# Nurses' Performance Regarding Care of Patients with Spinal Cord Injuries

**Marwa Mohamed Hafez Elsayed [(1)], Fathia Attia Mohamed [(2)], Gehan Elsayed Hafez [(3)] and Suzan Mohamed Elsayed [(4)]**

[(1)] *B.Sc. Nursing, Faculty of Nursing, Zagazig University, Egypt.* [(2)] *Professor of Medical Surgical Nursing, Faculty of Nursing, Zagazig University, Egypt.* [(3)] *Assistant Professor of Medical Surgical Nursing, Faculty of Nursing, Zagazig University, Egypt.* [(4)] *Assistant Professor of Medical Surgical Nursing, Faculty of Nursing, Zagazig University, Egypt.*

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## Abstract

**Background:** Spinal cord injuries are devastating and irreversible injuries that cause a temporary or permanent loss of physiologic function in the body below the injured segment. It produces long-term physical, psychological, and financial burden for patients. Nurses' performance has a substantial impact on patient outcomes. **Aim of the study:** This study aimed to evaluate nurses' performance regarding care of the patients with spinal cord injuries. **Subjects and methods: Study design:** A descriptive design was used to meet the aim of this study**. Setting:** The present study was conducted at the Accidents Hospital's Intensive Care Unit in the hospitals of Zagazig University, Sharkia governorate, Egypt. **Subjects:** A convenience sample consisted of all available nurses (40) who worked in the previously mentioned setting. **Tools of data collection:** two different tools were used for collecting data. **Tool I:** Self-administered questionnaire for evaluating knowledge and attitude of studied nurses' about the care of the spinal cord injuries patients. **Tool II:** An observational checklist for assessing practices of nurses regarding care of patients with spinal cord injuries**. Results:** More than two thirds of nurses in the study (70%) had insufficient overall knowledge, three fifths (60%) had unsatisfactory overall practice, around two thirds of nurses under the study (65%) had expressed a positive attitude regarding the care of the patients suffering from SCIs. **Conclusion:** positive association that is highly statistically significant was observed among the total nurses' knowledge, attitude and practice level regarding the care provided to the patients with spinal cord injuries. **Recommendation**: It is highly suggested that nurses should engage in training programs to enhance their overall performance.

**Keywords**: Nurses performance, Patients, Spinal cord injuries.

## Introduction

Spinal cord injuries are acute damage of the spinal cord caused by traumatic event that results in any level of temporary or permanent bladder/bowel dysfunction or sensory/motor impairment, although they account for a minor percentage of all injuries, but the resulting impairments and life changes, and economic consequences make SCIs one of the most catastrophic injuries **(Ding et al., 2022)**.

Spinal cord injuries are described as injury to the spinal cord caused by traumatic events, disease, or degeneration, which causes temporary or persistent modifications in the functioning of those who are exposed to

the injury. The injury can impair the communication process between the brain and the rest of body, which causes loss of sensory, motor, and autonomic functions. People can develop paralysis, altered sensation, and autonomic dysfunction depending on the extent (complete/incomplete) and location of injury **(Skovbjerg et al., 2025)**.

The level of spinal cord injury is determined by a neurological examination, a CT scan, an MRI of the spine, or spinal x-rays. Some signs and symptoms of SCI include loss of movement, pain, loss or altered sensation, loss of bladder control, difficulty breathing, coughing, and clearing secretions, increased reflex actions or spasms, and changes in the sexual function. To avoid further damage, immediate treatment is recommended; in certain cases, surgery may be required to fix the spine's bones. Bed rest may be required to aid in the healing process following an acute injury to the spinal cord. Physical therapy, occupational therapy, as well as other additional rehabilitation intervention forms may also be required **(Urden and Stacy, 2013).**

Individuals with spinal cord injuries require specialized nursing care. Patients with SCIs always receive patient-centered care. Nursing staff play an important part in the interdisciplinary team. It is essential for the nurse, patient, family, and multidisciplinary team to communicate effectively **(Khan, et al., 2017)**. Nurses' performance can have a substantial impact on patients' prognosis following severe SCIs; 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).**

## Significance of the study

The number of traumatic SCI cases in the Middle East and North Africa region was 23.24 per million. Each year, approximately 250,000 to 500,000 individuals experience spinal cord injury Worldwide. Violence, motor vehicle collisions and other avoidable reasons account for many SCI events. Annually, approximately 17,000 new cases of SCI are reported in the United States. According to estimates, 282,000 people live with SCI. Male patients account for most sports-related SCIs. The risk of SCI is higher among people aged 16 to 30 **(Bennett et al., 2024).** So, the current study was carried out to assess nurses' performance regarding care of patients with spinal cord injuries

## Aim of the study

This study aimed to evaluate nurses' performance regarding care of patients with spinal cord injuries was the aim of this study.

## Research questions

- What is the level of nurses' knowledge regarding the care of the patients with spinal cord injuries?
- What is the level of nurses' practice regarding the care of the patients with spinal cord injuries?
- What are attitudes of nurses regarding the care of the patients with spinal cord injuries?

## Methods and subjects

### Research design

In this study, a descriptive research design was used.

**Study setting**

This study was carried out in accidents ICU in accidents hospital at Zagazig university hospitals, Egypt.

**Subjects**

Convenient sample of available nurses (40) deliver direct care to the patients with spinal cord injuries, had work experience of at least a year, and had approved for participation in the study were selected using convenience sampling.

**Tools of data collection**

**Tool I: Self-administered questionnaire for nurses**

The researcher created this tool after examining the relevant literature of **(Urden et al., 2021; Ali et al., 2022; Srivastava., 2023; Koutoukidis and Stainto; 2024).** It was composed of the three sections that follow:

**Section 1: The demographic features of nurses:** It was utilized to assess the demographic features of nurses under the study. It comprised eight close ended questions included (age, marital status, gender, residence, nursing qualification, experience years in the accidents ICU, monthly income, and participating in training sessions about providing care of the patients with SCIs).

**Section 2: Knowledge Questionnaire for nurses:** This section was used to assess nurse's knowledge regarding SCIs. 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%). (57-72 grades) and unsatisfactory if score below 80%. (0–56 grades). In accordance with the statistical analysis.

**Section 3: Attitudes of nurses regarding providing care for the patients suffering from spinal cord injuries:** It comprised of 16 statements that demonstrated nurses' feelings and reactions toward care for patients with SCIs, 14 of which were positive and two of which were negative, and nurses' responses were graded using a Likert scale (agree, neutral, or disagree).

**Scoring system**

A three-point Likert scale was utilized, with scores ranging from two (agree), one (neutral), and zero (disagree) for positively phrased items and the inverse for negatively worded statements. The overall score for nurses' attitude was calculated and divided into two categories: those with a percentage of ≥ 80% indicating positive attitude. If the percentage < 80% indicates negative attitude. Based on statistical analysis.

**Tool II: Observational checklist**

It was utilized to evaluate practices of nurses when providing care 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: satisfactory if the score is ≥ 80%. (90-113 grades) and unsatisfactory if score <80%. (0-89 grades). As statistically indicated.

**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 some modifications were done based on their opinions such as rewording or rephrasing some of the questions and changing others. 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 0.780, 0.941 for practice, and 0.72 for attitude. Reliability testing had carried out before data collection had begun.

**Field work**

Data collection was carried out over a period of six-month, from August 2024 and ending in January 2025. Every nurse was individually met, given a detailed description of the objectives of study, and offered to join. The self-administered questionnaire and instructions for completing it were provided to the nurse who provided informed consent to participate in the study. The data were collected two days a week (Saturday and Sunday) in morning and afternoon shifts, and each nurse taking 20-30 minutes to complete the self-administered questionnaire, depending on their physical and mental readiness. The researcher also observed the practical skills of nurses regarding the study procedures. Between 30 and 45 minutes are needed to finish the checklist.

**Pilot study**

Pilot study was carried out on four nurses (10%) of the overall entire study subjects to ensure the clarity and comprehensiveness of the tool. Since no changes were made, the pilot participants were subsequently included to the main study population.

**Administrative and ethical consideration**

First, the study proposal was accepted through the Zagazig University Faculty of Nursing's Post Graduate Committee and Research Ethics Committee (REC) with the code of M.D.ZU.NUR/220/10/6/2024

The required permissions were obtained from the head of the faculty of nursing and delivered to Zagazig University Hospitals' general director. After explaining the aim of study. The Permission to carry out the study was obtained from the head of Zagazig University Hospitals, Egypt.

At the initial interview, each eligible subject was given information on the purpose, nature, and advantages of the study, and informed that his/her participation is voluntary. Confidentiality and anonymity of the subjects were further ensured through coding of all data.

The researcher promised the study subjects that the data collected will be kept private and utilized exclusively for the study's objectives, and they wouldn't be in harm while the study process was being applied. Furthermore, each participant provided an informed consent before to inclusion in study and following thorough description of its

purpose and procedures. The study subjects were given clear information about their right to refuse or withdraw from the study at any time with no reason to be given or consequences.

**Statistical analysis**

The Statistical Package for Social Science (SPSS) version 20 for Windows was used to collect, tabulate, and statistically analyze all of the data. The mean ± SD and range were utilized for quantitative data and Absolute and relative frequencies (percentages) were used for qualitative data. When applicable, Fisher's exact test or the Chi-square was used to compare the categorical variables. Pearson's correlation coefficient was computed to evaluate the relation between the study variables, when $p < 0.05$, a level value was considered significant, and $p < 0.01$ deemed very significant, while $p \geq 0.05$ was deemed not significant. Linear regression is a method for describing data and explaining how one or more independent variables relate to one or more dependent variables. Every test had two sides.

**Results**

**Table (1)**, Demonstrates that nurses under the study had ages ranged from 22 to 40 years, with Mean ± SD=26.7±4.4, two fifths (40%) had their age more than 25 years, over the half of nurses researched (55%) were females and married. Regarding the qualification of nurses 5.0% of studied nurses had nursing diploma, (70.0%) had technical institute, (25.0%)had bachelor of nursing, more than three quarters had hospital experience equal or less than five years ≤ 5 years (77.5%),more than half (55.0%) had insufficient monthly income. Nearly three quarters (72.5%) were living in rural area. Furthermore; of the nurses in the study, two thirds (67.5%) hadn't received any training programs on how to provide care for the spinal cord injuries patients.

**Table (2)**, Demonstrates that over the two thirds (70%) of nurses evaluated had unsatisfactory knowledge score, with allover mean± SD 43.9±13.4, and range from 17 - 66.

**Table (3)**, Shows overall attitude of nurses evaluated toward caring for spinal cord injuries patients. The table shows that approximately two-thirds (65.0%) of the nurses in the study had overall positive attitude with mean± SD 26.7±4.95 and range from 16 - 32. While more than one third (35.0%) of nurses under the study had total negative attitude regarding care of the patients with spinal cord injuries.

**Table (4)**, shows that the majority of the nurses researched (77.5%) had unsatisfactory overall practice level regarding the head to toe assessment followed by the nursing intervention measures (67.5%). While more than half (55.0%) had satisfactory total practice related to general assessment followed by neurological assessment (42.5%).

**Table (5)**, Demonstrates that, with regard to the care provided to the patients with SCIs, there was a highly significant statistical association between total knowledge score and total attitude score, total knowledge score and total practice score, and total attitude score and total practice score among the studied nurses ($p = 0.0001$).

**Discussion**

In terms of the demographics of the nurses investigated, the study found that three-fifths of nurses in the study were ≤ 25 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 women made up over half 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, over the two-thirds 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, 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.

According to the current study, three-fifths of nurses in the study had an inadequate level of knowledge concerning the anatomy and physiology of the spinal cord. 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.

Concerning nurses' knowledge about SCIs. The recent findings showed that almost three-quarters of nurses investigated had an inadequate knowledge level regarding SCIs. This finding matches up with **Ram et al. (2021),** who evaluated knowledge and practice of staff nurses on the management of SCI 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 SCIs. 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 SCIs.

In regard to knowledge of nurses in providing care to patients suffering from SCIs, approximately half of nurses in the current study lacked sufficient knowledge regarding nursing care of spinal cord injuries patients. 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**.**

Concerning overall knowledge level, according to the current study, over two-thirds of nurses investigated lacked sufficient overall knowledge about how to care for patients with SCIs. It might be related to that more than two-thirds of the nurses investigated 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.

The recent study found that almost two-thirds of nurses felt a positive attitude about providing care for patients who had spinal cord injuries. This is matched with **Al-Othman et al. (2018)** who assessed individual's knowledge, attitudes, and practices about cervical-spinal injuries in Dammam city and revealed that over half of the nurses researched had positive attitudes. This finding is reinforced by **Vorster (2023)**, who revealed that almost the majority of nurses in the study had a positive attitude toward caring for the patients with SCIs. This contradicts **Afify et al., (2024)**, who investigated an assessment of nurses' performance for the patients with spinal cord injuries and found that more than half of nurses in the study had a negative attitude.

According to nurses' practice regarding neurological assessment, recent study showed that over half of the nurses who are being studied had unsatisfactory practice. 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.

According to current study, found that three-fifths of the nurses investigated had unsatisfactory level of practice with regards to caring for SCIs patients. Due to inadequate training and supervision, increased workloads, and a lack of commitment to evidence-based guidelines. 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 skills 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 total knowledge, total practice, and total attitude scores of nurses under study showed a highly statistically significant association. 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. In agreement with **Tharu et al. (2022)**, who examined a rehabilitation center in Bangladesh, caregivers' awareness, perspectives, and behaviors

about pressure injuries in patients with spinal cord injuries. They discovered no statistically significant correlation between attitudes and practices of nurses studied.

## Conclusion

In the context of the current study finding, it is possible to be determined that almost two-thirds of the nurses in the study possessed inadequate overall knowledge, three-fifths had unsatisfactory total practice, and approximately two-thirds had a positive attitude toward caring for patients with spinal cord injuries. Total knowledge, total practice, and total attitude scores of nurses under study showed a highly statistically significant association toward care for the patients with SCIs.

## Recommendations

**Depending on findings, it is recommended:**

- Developing and implementing Training programs to enhance nurses' performance in caring for the patients with SCIs.
- Study should be replicated on a larger sample size and in different hospitals in order to generalize results.

## Authors' contributions

F.A.M; Suggested topic, study design, and helping in collection of data M.M.H Performing, and typing interviews, collection and revising data, and writing the manuscript. G.E.H and S.M.E; Analyzing and interpreting data assess accuracy of analysis, drafting the thesis. F.A.M; conducted the overall supervision and participated at every stage of the research process prior to the publishing of the manuscript. Every author contributed, edited, and approved the final work.

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## Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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**Table (1): The frequency and percentage distribution of the nurses under the study according to their demographics (n=40)**

| Demographic characteristics | No. | % |
|---|---|---|
| **Age** | | |
| ≤25 years | 24 | 60.0 |
| >25 years | 16 | 40.0 |
| **Mean ±SD** | 26.7±4.4 | |
| **Median(range)** | 25(22-40) | |
| **Gender** | | |
| Male | 18 | 45.0 |
| Female | 22 | 55.0 |
| **Educational level** | | |
| Diploma of nursing | 2 | 5.0 |

| | | |
|---|---|---|
| technical Institute of nursing | 28 | 70.0 |
| Nursing Bachelor | 10 | 25.0 |
| **Marital status** | | |
| Married | 22 | 55.0 |
| Single | 18 | 45.0 |
| **Residence** | | |
| Rural | 29 | 72.5 |
| Urban | 11 | 27.5 |
| **Monthly income** | | |
| Sufficient | 18 | 45.0 |
| Not sufficient | 22 | 55.0 |
| **Experience years in accidents ICU** | | |
| ≤5 years | 31 | 77.5 |
| >5 years | 9 | 22.5 |
| **Mean ±SD** | 4.2±3.7 | |
| **Median(range)** | 3(1-15) | |
| **Attending training courses** | | |
| Yes | 13 | 32.5 |
| No | 27 | 67.5 |
| **Number of training courses** | | |
| One | 5 | 12.5 |
| Two | 7 | 17.5 |
| Three | 1 | 2.5 |

**Table 2: Frequency and percentage distribution of total studied nurses' knowledge about care of patients with spinal cord injuries (n=40)**

| Overall knowledge about spinal cord injuries | No. | % |
|---|---|---|
| **Overall knowledge about spinal cord anatomy and physiology** | | |
| Satisfactory ≥80% | 16 | 40.0 |
| Unsatisfactory <80% | 24 | 60.0 |
| Total knowledge about spinal cord injuries | | |
| Satisfactory ≥80% | 10 | 25.0 |
| Unsatisfactory<80% | 30 | 75.0 |
| **Overall knowledge about providing nursing care for the patients with spinal cord injuries** | | |
| Satisfactory ≥80% | 7 | 17.5 |
| Unsatisfactory<80% | 33 | 82.5 |
| Overall knowledge score | | |
| Satisfactory ≥80% | **12** | **30.0** |
| Unsatisfactory<80% | **28** | **70.0** |

**Table 3: Frequency and percentage distribution of studied' nurses' overall attitude level regarding care of patients with spinal cord injuries (n=40)**

| Items | No. | % |
|---|---|---|
| **Overall attitude of nurses toward the care of patients with spinal cord injuries (16)*** | | |
| • Positive attitude≥80% | 26 | 65.0 |
| • Negative attitude<80% | 14 | 35.0 |
| **Mean ±SD** | 26.7±4.95 | |
| **Median (Range)** | 28 (16-32) | |

***( )* maximum score***

**Table 4: Frequency and percentage distribution of studied nurses' overall practice level regarding care of the patients with SCIs. (n=40)**

| Items | Competent | | Incompetent | |
|---|---|---|---|---|
| | **No.** | **%.** | **No.** | **%.** |
| **Assess Orientation** | 19 | 47.5 | 21 | 52.5 |
| **Assess GCS** | 21 | 52.5 | 19 | 47.5 |
| **Sensory function assessment** | 14 | 35.0 | 26 | 65.0 |
| **Assess motor function** | 25 | 62.5 | 15 | 37.5 |
| **Neurological assessment** | **17** | **42.5** | **23** | **57.5** |
| head | 6 | 15.0 | 34 | 85.0 |
| neck | 5 | 12.5 | 35 | 87.5 |
| chest | 13 | 32.5 | 27 | 67.5 |
| Abdomen | 13 | 32.5 | 27 | 67.5 |
| back | 23 | 57.5 | 17 | 42.5 |
| Gentilia | 10 | 25.0 | 30 | 75.0 |
| Extremities | 25 | 62.5 | 15 | 37.5 |
| **Head – to – toe assessment** | **9** | **22.5** | **31** | **77.5** |
| Vital sign | 24 | 60.0 | 16 | 40.0 |
| General survey | 24 | 60.0 | 16 | 40.0 |
| **General assessment** | **22** | **55.0** | **18** | **45.0** |
| Cardiac monitoring | 13 | 32.5 | 27 | 67.5 |
| Oxygen administration via /mask | 16 | 40.0 | 24 | 60.0 |
| Maintaining breathing pattern and airway clearance | 20 | 50.0 | 20 | 50.0 |
| Maintaining Skin integrity | 19 | 47.5 | 21 | 52.5 |
| psychological support | 24 | 60.0 | 16 | 40.0 |
| **Nursing interventions** | **13** | **32.5** | **27** | **67.5** |
| **Total practice score** | **16** | **40.0** | **24** | **60.0** |

**Table 5: Correlation matrix between the total knowledge, total attitude level, and total practice level of nurses regarding care of the patients with spinal cord injuries (n=40)**

| Items | Nurses' Knowledge score | | Nurses' Attitude score | | Nurses' practice score | |
|---|---|---|---|---|---|---|
| | R | P | R | P | R | P |
| **Nurses' Knowledge score** | | | | | | |
| **Nurses' Attitude score** | 0.60* | 0.0001 | | | | |
| **Nurses' practice score** | 0.62 * | 0.0001 | 0.73* | 0.0001 | | |

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