Biopsychosocial Needs for Patients with Non Traumatic Spinal Cord Injury

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Abstract

Background: Non-traumatic spinal cord injury is a neurological emergency associated with a high risk for morbidity and reduced quality of life. It is defined as any damage to the spinal cord resulting from a non-traumatic cause. **Aim of the study:** The current study was conducted to assess the biopsychosocial needs for patients with non- traumatic spinal cord injury**. Research Design:** A descriptive exploratory design was used. **Study Settings:** The study was conducted in the Neuro-surgery units (word and out patients clinic) at Damanhour Medical National Hospital. **Subject:** A purposive sample of (60) patients in outpatient clinic and neurosurgery department. **Result:** 93.3% of studied patients had satisfactory level of knowledge about non-traumatic spinal cord injury, 65% of them were moderate dependent for daily living activity, 40% of them had a moderate pain, 33.3% of them had mild level of anxiety, 31.7%of them had a moderate level of depression, and 48.3% of them had moderate level of social dysfunction. **Conclusion**: The majority of studied patient had satisfactory level of knowledge while minority of them had a moderate knowledge about non-traumatic spinal cord injury**.** Also less than two thirds of them were had moderate dependent on daily activity, more than one fifth of them were slight dependent and more than one tenth of them were severe dependent. Moreover two fifths of studied patients had a moderate pain, while one third of them had mild anxiety, one fifth of them had moderate anxiety and less than one third of them had a moderate depression, less than half of them had moderate level of social dysfunction**. Recommendations:** Developing a simplified illustrated and comprehensive Arabic booklet to be available for all patients early when diagnosed including latest information about non-traumatic spinal cord injury, its therapeutic regimen and how the patients can manage their symptoms.

Key wards: Biopsychosocial Needs, Non Traumatic Spinal Cord Injury

Introduction:

Spinal cord injury is a damage to the spinal cord that temporarily or permanently causes changes in its function. SCI is devided into traumatic and non- traumatic aetiologies. It is a devasting condition that can lead to significant neurological impairment and reduced quality of life **(Pruthi et al., 2021).**

Traumatic SCI occurs when an external physical impact for example a motor vehicle injury, fall, sports-related injury or violence acutely damages the spinal cord, where as non-traumatic SCI occurs when an acute or chronic disease process such as degenerative disc disease, a tumor or infection generates the primary injury **(Alizadeh et al., 2019).**

Following degenerative disease of the spine, spinal tumors are the main cause of non-traumatic spinal cord injury in the united states and other developed countries. On the other hand, infection including tuberculosis and HIV are the predominant cause of non-traumatic myelopathy in many developing countries. Other vascular injuries, developmental and genetic disease, malnutrition and inflammation are the causes of non traumatic spinal cord injury **(Hyun-Yoon, 2019)**.

After SCI, the motor, sensory and autonomic deficits limit not only the convenience of exercising, but notably the capacity to exercise due to the decreased ability to ventilate independently and limited innervated skeletal muscle **(Taylor, 2018).**

An important evolution in management has been the recognition and prevention of the chronic complications of SCI including respiratory compromise, bladder dysfunction, and pressure

sores through directed interventions along with early integration of physical rehabilitation and mobilization **(Abrams, & Wakasa, 2019).**

Special nursing care to be given if patient is having quadriplegia or paraplegia. Nurse has to assess each nerve for the patient's potentials and design the preventive measures to avoid bedsores and contractures and also to help for early ambulation and rehabilitation. It is important to prepare patient and family to live with the deficit if any. Patient and family should be given the knowledge about the injury, prognosis, and possible complication **(Consortium for Spinal Cord Medicine Clinical Practice Guidelines, (2018).**

Significance of the study:

The number of nontraumatic spinal cord injuries is difficult to know because there are so many different causes, and there is no one big registry where all the information is kept. While it is thought that in the United States there are between 183 000 and 230 000 people with traumatic spinal cord injuries, it is thought that if included nontraumatic cases then this number would more than quadruple.

Developed countries tended to have a higher proportion of cases with degenerative conditions and tumours causing NTSCI. Developing countries, in comparison, tended to have a higher proportion of infections, particularly tuberculosis and HIV, although it was interesting that a number also reported tumours as a major cause.

According to medical registration department at Damanhour Medical National Hospital 200 cases with non traumatic spinal cord injury was reported during 2019.

Aim of this study:

The current study was conducted to assess the biopsychosocial needs for patients with non-traumatic spinal cord injury through:

1- Assessing physical, psychological and social needs of patients with non- traumatic spinal cord injury.
2- Assessing patient level of knowledge regarding the non-traumatic spinal cord injury

Research questions:

The current study was answered the following questions

I. What are the biopsychosocial needs of patients with non-traumatic spinal cord injury?
II. What are the patient's level of knowledge regarding the non-traumatic spinal cord injury?

The subject and methods of the current study were designed under the following main four designs:

I. Technical Design
II. Operational Design
III. Administrative Design
IV. Statistical Design

I. **Technical Design**

It included research design, study settings, subject and tools of data collection.

Research Design

A descriptive exploratory design was used to conduct this study.

Study Settings

The study was conducted in the Neuro-surgery units (word and out patients clinic) at Damanhour Medical National Hospital. The word is located on the seventh floor and contains 5 rooms, each room has 4 beds. While the outpatients clinic is in a separate building from the hospital and the building contains 11 clinics for different specialties diagnoses

Subject:

Sample type: A purposive sample of (60) patients in outpatient clinic and neurosurgery department who met the selective criteria were included in the study sample according to the criteria for selection.

Inclusion criteria:

I. All adult patients with non-traumatic spinal cord injury
II. All adult patients who are conscious and able to communicate

Exclusion criteria:

I. Patients with traumatic spinal cord injury
II. Comatosed patients and bedridden patients

Sample size:

According to medical registration department at Damanhour Medical National Hospital 200 cases with non-traumatic spinal cord injury was reported during 2019. Sample size was

containing 60 patients who met the selective criteria.

$$n = N \times \frac{\frac{Z^2 \times P \times (1-P)}{e^2}}{(N-1+\frac{Z^2 \times P \times (1-P)}{e^2})}$$

$$n = 200 \times \frac{\frac{1.96^2 \times 0.5 \times (1-0.5)}{0.05^2}}{(200-1+\frac{1.96^2 \times 0.5 \times (1-0.5)}{0.05^2})}$$

n = 60

N = population size

Z = critical value of the normal distribution at the required confidence level

P = sample proportion

e = margin of error

Tools of data collection:

Five tools were used in this study and classified as the following:

Tool (I): Interviewing questionnaire:

It is a structured questionnaire was developed by the researcher in an Arabic language based on review of the related literature ***(Babu. 2018; Hyun-Yoon, 2019; Graicy, Prema 2013)*** and it was include three parts:

The 1st part: was concerned with the socio-demographic data of patients (age, gender, marital status, educational level, job, residence and income sufficiency).

The 2nd part: was concerned with patients clinical data (degree of spinal cord injury, number of affected vertebrae, type of surgery& effect of SCI on body function).

The 3rd part: patient's level of knowledge regarding the non-traumatic spinal cord injury.

❖ **Knowledge scoring system:**

Each question was scored as (1) for a correct answer and (zero) for an incorrect answer. While the total knowledge score was calculated as the following: knowledge was considered low if the percent score was <50 %(7) and was moderate if percent was (>50% to <75%) (7-11) and consider high if percent was 75% (11) and more.

Tool (2): Daily Living Activities Scale (Barthel Index) (BI) :

It used to measure performance in activities of daily living (ADL). Ten variables describing ADL and mobility are scored, a higher number being a reflection of greater ability to function independently following hospital discharge. Time taken and physical assistance required to perform each item are used in determining the assigned value of each item. The Barthel Index measures the degree of assistance required by an individual on 10 items of mobility and self-care ADL ***(Tobimatsu and Nakamura, 2001)***

❖ **Scoring system**

The total score for this scale is 100 degree (100) according to items of ADLS (Feeding 10 degree), (Move from wheelchair to bed and return 15 degree), (Doing personal toilet 5 degree), (Getting on and off toilet 10 degree), (Bathing self 5 degree), (Dressing10 degree) (Walking on a level surface 15 degree), (Ascending and descending stairs 10 degree), (Bowel control 10 degree) and (Bladder control 10 degree).

Daily living activity scoring system:

Contained 10 items that 6 of them grading as (0, 5, 10), 2 of them grade as (0, 5) and 2 grade as (0, 5, 10, 15), the total score ranging from 0-100. The total daily living activity score was calculated as the following:

0 – 20= Total dependency
21 – 60 = Severe dependency
60 – 90 = Moderate dependency
91 – 100 = Slight dependency

Tool (3): Numerical Pain Rating Scale:

It was assess level of pain in patients with non-traumatic spinal cord injury, which a respondent selects a whole number (0-10) as ″0″ representing to no pain and ″10″ representing to the worst pain. ***(Galer & Gammaitoni, 2003)***

Numerical Pain scoring:

The score zero (0) indicates no pain and the top score (10) indicates the worst possible pain. It divided into 3 main parts: the first part graded from 1-3 cm which reflects mild pain, the second part graded from 4-6 cm for moderate pain and the third part graded from 7-9 cm for severe pain and 10 for worst pain.

Tool (4): Hospital Anxiety and Depression Scale:

It was commonly used to determine the levels of anxiety and depression that a person is experiencing. The HADS is a fourteen item scale that generates: Seven of the items relate to anxiety

and seven relate to depression, it adopted from **(snaith, 2003).**

Hospital's anxiety and depression scoring system:

Each one contained 7 items that had a grading from 0-3, the total score ranged from 0-21. Total hospital's anxiety and depression score was calculated as the following:

0-7 = No Depression \ Anxiety
8-10 = Mild Depression \ Anxiety
11-14 = Moderate Depression \ Anxiety
15 – 21 = Severe Depression \ Anxiety

Tool (5): Social Dysfunction Rating Scale:

It was measured the dysfunctional aspect of adjustment ***(McDowell, 2006).***

❖ **Scoring system:**

The scale included 20 symptoms of social and emotional problems, each item was scored on a scale of 0-2 (no /moderate/very high level). Responses was" never", " sometimes", " always" and was respectively scored 2, 1 and 0. The ratings was grouped into three classes: four items refer to the respondent's self-perception, five items refer tointerpersonal relations and eleven items concern social performance.

Social Dysfunction scoring system:

Contained 20 items that had a grading from (0-2), the total score ranging from 0-40. The total Social dysfunction score was calculated as the following:

0 – 14 = Very high level of social dysfunction
12 – 28 = Moderate level of social dysfunction
28 – 40 = No social dysfunction

II. Operational Designed

It included operational design for this study consisted of four phases, namely preparatory phase, ethical considerations, pilot study and fieldwork.

Preparatory Phase

This phase included reviewing of current and past, local and international related literature and theoretical knowledge of various aspect of the study using books, articles, periodical magazines and internet to modify tool 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.

Tool validity and reliability

Testing validity of the proposed tools by inspecting the items to determine whether the tools measure what supposed to measure. The tools revised by a jury of seven experts from different academic categories (two professor, two assistant professors and three lecturers) from medical surgical nursing department, faculty of nursing, Ain Shams University. The experts reviewed the tools and its content for clarity, relevance, comprehensiveness, accurateness, logical consequence, applicability and simplicity. Modifications were done according to their recommendations

Testing reliability of the proposed tools was done statistically by Cronbach Alpha test. It was used to examine whether the questionnaire had an internal consistency. The knowledge and practice tools had an internal consistency. Alpha tests reached 0.735 for Personal, medical and knowledge tool. Alpha tests for Daily living activity scale was 0.614, also Numerical Pain scale with alpha test reached 0.815, Hospital's anxiety and depression scale with alpha test reached 0.903, additionally, Social Dysfunction scale alpha test reached 0.909

Pilot Study

The pilot study was carried out on 10% (6) of patients in order to test the applicability of the constructed tools and the clarity of the questions. The pilot has also served to estimate the time needed for each subject to fill in the questionnaire. According to the results of the pilot, no corrections and omissions of items were performed, so the nurses were included in the study sample.

Fieldwork

Data were collected through six months, from the beginning of October 2021 to the end of March 2022. The investigator firstly met with patients at the previously mentioned settings, explained the purpose of the study after introducing herself. Then, individual interviewing was done after obtaining patient consent to participate. The researcher was visiting the study setting 2days / week at morning and afternoon shifts to collect data. The questionnaire was filled by the investigator for non educated patients, the tool taken 35 -45 mints for data collection.

III. Administrative Design

An official permission was obtained by submission of a formal letter issued from the Dean of faculty of nursing, Ain Shams University to the director of Dmanhour Medical National Hospital. An official agreement was obtained from Hospital Manager and to get their approval to conduct the study. Collect the necessary data for current study after a brief explanation of the purpose of the study.

Ethical Considerations

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

IV. Statistical Analysis

Data entry and data analysis were done using statistical package for the social science (SPSS) version 26. Data were presented as number, percentage means and standard deviation. Chi-square test was used to show relation between variables. T-test was used to compare 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
- ✓ Non-significant at p-value ≥ 0.05.

Results:

Table (1): regarding socio-demographic characteristics, it is illustrated that 41.7% of studied patient had an age group from (30-60) years with a mean and SD of 46.8±16.3 **.** Concerning sex about 60% of patients were male. Regarding residence 55% were from urban areas. About 63.3% of studied patients were married and employed. About 43.3% of studied patients their monthly income covered treatment cost.

Table (2): Illustrates that 68.3% of studied patient knew correctly the meaning of non-traumatic spinal cord injury, 70% and 56.6% answered correctly for "spinal Cord Injury occurs as a result of " and "not considered cause of non-traumatic spinal cord injury" respectively. About 66.7% answered correctly for diagnostic methods for non-traumatic spinal cord injury.

Table (3): displays daily living activities of studied patients, and reports that 5% were unable to feed or transfer. Regarding bathing 13.3% were dependent. Concerning grooming 28.3% needed help. As regard stairs about 16.7% were unable.

Figure (1): illustrates educational level of studied patients and reports that 28.3% of studied patients had a high level of education and 26.7% had a secondary level of education.

Figure (2): displays that 93.3% and 6.7% of studied patient had a moderate and low knowledge about non-traumatic spinal cord injury respectively

Figure (3): represents that 65% of studied patients were moderate dependent, 21.7% were slight dependent and 13.3% were severe dependent.

Figure (4): displays that 40% of studied patients had a moderate pain, 38.3% had a mild level of pain and about 13.3% had a severe level of pain.

Figure (5): represents that 36.7% of studied patients had no anxiety, about 33.3% had mild anxiety, 20% had moderate anxiety and 10% had a severe anxiety.

Figure (6): demonstrates total hospital's depression score of studied patients and reports that 31.7% had a moderate depression, about 20% had a mild depression and about38.3 had no depression.

Figure (7): represents total social dysfunction score of studied patients, and illustrates that 48.3% had moderate level of social dysfunction. About 31.7% of studied patients had no social dysfunction and 20% had very high level of social dysfunction.

Table (1): Frequency and percentage distribution of studied patients according to socio demographic characteristics N (60).

Socio demographic characteristics	N	%
Age group:		
• 18-< 30 year	15	25.0
• 30- <60 year	25	**41.7**
• 60 year or more	20	33.3
Age mean± SD	**46.8±16.3**	
Gender		
• Male	36	**60.0**
• Female	24	40.0
Marital Status		
• Married	38	**63.3**
• Single	22	36.7
Educational level:		
• High education	17	**28.3**
• Secondary	16	26.7
• Pre- university	15	25
• Can't read and write	12	20
Job		
• Employee	38	**63.3**
• Un employee	22	36.7
Residence:		
• Urban area	33	**55.0**
• Rural area	27	45.0
Monthly income enough for the cost of treatment		
• Yes	26	**43.3**
• No	34	56.7
If no there is an agency that covers patient's treatment cost		
• Yes	19	55.9
• No	15	44.1

Table (2): Frequency and percentage distribution of studied patients according to meaning, causes and diagnosis of non-traumatic spinal cord injury.

Items	N (60)	%
Meaning of non-traumatic spinal cord injury:		
• Correct answer	41	**68.3**
• Incorrect answer	19	31.7
Spinal Cord Injury occurs as a result of		
• External collision	6	10.0
• Complication of diabetes mellitus	6	10.0
• **Inflammation in spinal cord**	42	**70.0**
• Stab wound in spinal cord	6	10.0
Not considered Cause of non-traumatic spinal cord injury		
• Infection	6	10.0
• Vascular disease	7	11.7
• **Traffic accident**	34	**56.6**
• Genetic disease	13	21.7
Diagnostic methods for non-traumatic spinal cord injury are the following except		
• CT scan	5	8.3
• MRI	5	8.3
• Laboratory studies (CBC – tumor markers)	10	16.7
• **EEG**	40	**66.7**

Table (3): Frequency and percentage distribution of studied patients regarding their daily living activities.

Items		N (60)	%
Feeding	Unable	3	**5.0**
	Needs help	17	28.3
	Independent	40	66.7
Bathing	Dependent	8	**13.3**
	Independent	52	86.7
Grooming	Needs help	17	**28.3**
	Independent	43	71.7
Dressing	Dependent	0	0.0
	Needs help	37	61.7
	Independent	23	38.3
Bowels	Incontinent	3	5.0
	Occasional accident	1	1.7
	Continent	56	93.3
Bladder	Incontinent	6	10.0
	Occasional accident	3	5.0
	Continent	51	85.0
Toilet use	Dependent	3	5.0
	Needs some help	30	50.0
	Independent	27	45.0
Transfers (Bed to chair and back)	Unable, no sitting balance	3	**5.0**
	Major help	8	13.3
	Minor help	16	26.7
	Independent	33	55.0
Mobility	Immobile	0	0.0
	Wheelchair Independent	11	18.3
	Walks with help of one person	9	15.0
	Independent	40	66.7
Stairs	Unable	10	**16.7**
	Needs help	12	20.0
	Independent	36	63.3

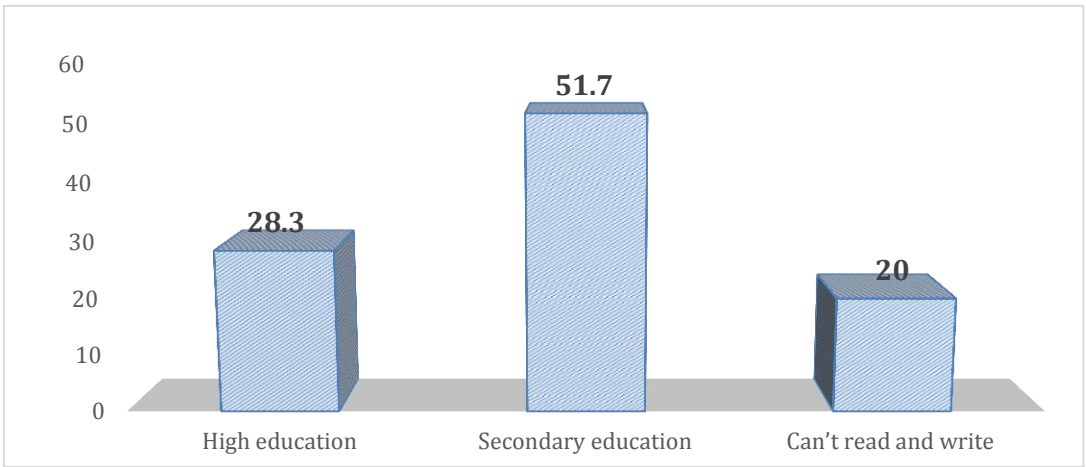

Figure (1): Percentage distribution of studied patients regarding educational level of studied patients

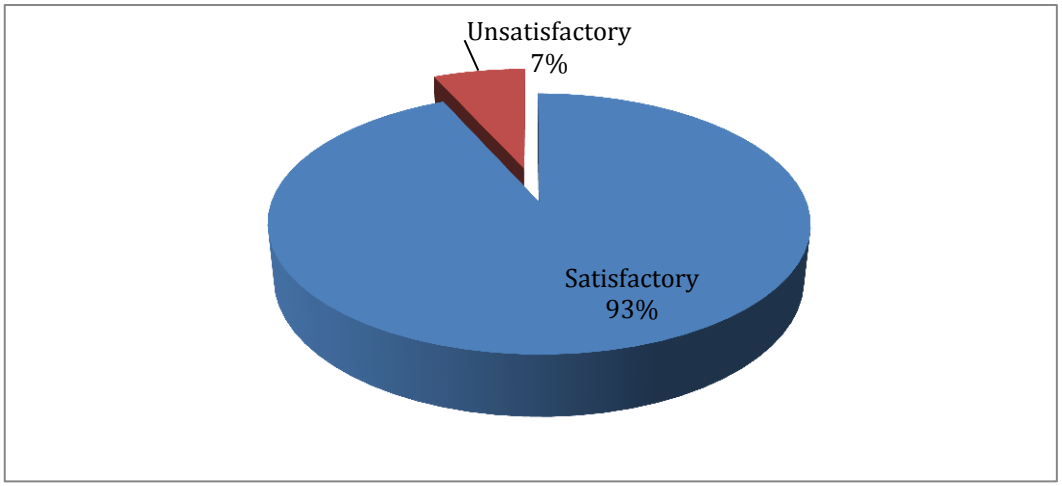

Figure (2): Total level of knowledge about non-traumatic spinal cord injury.

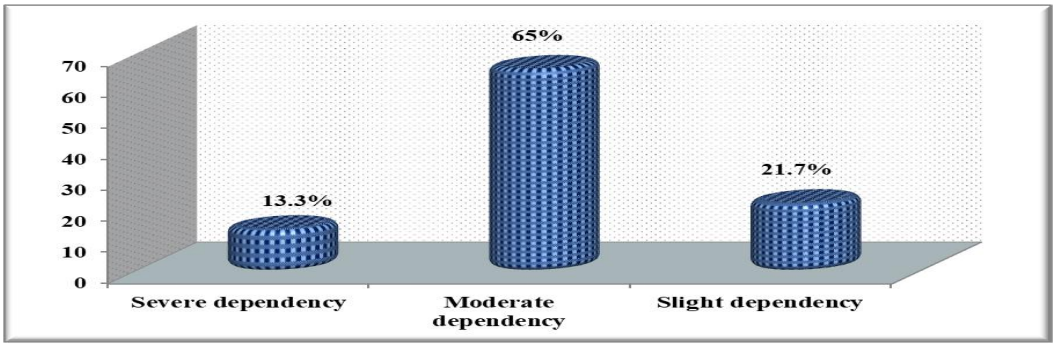

Figure (3): Total daily living activity of studied patients.

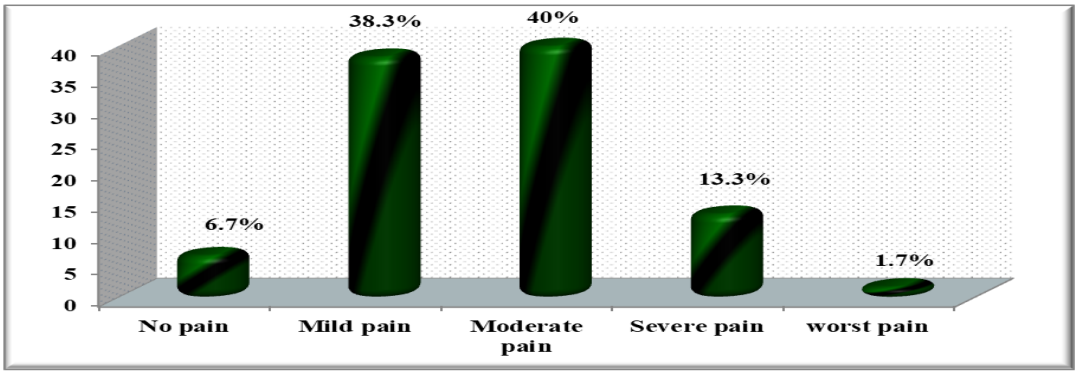

Figure (4): level of pain of studied patients.

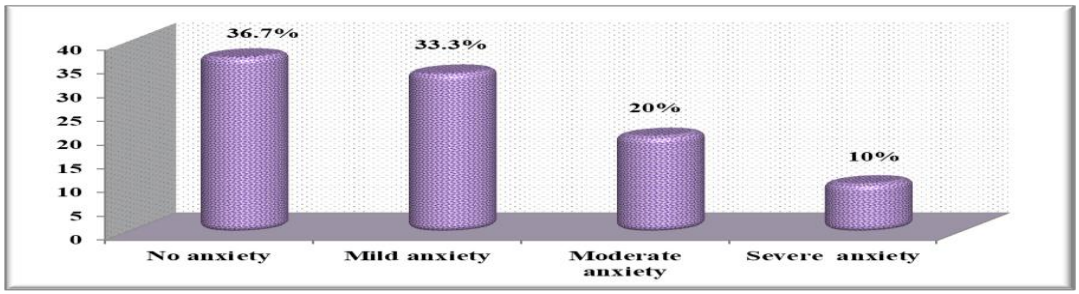

Figure (5): Total level of anxiety score of studied patients.

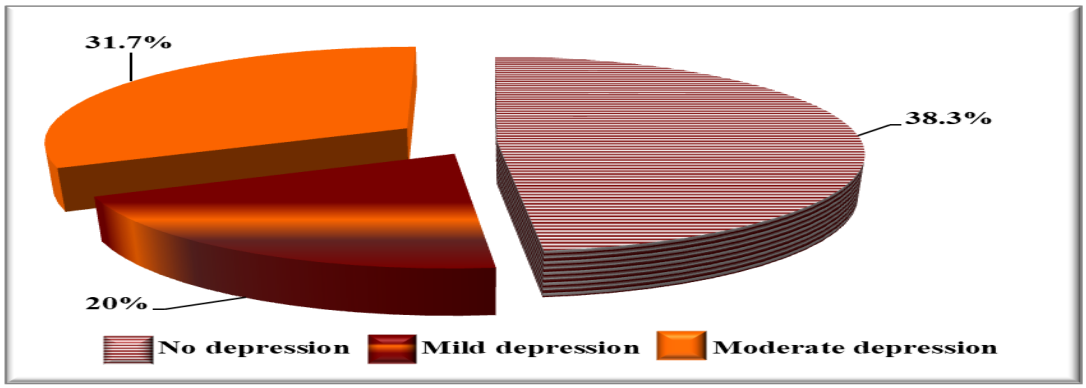

Figure (6): Total level of depression score of studied patients

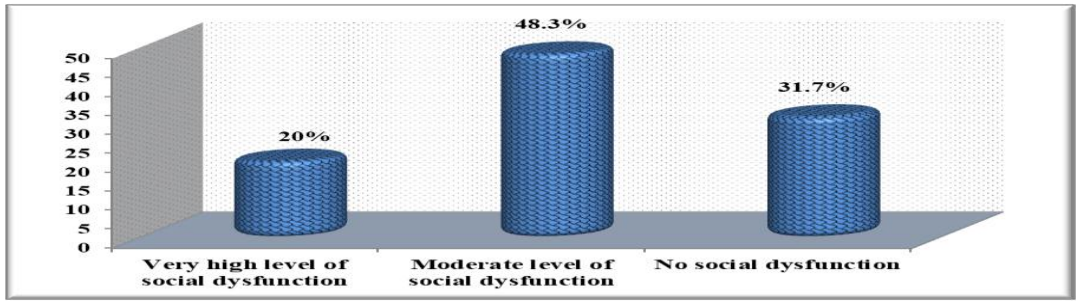

Figure (7): Total social dysfunction score of studied patients.

Discussion:

Non-traumatic spinal cord injury **(NTSCI)** is a neurological emergency associated with a high risk for morbidity and reduced quality of life. It is defined as any damage to the spinal cord resulting from a non-traumatic cause **(Müller-Jensen et al., 2021).** Despite pharmacological and surgical treatment along with SCI focused rehabilitation, secondary medical complications continue to be common in SCI patients. Acute and chronic secondary complications include respiratory, cardiovascular, and neurological problems that worsen the mortality and morbidity associated with SCI. These complications include respiratory failure, wound complications, urinary tract infections, and neurogenic shock. These complications can lead to longer hospital stay, decreased functional recovery at long-term

follow-up, and increased rate of mortality **(Arul et al., 2019).** So the current study aimed to assess the biopsychosocial needs for patients with non -traumatic spinal cord injury

Regarding socio demographic characteristics of studied patients the present study result illustrated that more than two fifths of studied patient had an age group from (30-60) years with a mean and SD of 46.8±16.3**.** Concerning sex and less than two thirds of them were male. Regarding residence more than half of them were from urban areas. Also less than two thirds of them were married and employed, and less than half of studied patients their monthly income covered treatment cost.

The present study result in the same line with **Welk et al., (2021)** who applied study entitled "A qualitative assessment of psychosocial aspects that play a role in bladder management after spinal cord injury" and mentioned that, less than two thirds of the studied patients were male while disagree in relation to age less than two thirds of them the median age was 49 years, also contrast with **Burke, Lennon, & Fullen, (2018)** who conducted study entitled " Quality of life after spinal cord injury: The impact of pain" and reported that, the mean age of respondents was 52 years less than three quarters of the studied patients were males, less than one third of them were employed

Regarding total knowledge of the studied patients about non-traumatic spinal cord injury the present study result mentioned that, the majority of studied patient had satisfactory level of knowledge while minority of them had unsatisfactory knowledge about non-traumatic spinal cord injury**.** From the investigator point of view this level of knowledge might be due to presence of medical learning programs.

Concerning total daily living activity of studied patients the current study result represented that less than two thirds of studied patients were moderate dependent, more than one fifth of them were slight dependent and more than one tenth of them were severe dependent. The present study result contrast with **Jiang, Sun, & Meng, (2021)** who applied a study entitled " Identification and relationship of quality of life and self-care ability among Chinese patients with spinal cord injuries" and reported that, more than one fifth of studied patients were highly dependent on the caregiver, two fifths of them were moderately dependent, more than one tenth of them were mildly dependent on the caregiver, while, minority of them were independent for activities of daily living.

Regarding level of pain of studied patients the present study result showed that, two fifths of studied patients had a moderate pain, less than two fifths of them had a mild level of pain and more than one tenth of them had a severe level of pain. The present study result in accordance with **Akter, (2018)** who applied study entitled "Characteristics of shoulder pain and its associated Functional limitation for patient with spinal cord injury at centre for the rehabilitation" and reported that, highly percentage of the studied patients had moderate pain while one tenth of them had severe pain. While disagree with **Kuiper, et al., (2021)** who conducted study entitled " Post-traumatic stress disorder symptoms and pain intensity in persons with spinal cord injury" and demonstrated that, highly percentage of the studied patients had moderate to severe pain levels, while less than one fifth of them did not have pain at all, and more than one tenth of them had mild pain

Regarding total hospital's anxiety score of studied patients the present study result represents that more than one third of studied patients had no anxiety, about one third of them had mild anxiety, one fifth of them had moderate anxiety and one tenth of them had a severe anxiety. The present study result disagree with **Dalgic, & Kutlu, (2020)** who applied study entitled " The Level of Depression and Anxiety in Individuals with Traumatic and Nontraumatic Spinal Cord Damage" and showed that, there were light and moderate symptoms of depression and anxiety in most of the patients with spinal-cord injuries.

Also contrast with **Rauf et al., (2019)** who conducted study entitled **"** Levels of anxiety and depression among patients with

spinal cord injury coming to paraplegic centre, " and demonstrated that, more than one tenth of the studied patients had normal anxiety, more than one quarter of them had mild, less than half of them had moderate while more than one tenth of them had severe anxiety. From the researcher point of view the level of anxiety depend on hospital environmental condition, staff of nursing and patient condition also social support.

Regarding total hospital's depression score of studied patients the present study result showed that, less than one third of the studied patients had a moderate depression, about one fifth of them had a mild depression and less than two fifths of them had no depression. The present study result disagree with **Rauf et al., (2019)** who mentioned that, less than two fifths had normal depression, less than half of them had mild, less than one third of them had moderate while minority of them had severe depression

Regarding total social dysfunction score of studied patients the current study result illustrated that, less than half of them had moderate level of social dysfunction, less than one third of them of studied patients had no social dysfunction and one fifth of them had very high level of social dysfunction.

The current study result disagree with **Kugbey et al., (2020)** who recommended that,. social support to have significant and positive relation with the overall quality of life among the studied patients, increased social support significantly associated with concomitant increase in overall quality of life of the participants. The effect of social support on the health outcomes of persons living with chronic illnesses have been documented in the literature as social support serves as an important resource in times of distress

Conclusion

In the light of the current study findings, it can be concluded that,

The majority of studied patient had satisfactory level of knowledge while minority of them had unsatisfactory level of knowledge about non-traumatic spinal cord injury**.** Also less than two thirds of them were had moderate dependent on daily activity, more than one fifth of them were slight dependent and more than one tenth of them were severe dependent. Moreover two fifths of studied patients had a moderate pain, while one third of them had mild anxiety, one fifth of them had moderate anxiety and less than one third of them had a moderate depression, less than half of them had moderate level of social dysfunction

Recommendations:

Based on the current study finding the following recommendations:

- The patients need to health program about content of diet, how to manage hospital anxiety and depression after non-traumatic spinal cord injury.
- Educational programs for patients about disease and its treatment modalities, how to deal with disease, Bio-psychosocial needs should be provided for non-traumatic spinal cord injury patients.
- Health education for caregivers about important of social support for patients after non-traumatic spinal cord injury.
- Developing a simplified illustrated and comprehensive Arabic booklet to be available for all patients early when diagnosed including latest information about non-traumatic spinal cord injury, its therapeutic regimen and how the patients can manage their symptoms.

Further study for Recommendations

- The study should be replicate don large sample and different hospitals setting in order to generalize the result

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