al., 2021; Mohammed, et al., 2022; Afify et al., 2024).**

Scoring system

Each step done correctly scored one, whereas step incorrectly done or not done was scored zero. The total score is 115 grades. These scores were totaled and translated into percentage. It was categorized into 2 categories: competent if the score is ≥ 80%. (90-113 grades) and incompetent if score <80%. (0-89 grades).

Methods:

Preparatory Phase

This phase included reviewing current and past, local and international related literature and theoretical knowledge of various aspects of the study using books, articles, periodical magazines, and the internet to modify tools for data collection. During this phase, the researcher also visited the selected places to get acquainted with the personnel and the study settings. Development of the tools was under supervisors' guidance and experts' opinions were considered.

Validity and reliability of the content

The study tool was reviewed by three medical-surgical nursing and two medicine experts to find out if the tools covered the aim or not, and to assess each item individually. It was utilized to alter them, and no modifications were done based on their opinions. In order and determine the tools comprehensiveness, clarity, applicability, understanding, and relevance or not, the content validity of the study tools was measured. The internal consistency of tools was measured to evaluate tool reliability. Cronbach's alpha reliability coefficient for nurse's knowledge was 0.799, 0.932 for practice, and 0.767 for attitude. Reliability testing had carried out before data collection had begun.

Pilot Study

To evaluate the applicability of the developed tools and the clarity of the questions, a pilot research involving 10% (5) of nurses was conducted. The time required for each individual to complete the questionnaire has also been estimated thanks to the pilot. The nurses were added to the study sample since, based on the pilot's results, no item adjustments or omissions were made.

Administrative Design

Official permission was obtained by submission of a formal letter issued from the Dean of the Faculty of Nursing, Sohag University. An official agreement was obtained from the Hospital Manager to get their approval to conduct the study. Collect the necessary data for the current study after a brief explanation of the purpose of the study.

Ethical Considerations

Approval was obtained from the study subjects individually and the scientific ethical committee of Sohag University using written informed consent obtained from each participant before any data collection. They were assured that anonymity and confidentiality would be guaranteed and the right to withdraw from the study at any time. Ethics, values, culture, and beliefs were respected.

Fieldwork

Data collection was carried out over a period of six-month, from November 2023 and ending in April 2024. The researcher first visited with nurse in the previously described settings, introducing herself and outlining the goal of the study. Following the nurses' consent to participate, one-on-one interviews were conducted. The data were collected two days a week (Sunday and Monday) in morning and afternoon shifts, and each nurse taking 20-30 minutes to complete the self-administered questionnaire.

B-Implementation phase:

The study included 50 nurses. The researchers collected data from the studied nurses who attended previously selected settings. The

researchers met nurses individually at previously selected setting and explained the aim of the study after introducing themself to nurses.

The theoretical and practical part included the nurses' knowledge and practices regarding spinal cord injuries. Role-plays, educational videos, posters, lectures, and scenarios were used to put it into practice. The researchers provided nurses with an informative pamphlet regarding spinal cord damage which was written in plain Arabic and included descriptive photographs.

There were two sessions covering the topic material for the theoretical component, each lasting around twenty to thirty minutes. One was finished in thirty minutes total. Each session started with a review of the input from the previous session, and the first session opened with an introduction to the educational guidelines related to spinal cord injury. Details about spinal cord injury procedures were included in the practical section. Each nurse spent about 20 to 30 minutes to complete the questionnaire and respond to the questions. Posters, lectures, and instructional films were used to implement it.

The theoretical educational guidelines regarding spinal cord covered the following:

- Knowledge of nurses regarding spinal cord anatomy and physiology
- Knowledge of nurses regarding spinal cord injuries
- Knowledge of nurses regarding nursing care for the patients suffering from spinal cord

The practical educational guidelines regarding spinal cord covered the following:

- Neurological assessment
- head to toe assessment
- general assessment
- nursing interventions

Evaluation:
The evaluation was conducted two months after the educational guidelines were implemented to evaluate the their effect on enhancing nurses' competence in spinal cord injury management using the same pre- test instruments that were scored using the same methodology.

Statistical Analysis

Data entry and data analysis were done using a statistical package for the social science (SPSS) version 26. Data were presented as numbers, percentage means, and standard deviation. The chi-square test was used to show the relation between variables. A T-test was used to compare the mean. P-value considered statistically significant when $p < 0.05$. Significance of the results; Highly significant at p-value < 0.01; Statistically significant was considered at p-value < 0.05; and Non-significant at p-value ≥ 0.05.

Results:

Table (1), Demonstrates that nurses' ages with Mean ± SD=27.6±3.5, (66%) of them their age was ≤30 years years, three fifths of nurses researched (60%) were females. Regarding the qualification of nurses (60.0%) had technical institute, less than three quarters had hospital experience equal or less than five years ≤ 10 years (70%), and more than three quarters (80%) were living in rural area.

Figure (1) demonstrates that 90% of the studied nurses did not participate in training sessions on how to care for individuals with spinal cord injuries.

Figure (2): Illustrates that 80% of the nurses in the study said that doctors were the main source of **knowledge** about spinal cord injury.

Table (2): demonstrates that after adopting educational guidelines, the nurses' knowledge regarding spinal cord injury improved over the pre- implementation period. After two months of implementing educational guidelines, a highly statistically significant difference was observed in all knowledge items mean scores (P-value <0.001).

Figure (3) demonstrates that the total **nurses'** knowledge level regarding spinal cord injury management was satisfactory for 14% of the nurses before the educational guidelines implementation, which increased to a satisfactory level for 90% after the educational guidelines implementation.

Table (3): demonstrates that, when compared to before the educational guidelines were implemented, there was an improvement in total nurses' practice concerning spinal cord injuries. All practice items were shown to differ

significantly (highly statistically) before and after two months of educational guidelines implementation (P-value <0.001).

Figure (4) shows that following spinal cord injury and the implementation of pre- educational guidelines, 92% of the studied nurses had incompetent practice level concerning spinal cord injury management. This percentage dropped to 8% post- educational guidelines implementation. Conversely, two months following the educational guidelines implementation, 90% of them had competent practices**.**

Table (4): Illustrates that after two months of implementing the educational guidelines, there was a positive correlation (P=0.005) between the nurses' knowledge and their practice regarding spinal cord injury management.

Table (5): shows that the all of the studied nurses (100%) expressed their satisfaction with the educational guidelines' content, which addressed all of their questions about spinal cord injuries and was written understandably and easily.

Table (1): Nurses distribution regarding to their demographic data (n=50)

Demographic data	No.	%
Age		
≤30 years	33	66.0
>30 years	17	34.0
Mean ±SD	27.6±3.5	
Gender		
Male	20	40.0
Female	30	60.0
Educational level		
Diploma of nursing	5	10.0
Technical Institute of nursing	30	60.0
Nursing Bachelor	15	30.0
Residence		
Rural	40	80
Urban	10	20
Experience years		
≤10 years	35	70
>10years	15	30

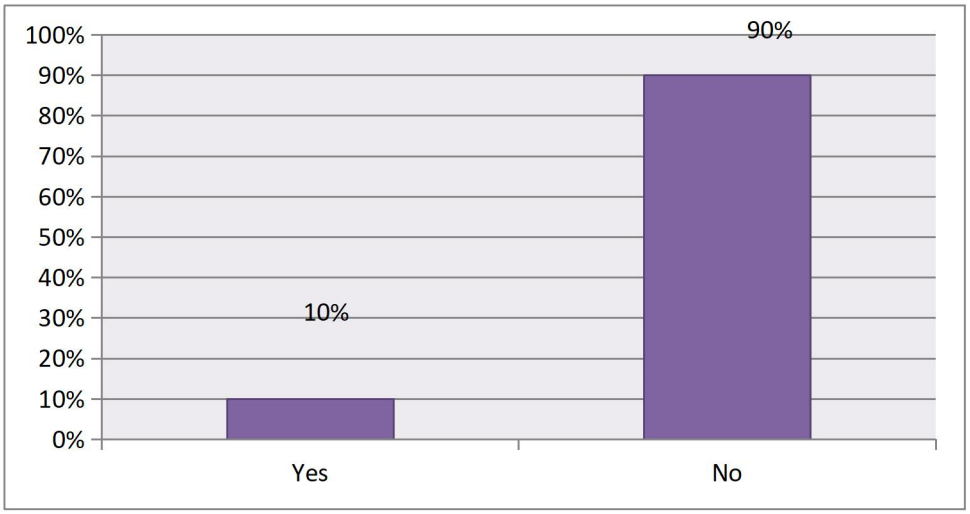

Figure (1): The studied nurses' distribution according to attending training sessions related (n=50).

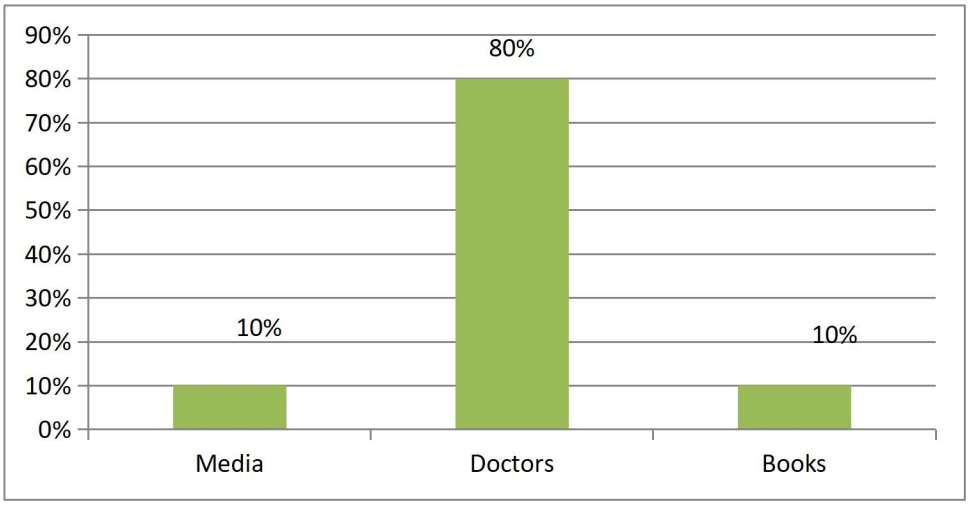

Figure (2): Source of knowledge regarding spinal cord injury among the studied nurses (n=50).

Table (2): Differences between the knowledge mean scores of the studied nurses pre and post educational guidelines regarding spinal cord injury management (50)

Nurses' knowledge mean scores	Pre	Post	t-test	P-value
Knowledge about spinal cord injuries	4.56±2.11	9.33 ±0.22	**23.56**	**<0.001**
Knowledge about spinal cord anatomy and physiology	14.33±3.22	26.11 ±3.45		
Knowledge about providing nursing care for the patients with spinal cord injuries	17.44±3.56	29.41 ±1.33		

** Highly Significant (HS) $p \leq 0.001$

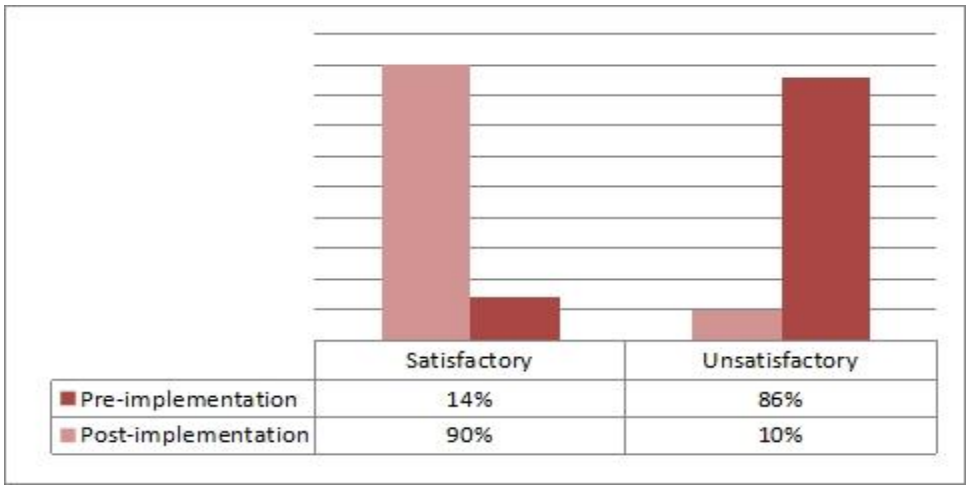

Figure (3) Total nurses' knowledge level concerning spinal cord injury management pre and post-two months of educational guidelines implementation (n=50)

Table (3): Differences between practices of the studied nurses regarding spinal cord injury management before and after educational guidelines implementation (n=50)

Nurses' total reported practice mean scores	Pre	Post	t-test	P-value
Neurologyical assessment	12.45 ±1.06	20.22±0.33	16.56	<0.001
Head to toe assessment	16.22 ±1.07	24.22±0.33	18.47	<0.001
General assessment	4.37 ±1.02	8.23±0.11	36.34	<0.001
Nursing interventions	22.33 ±1.42	44.22±0.51	36.34	<0.001

** Highly Significant (HS) $p \leq 0.001$

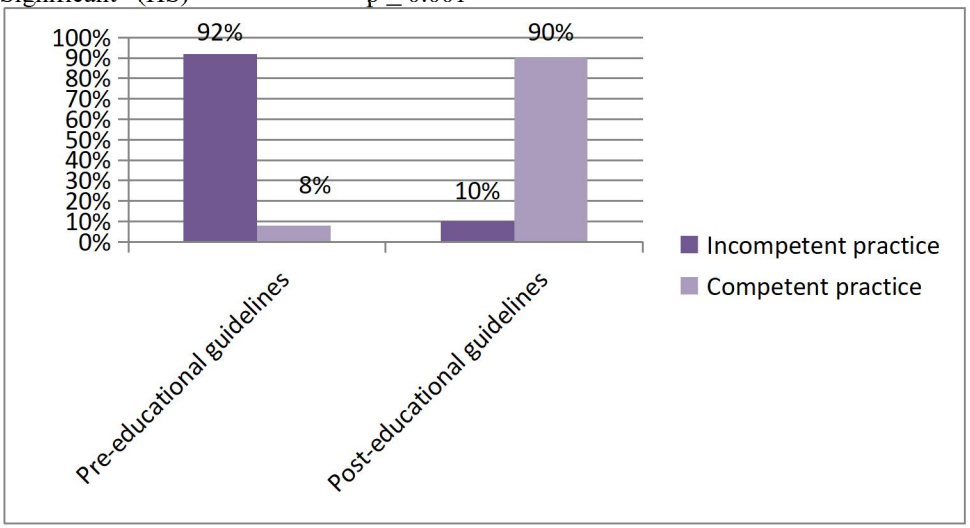

Figure (4) Total nurses' practice level concerning spinal cord injury management pre and post-two months of educational guidelines implementation (n=50).

Table (4): Correlation coefficient between total studied nurses' knowledge and practice scores regarding spinal cord injury management during pre and post- educational guidelines implementation

Knowledge	Practice			
	Pre- implementation		Post implementation	
	R	P	R	P
Pre-test total knowledge	0.038	0.823(N.S)	---	---
Post-test total knowledge	---	---	0.421	0.005

Table (5): Nurses' feedback regarding to educational guidelines content about spinal cord injury (n=50)

Content of educational guidelines implementation	No	%
Satisfaction about the content of the educational guidelines		
• Yes	50	100
• No	0	0
All questions related to spinal cord injury were answered through educational guidelines implementation.		
• Yes	50	100
• No	0	0
Guidelines content was easily written in a simple language		
• Yes	50	100
• No	0	0

Discussion:

A spinal cord injury represents a neurological crisis that poses a considerable risk of disability and a reduced quality of life. As per Muller-Jensen et al. (2021), it is characterized as any spinal cord injury resulting from a non-traumatic cause. Individuals with spinal cord injuries persistently face additional medical complications despite undergoing pharmacological and surgical interventions, along with rehabilitation specifically aimed at their condition. Mortality and morbidity associated with spinal cord injury are worsened by both acute and chronic secondary effects, such as respiratory, cardiovascular, and neurological problems. Some of these repercussions include respiratory failure, wound issues, UTIs, and neurogenic shock. Prolonged hospitalizations, reduced functional recovery at long-term follow-ups, and an increased mortality rate may arise from these concerns **(Arul et al., 2019).**

People with spinal cord injuries may experience severe consequences to their motor and cognitive abilities. The best treatment for a patient with a spinal cord injury depends on using the right nursing and rehabilitation techniques. A patient's degree of disability, ability to operate independently, and lifestyle are all significantly impacted by their prognosis. Thus, the current research aimed to evaluate the effect of educational guidelines on enhancing nurses' competence in spinal cord injury management **(Jiang et al., 2021).**

Regarding to the demographics of the studied nurses, the study found that more than three-fifths of nurses in the study were ≤30 years. This is in the same line with **Abd-Elhameed and Sayed (2018)** who investigated nurses' education on spinal cord injuries rehabilitation and found nearly all of study participants were under the age of 25. These findings differed from those of **Alhussin et al. (2022),** who evaluated how an educational program affects nurses' understanding of providing critical care to patients and discovered that over the half of the nurses in the study had age ranged from 25 to 30.

Regarding gender, the present study found that female made up three-fifths of the nurses involved. This coincided with that of **AL-Gabri et al. (2020),** who investigated factors influencing nurses' compliance with providing care to patients with chest trauma and found that over the two-thirds of the nurses interviewed were female. This was an argument of contention with **Miriam-Therese (2019),** who investigated the evaluation of proficiency of nurses in the management of patients with spinal cord injuries in accident and emergency/orthopedics wards of the University at Port-Harcourt Hospital in Nigeria, and found that over the two- thirds of the nurses evaluated were men.

Regarding education, three-fifths of nurses interviewed had technical nursing institute. This finding agreed with that of **AL-Gabri et al. (2020)**, who stated that more than half of the investigated nurses were graduated from technical nursing institute. In accordance to results of **Reynolds et al. (2016),** who carried out a study of implementation strategies to improve understanding and compliance to spinal cord injury guidelines, disagreed with this finding because all of nurses had nursing bachelor's degree.

Additionally, less than three-quarters of

nurses studied had from one to five years of work experience. This is matched with **Alhussin et al. (2022),** who revealed that over the three-quarters of the nurses evaluated had (1–5 years) of experience. This study finding contradicts the findings of **Almarhabi et al. (2023)**, they carried out an exploratory multiple case research on intensive care unit nurses' in- service trauma care education and found that most of the nurses assessed had more than six years of experience.

The result of the present study revealed that almost all of the studied nurses did not participate in training sessions on how to care for individuals with spinal cord injuries. From the researchers' points of view, it confirmed the important need for instructional guidelines implementation.

The result of the present study revealed that the majority of the nurses in the study said that doctors were the main source of **knowledge** about spinal cord injury. From the researchers' points of view, this demonstrated the adequate and accurate information that medical professionals had given about the subject. Furthermore, the accurate information that medical professionals have provided can aid in dispelling myths and misconceptions regarding spinal cord injury.

Regarding the nurses' knowledge, the current study's findings indicated that the nurses' knowledge regarding spinal cord injury improved over the pre- implementation period. After two months of implementing educational guidelines, a highly statistically significant difference was observed in all knowledge items mean scores. From the researchers' points of view, i t could be attributed to the benefits of the educational guidelines' implementation.

This finding matches up with **Ram et al. (2021),** who evaluated knowledge and practice of staff nurses on the management of spinal cord injury patients in order to develop and evaluate the effectiveness of the teaching program, reported over the half of study subjects had an unsatisfactory knowledge score about spinal cord injury. This contrasts **Abd- Elhameed and Sayed (2018)** result revealed more than two-thirds of nurses under study were found to possess sufficient knowledge of the anatomy and physiology of the spinal cord.

This result differed from **Vorster (2023),** who assessed knowledge, practices, and attitudes of nurses toward logrolling patients suffering from spinal cord injuries and showed the majority of nurses interviewed had enough understanding on spinal cord injury. Also, this contrasts with **Mohammed et al. (2022)**, who assessed how well nurses performed in providing care for patients with spinal cord injuries after participating in a video-assisted teaching program. Found over the half of the nurses demonstrated a sufficient level of nursing care knowledge**.**

The study findings indicate that the total **nurses'** knowledge level regarding spinal cord injury management was satisfactory for less than one fifth of the nurses before the educational guidelines implementation, It might be related to that nurses graduated from technical nursing institute, lack of scientific ongoing training activities or nurses' illiteracy. In agreement with **Ali et al. (2022)** in a study which investigated nurses' competence related care of the patients with damage to the spinal cord. Their study results indicated that the majority of nurses in the study had insufficient total knowledge. This finding contradicts **Al-Marhoon et al. (2018),** who assessed medical students' understanding, perspective, and utilization of first aid for spinal injuries, revealed the majority of nurses evaluated had sufficient overall knowledge owing to their high education level, which increased to a satisfactory level for most of them after the educational guidelines implementation. The success of implementing educational guidelines that fit the needs of the **nurses** under study is seen in these results.

According to nurses' practice, the result of the current study revealed that, when compared to before the educational guidelines were implemented, there was an improvement in total nurses' practice concerning spinal cord injuries. All practice items were shown to differ significantly (highly statistically) before and after two months of educational guidelines implementation.

The results are in the same line with **Elsayed et al. (2020),** who assessed the performance of nurses in providing trauma patients with advanced care in an emergency and reported that more than half of the nurses under study had a competent level of practice. In a research evaluating nurses' knowledge and practice in caring for patients with spinal cord injuries, **Ahmed et al. (2021)** supported this finding, revealed that over the two thirds of

nurses evaluated had incompetent level of practice. This finding was also consistent with **Shehade et al., (2023),** who examined the practice and knowledge of nurses caring for patients with head injuries in West Bank intensive care units, found the majority of the nurses researched were practicing at incompetent level of practice.

The results of the current study revealed that after two months of implementing the educational guidelines, there was a positive correlation between the nurses' knowledge and their practice regarding spinal cord injury management. These findings are equivalent to those reported by **Al-Marhoon et al. (2018)**, who reported a positive association between the total practice and total knowledge scores of nurses under the study. This was in contrast to **Vorster's (2023),** who found no significant relation between the knowledge and practice scores..

The findings of the present study showed that following spinal cord injury and the implementation of pre- educational guidelines, almost of the studied nurses had incompetent practice level concerning spinal cord injury management. This percentage dropped to less ten percent post- educational guidelines implementation. Conversely, two months following the educational guidelines implementation, most of them had competent practices**.** From the researchers' point of view, the findings showed that the accessibility and ease of use of the educational guidelines' content contributed to their efficacy.

The findings of the present study showed that the all of the studied nurses expressed their satisfaction with the educational guidelines' content, which addressed all of their questions about spinal cord injuries and was written understandably and easily. From the researchers' point of view, this result reflects the positive effect of educational guidelines, which met the needs of the nurses and provided them with sufficient knowledge and practices. Also, suggests that the guidelines were successful.

Conclusion:

Based on the findings of the current study, the results of this study suggest that the study concluded that educational guidelines implementation for nurses had a positive effect on guidelines on enhancing nurses' competence in spinal cord injury management with significant differences between pre and educational guidelines implementation.

Recommendations:

The following suggestions are made in light of the findings of the current study:

- Develop a simplified illustrated and comprehensive Arabic booklet to be available for all nurses including the latest information about spinal cord injury, its therapeutic regimen, and how the patients can be managed and to improve their knowledge and practices
- A comprehensive Arabic booklet with simplified illustrations that should be accessible to all nurses to increase knowledge and practices.

- Study should be replicated on a larger sample size and in different hospitals in order to generalize results.

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