Assessment of nurses' competence in pain management among post laminectomy patients

Esraa Elsayed Ebrahim Mostafa[1], Alice Edward Rezian[2],
Soheir Mostafa Mohamed Eweda[3], Marwa Khalil Hafez [4]

[1] (Nurse Educator, Technical Health Institute of Nursing, Alexandria University, Egypt.)

[2,3] (Professor, Medical Surgical Nursing Department, Faculty of Nursing, Alexandria University, Egypt.)

[4] (Lecturer, Medical Surgical Nursing Department, Faculty of Nursing, Alexandria University, Egypt.)

Corresponding Author: Marwa Khalil Hafez

Abstract: **Accurate nursing management of postoperative pain is imperative to provide optimum pain relief. Knowledge deficits, inadequate skills and inaccurate beliefs among nurses may impede the management of postoperative pain. Aim: This study aimed to assess nurses' competence in pain management among patients post laminectomy. Setting: This study was conducted at the inpatient neurological department at the Main University Hospital, at Alexandria University, Egypt. Subjects: All the available nurses (32 nurses) who were providing nursing care of patient's post laminectomy were included in the study. Tool: Two tools were adapted and used to collect the necessary data about the nurses' knowledge, skills and attitude. Results: More than 75% of the studied nurses had a very low level of competence in post laminectomy pain management. Statistically significant relationships were found between the studied nurses educational level, attendance in training program and their knowledge where p = 0.002 and 0.007 respectively. Conclusion: It was concluded that, the studied nurses had inadequate knowledge, a negative attitude, and did not perform adequate skills to manage pain among post-laminectomy patients.**

Keywords: **Nurses' competence, Pain, Pain management, Post laminectomy.**

I. INTRODUCTION

Unrelieved post-operative pain contributes not only to post-operative subjective discomfort, but also to postoperative complications. Poor patient outcomes, prolonged hospital stay, and psychological consequences are also associated with postoperative pain. In addition, poorly managed postoperative acute pain may result in the development of chronic pain which is known to have a strong association with anxiety, depression, poor quality of life, impaired ability to sleep, communicate and working. Actually, the International Association for the Study of Pain stated that managing postoperative pain is essential component of nursing practice [1].

Unfortunately, acute postoperative pain after back surgery remains a common problem. A high prevalence estimated 30% to 64% of back or spine surgery patients had moderate or severe pain on the first day following surgery. Thus indicates that pain management is a very important element in nursing care of patients post laminectomy. [2]

Laminectomy is one of the surgical procedures used to treat intervertebral disc (IVD) protrusions. It consists of removing the vertebral lamina to expose and allow access to the IVD that is responsible for the nerve root compression and so relieve the pressure placed on the injured nerve. It is done to relieve back pain that has not been helped by more conservative treatments [3].

Effective pain management for post laminectomy patients is therefore, a major aspect of nursing care. Nurses caring for patients undergoing lumbar laminectomy spend more time with patients than do other health care providers. Hence,

patient outcomes are affected by quality of nursing management. Thus, improvements in pain management can be achieved by improving nurses' competence. It encompasses knowledge, skills, and attitudes, which are gained in the healthcare professions through pre-service education, in-service training, and work experience. Therefore, assessing nurses' competence is essential for determining the ability and readiness of them to provide quality services and enhance proper patient care. [4,5]

In fact nurses are the first group of healthcare professionals that patients tell about their pain because of their twenty-four hours per day presence at the patient's bedside. Effective pain management requires perfect competence of the nurse. Nursing competence is a professional issue and is central to patient care outcomes. It includes accurate knowledge, proper skills and positive attitudes of nurses that are critical in providing effective pain relief and quality of patient care.[6]

Knowledge and attitudes of nurses regarding postoperative pain management are defined as nurses' understanding and valuing about post-operative pain, assessment, intervention, evaluation, and documentation of postoperative pain. Skills of nurses regarding post-operative pain management were defined as " nurses own actions performed to reduce or relief post-operative pain. These include implementing pain assessment, intervention, evaluation, and documentation. [7,8]

Major knowledge deficits, malpractices negative attitudes and inaccurate beliefs among nurses may impede the management of post-operative pain post laminectomy. Patients no longer place blind trust in health care providers. Today consumers negotiate services and compare the quality of care among health care providers. To face these challenges and ensure that the best care is given by nurses, it is necessary to assess the nurses' clinical competence in postoperative pain management especially among post laminectomy patients. [9, 10]

Aim of the study

- The present study aimed to assess nurses' competence in pain management among post laminectomy patients.

II.   MATERIALS AND METHOD

Materials:

 Study design: A descriptive study design was utilized to conduct the study.

Setting:

The study was conducted at the inpatient neurological department at the Main University Hospital, at Alexandria, Egypt.

Subjects:

The subjects of this study consisted of all the available nurses (32 nurses) who were responsible for providing nursing care of patient's post laminectomy.

Tools:

Two tools were used to collect the necessary data. The tools were adapted from Ram D (2013) [11] and modified by the researchers based on the review of recent relevant literature[12-15], to collect the necessary data for the study.

Tool I: Nurse's Knowledge and attitude of pain management post laminectomy: (Structured Interview Schedule)

This tool was adapted then modified by the researcher to elicit data about nurse's knowledge and attitudes regarding post-laminectomy pain management. It included two parts as follows:

Part I: Nurses Socio-demographic data

It was used to collect nurse's sociodemographic characteristics of nurses including age, gender, marital status, level of nursing education, working experience in surgical words, and in-service education about pain management (whether the participants had attended pain management training or not).

Part II: Nurses' knowledge and attitude in pain management among post laminectomy patients assessment sheet:

This tool was adapted then modified by the researcher and used to collect necessary data about knowledge and attitude of nurses regarding post laminectomy pain management. It consisted of (34items) for knowledge and (21 items) for attitude of nurses. These items were assessed in relation to pain assessment, intervention, evaluation, and documentation.

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 6, Issue 3, pp: (286-295), Month: September - December 2019, Available at: **www.noveltyjournals.com**

Tool II: Nurse's observational checklist regarding pain management among post laminectomy patients:

It was used to assess nurses' practices which were performed to manage pain of post laminectomy patients. This observational checklist included 37 items, which covered also pain assessment, intervention, evaluation and documentation.

Scoring system: The total scores for nurses' knowledge, attitude and skills in providing appropriate nursing management for post laminectomy patients were calculated and categorized as follows: Very high (90-100%), High (80- < 89%), Moderate (70- < 79%), Low (60- < 69 %) and Very low < 60%.

Methods

1. Written approval to carry out the study was obtained from the hospital directors after full explanation of the aim of the study.

2. The adapted tools were submitted to five experts in the field of Medical-Surgical Nursing for content validity to ascertain its clarity, accuracy, completeness, and appropriateness then the necessary modifications was carried out accordingly.

3. Reliability of the tools was done using *Cronbach Alpha* test to measure the internal consistency of the tool. Reliability coefficient for tool I was (r=0.958), and (r=0.785) for tool II.

4. A pilot study was conducted on five nurses before beginning the study to test the feasibility and applicability of the tools.

5. Data collection:

- The data were collected over a period of three months; starting at 5th of February and ending at the 30th May 2019.

- After securing the administrative approval, data were collected by using the tools during the morning and afternoon shifts.

- A structured interview was conducted by the researcher for every nurse and took nearly 30-45 minutes in order to assess their knowledge and attitude using tool I for evaluating their competence in relation to pain management post laminectomy.

- All nurses were observed using tool II to assess their performance in pain management post laminectomy. Observations were conducted in the morning and evening shifts. Every nurse was observed twice, 2 hours for each observation.

- A total score was given to the nurses for knowledge, attitude and skills in order to evaluate their overall competence regarding pain management for post laminectomy patients.

Ethical considerations:

- The purpose of the study was explained to all the studied nurses. Their approval and readiness to be included in the study were obtained initially before participation.

- All nurses were assured about the privacy and confidentiality to participate in the study.

Statistical analysis of the data:

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. [16] Qualitative data were described using the number and percent. Quantitative data were described using minimum, maximum, standard deviation and median. Significance of the obtained results was judged at the 5% level. **The two-sample t-test (Student t-test)** for normally distributed quantitative variables, to compare between means in two different studied groups. **F-test (ANOVA)** for normally distributed quantitative variables, to compare between more than two groups.

III. RESULTS

Table 1: Frequency Distribution of the Studied Nurses Regarding Their Sociodemographic Characteristics: It shows that (34.4%) of the studied nurses had age ranged from 40 to <50 years and the mean age was 40.75 years. The female and married nurses represented the vast majority (96.9% and 84.3% respectively). Regarding the educational level,

it was evident that the majority (87.5%) of the studied nurses held a diploma degree in nursing. Concerning the working experience, it was found that more than half (78.2%) of the studied nurses had more than 15 years. In relation to attendance of pain management workshops; the majority (87.5%) of the studied nurses stated that they didn't attend any pain management training or workshops.

Table (1): Frequency Distribution of the Studied Nurses Regarding Their Sociodemographic Characteristics (n = 32):

Q	Sociodemographic characteristics	The Studied Nurses (n=32)	
		No.	%
1	**Age (years)**		
	1. 21 < 30	5	15.6
	2. 30 < 40	10	31.2
	3. 40 < 50	11	34.4
	4. 50 ≤ 60	6	18.8
	Min. – Max.	28.0 – 60.0	
	Mean ± SD.	40.75 ± 9.19	
2	**Gender**		
	1. Male	1	3.1
	2. Female	31	96.9
3	**Marital status**		
	1. Single	2	6.3
	2. Married	27	84.3
	3. Divorced	2	6.3
	4. Widowed	1	3.1
4	**The educational level in nursing**		
	1. Diploma	28	87.5
	2. Associate degree	3	9.4
	3. Bachelor of nursing	1	3.1
5	**Working experience (years)**		
	1. Less than 5	1	3.1
	2. From 5 to less than 10	1	3.1
	3. From 10 to less than 15	5	15.6
	4. More than 15	25	78.2
6	**Have you ever attended a pain management training/workshop?**		
	1. No	28	87.5
	2. Yes	4	12.5

Table (2): Frequency Distribution of the Studied Nurses' Knowledge Regarding Post Laminectomy Pain Management: This table displays that pain assessment, intervention and overall knowledge levels of the majority of the studied nurses was very low level (71.8 %, 75.0% and 84.3% respectively).

Table (2): Frequency Distribution of the Studied Nurses' Knowledge Regarding Post Laminectomy Pain Management (n = 32):

Studied nurses' knowledge	Very low (<60%)		Low (60.0–69.9%)		Moderate (70.0–79.9%)		High (80 – 89.9%)		Very high (90 – 100%)	
	No	%	No	%	No	%	No	%	No	%
A- Post laminectomy pain assessment	23	71.8	4	12.5	0	0.0	3	9.4	2	6.3
B- Post laminectomy pain intervention	24	75.0	3	9.4	4	12.5	1	3.1	0	0.0
C- Post laminectomy pain evaluation	16	50.0	0	0.0	0	0.0	0	0.0	16	50.0
D- Post laminectomy pain documentation	12	37.5	0	0.0	0	0.0	0	0.0	20	62.5
E- Overall nurses' knowledge	27	84.3	3	9.4	0	0.0	0	0.0	2	6.3

Table (3): Levels of the Studied Nurses' Attitude Regarding Post Laminectomy Pain Management: It can be noticed from the table that the majority of the studied nurses had very low level of attitude regarding all items of post laminectomy pain management and overall attitude (75.0%, 90.6%, 71.8%, 43.7% and 75.0% respectively) .

Table (3): Levels of the Studied Nurses' Attitude Regarding Post Laminectomy Pain Management (n = 32):

Studied nurses' attitude	Very low (<60%)		Low (60.0–69.9%)		Moderate (70.0–79.9%)		High (80 – 89.9%)		Very high (90 – 100%)	
	No	%	No	%	No	%	No	%	No	%
A- Post laminectomy pain assessment	24	75.0	5	15.6	2	6.3	0	0.0	1	3.1
B- Post laminectomy pain intervention	29	90.6	2	6.3	0	0.0	1	3.1	0	0.0
C- Post laminectomy pain evaluation	23	71.8	2	6.3	0	0.0	1	3.1	6	18.8
D- Post laminectomy pain documentation	14	43.7	6	18.8	5	15.6	2	6.3	5	15.6
E- Overall nurses' attitude	24	75.0	7	21.9	0	0.0	1	3.1	0	0.0

Table (4): Levels of the Studied Nurses' Skills Regarding Post Laminectomy Pain Management: The table presents that the overall level of skills of the majority of the studied nurses was very low at the first observation and the percentage increased in the second observation (46.9% and 81.3%) respectively.

Table (4): Levels of the Studied Nurses' Skills Regarding Post Laminectomy Pain Management (n = 32):

Studied nurses' skills	Very low (<60%)		Low (60.0–69.9%)		Moderate (70.0–79.9%)		High (80 – 89.9%)		Very high (90 – 100%)	
	No	%	No	%	No	%	No	%	No	%
A- Post laminectomy pain assessment O1:	14	43.7	3	9.4	0	0.0	13	40.6	2	6.3
O2:	26	81.3	1	3.1	0	0.0	4	12.5	1	3.1
B- Post laminectomy pain intervention O1:	12	37.5	12	37.5	7	21.9	1	3.1	0	0.0
O2:	24	75.0	3	9.4	5	15.6	0	0.0	0	0.0
C- Post laminectomy pain evaluation O1:	17	53.1	3	9.4	5	15.6	5	15.6	2	6.3
O2:	26	81.3	1	3.1	4	12.5	0	0.0	1	3.1
D- Post laminectomy pain documentation O1:	6	18.7	4	12.5	4	12.5	2	6.3	16	50.0
O2:	16	50.0	4	12.5	7	21.9	2	6.3	3	9.3
E- Overall nurses' skills: O1:	15	46.8	5	15.6	10	31.3	2	6.3	0	0.0
O2:	26	81.3	1	3.1	5	15.6	0	0.0	0	0.0

Table (5): Relation between the Studied Nurses' Knowledge and Sociodemographic Characteristics (n=32): The table displays statistical significant relationships between the studied nurses knowledge regarding post-laminectomy pain management and their gender, educational level in nursing and attendance of pain management training workshops where p = 0.018, 0.014, 0.005, 0.002 and 0.007 respectively.

Table (5): Relation between the Studied Nurses' Knowledge and Sociodemographic Characteristics (n=32):

Sociodemographic Characteristics	Nurses' knowledge				
	Assessment	Intervention	Evaluation	Documentation	Overall
Age (years) F (p)	1.771 (0.175)	0.649 (0.590)	0.199 (0.896)	0.498 (0.686)	2.035 (0.132)
Gender t (p)	1.199 (0.240)	0.111 (0.913)	0.950 (0.350)	2.507 (0.018*)	0.974 (0.338)
Marital status F (p)	0.370 (0.775)	0.507 (0.680)	0.218 (0.883)	0.900 (0.454)	0.342 (0.795)
Educational level in nursing F (p)	4.990 (0.014*)	6.445 (0.005*)	2.156 (0.134)	0.359 (0.701)	7.535 (0.002*)
Years of experience F (p)	1.561 (0.213)	0.739 (0.573)	0.896 (0.480)	0.616 (0.655)	0.811 (0.529)
Attending pain management training/workshop? t (p)	0.195 (0.857)	0.422 (0.676)	2.899 (0.007*)	1.063 (0.296)	0.893 (0.379)

t: Student t-test   F: F for ANOVA test

*: Statistically significant at p ≤ 0.05

Table (6): Relation between the Studied Nurses' Skills and Sociodemographic Characteristics (n=32):

This table presents a statistically significant relationship between the studied nurses' age and their intervention skills in the first observation, documentation and overall skills in the second observation, where p = 0.026, 0.010 and 0.06 respectively. Moreover, a statistically significant relationship between nurses' gender and their assessment as well as overall skills in the second observation, where p = 0.014 and 0.03 respectively. Furthermore, statistically significant relationships between nurses' attendance in pain management workshops and their assessment, intervention, evaluation and overall skills in the second observation were noticed, where p = 0.001, 0.004, 0.001 and 0.001respectively.

Table (6): Relation between the Studied Nurses' Skills and Sociodemographic Characteristics (n=32):

Sociodemographic Characteristics	Nurses' skills				
	Assessment	Intervention	Evaluation	Documentation	Overall
Age (years): F(p)1 F(p)2	2.047(0.130) 1.977(0.140)	3.604 (0.026*) 2.307(0.098)	2.811(0.058) 2.181(0.113)	1.806 (0.169) 4.549 (0.010*)	2.916(0.05) 2.765(0.06*)
Gender: t(p)1 t(p)2	1.260(0.217) 2.624(0.014*)	1.162(0.255) 1.910(0.066)	0.762(0.452) 1.788(0.084)	0.813(0.422) 0.697(0.491)	1.22 (0.229) 2.232(0.03*)
Marital status : F(p)1 F(p)2	0.647(0.592) 0.980(0.416)	1.852(0.161) 1.240(0.314)	0.551(0.652) 0.759(0.527)	0.225(0.878) 1.274(0.303)	0.857(0.47) 1.25(0.307)
Educational level in nursing: F(p)1 F(p)2	0.121(0.886) 0.501(0.611)	1.576(0.224) 0.534(0.592)	0.383(0.685) 0.804(0.457)	2.872(0.073) 0.621(0.544)	0.754(0.48) 0.695(0.50)
Years of experience: t(p)1 t(p)2	1.772(0.164) 1.113(0.371)	0.662(0.624) 1.334(0.283)	0.717(0.588) 1.029(0.410)	0.643(0.636) 0.994(0.428)	1.287(0.30) 1.26(0.308)
Attending pain management training/workshop: t(p)1 t(p)2	1.183(0.286) 3.551(0.001*)	0.537(0.595) 3.393(0.004*)	0.387(0.701) 3.977(0.001*)	0.873(0.389) 1.430(0.163)	0.208(0.83) 4.24(0.001*)

t: Student t-test   **F: F for ANOVA test**

*: Statistically significant at p ≤ 0.05

(p)1: First observation   **(p)2: Second observation**

IV. DISCUSSION

Post-operative pain is still undermanaged despite the development of interventions, tools and methods of pain management. Nurses play a key role in pain management at the postoperative recovery and surgical units. Assessing nurses' competence level is crucial in identifying points of strengths and weaknesses in the care of patient. Thus they would be encouraged for professional development. [17] Therefore, the aim of this study, this study was to assess nurses' competence in pain management among post-laminectomy patients to gain important information about the level of nurses' knowledge, attitudes and skills regarding pain management of patients post laminectomy.

Sociodemographic characteristics of the studied nurses:

The findings of the present study revealed that, the majority of the studied nurses were in the age group of 40 < 50 years, married females, held a diploma degree in nursing and more than 15 years of working experience as well as they did not attend any pain management training programs or workshops. These come in agreement with the studies conducted by (Basak S 2010) [8] and Chatchumni M et al (2016) [12], who concluded that most of their studied nurses were female and diploma prepared nurses. Howerver, these findings were not in line with a similar study conducted by Manwere A et al (2015) who reported that the majority of their studied nurses had less than 15 years of experience [13].

Regarding attendance of pain management workshops; in the current study a higher percentage of the studied nurses stated that they there were no available training programs attended about pain management and they reported that they had never been asked to attend any pain management workshops. In this context, Twycross (2007) [15] stated in his study that continuing education about pain management does have an impact on improving nurses' knowledge and skills levels as well as changing their attitudes into positive and .

Nurses' knowledge, attitude and skills regarding post laminectomy pain management:

In the present study the majority of the studied nurses had increasing age which could be associated with decreased understanding, attention and awareness levels. In addition, lack of time as being married, low educational level of nursing and no attendance of any continuing educational programs to update their knowledge. Hence, these would be contributing factors to the findings of the present study which indicated that the majority of the studied nurses showed a very low level of competency toward post-laminectomy pain management.

The present study showed that the majority of nurses had very low level of knowledge, attitude and skills with lack of competences in post-laminectomy pain management. This might be greatly attributed to the lowest percentage of bachelor degree nurses in the current study who had attained nursing education that covers pain management in both theoretical and clinical training aspects.

Unfortunately, these findings were not surprising, because the majority of the studied nurses had a diploma degree in nursing. Thus, despite they had more than 15 years of working experience, they had no or minimal pain management training in their education and had lack of updated knowledge and skills. In addition to the majority of nurses reported they did not attend any pain management training or workshops. These findings were supported by the results of similar studies conducted by Samarkandi O (2018), Qadire (2014), Al-Khawaldeh (2013) and Almalki (2011) who all demonstrated that their studied nurses had low levels of knowledge and skills associated with poor attitude toward pain management [17-20].

However, these findings were not in line with the study findings of Hossain S (2010) who revealed that his studied nurses' levels of knowledge, skills and attitude toward postoperative pain management was at the moderate level [21].

Relation between nurses' knowledge and skills of the studied nurses with their socio-demographic characteristics:

The current study findings revealed that there were statistically significant relations between the studied nurses' level of knowledge and their gender, education level of nursing and no attendance of pain management training or workshops.

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 6, Issue 3, pp: (286-295), Month: September - December 2019, Available at: www.noveltyjournals.com

Additionally, statistically significant relationships were found between the studied nurses' low level of skills and age, gender as well as no attendance of pain management training or workshops. Moreover, the findings revealed that they had minimal intervention skills in the first observation, low documentation skills in the second observation, and their overall skills in the second observation were found to be very low. Furthermore, a statistically significant relationship between the studied nurses lack of attending pain management workshops and their assessment, intervention, evaluation and overall skills in post laminectomy pain management during the second observation, was noticed.

These findings were in agreement with Parthenopi P, et al (2016), who concluded in their similar study that there was a positive correlation between nurses' age and their level of competence as regards knowledge, attitude and skills in postoperative pain management [22]. On the contrary, these findings were not in line with a study conducted by Allcock (1996), who claimed that the age of nurses did not seem to be influential with the nurses' skills in postoperative pain management of patients [23].

Moreover, the current study findings did not show significant association between the studied nurses' duration of working experience and their competence level, although the majority of them had more than 15 years of working experience with post laminectomy patients. This finding was not in line with Erkes et al (2000) [24], who had found in a previous similar study a positive significant correlation between years of nursing experience and nurses' level of knowledge and attitude. In the same context, Lui et al (2008), Harsoor S (2011) and Shoqirat (2015) had found that the length of clinical experience of nurses was significantly correlated with their competence level in postoperative pain management. They stated that nurses with less than one year of working experience were more likely to overestimate the patient's pain, whereas those with 6-10 years of working experience were more knowledgeable and skillful in dealing with the patient's pain [25-27].

The present study revealed that the studied nurses' competence regarding post-laminectomy pain management was very low. Therefore, the nurses are required to be well educated, trained and experienced in recognizing and managing post laminectomy patient's pain.

V. CONCLUSION

The findings of the present study concluded that the studied nurses had inadequate knowledge, a negative attitude and did not perform adequate skills to manage pain of post-laminectomy patients. The studied nurses had very low level of competence in managing post-laminectomy pain.

VI. RECOMMENDATIONS

1. Nurses should update their knowledge and skills through participating in educational programs, attending workshops and reviewing pain management researches.

2. Efforts should be made to periodically assess nurses' competence regarding the care of post laminectomy patients in pain.

3. Training programs regarding pain and its management should be offered to nurses working in the clinical settings, particularly those who are working at surgical units.

REFERENCES

[1] International Association for the Study of Pain (IASP). Desirable characteristics of national pain strategies. recommendations by the International Association for the Study of Pain. 2011. Available at: www.iasp-pain.org. Retrieved on: 16/4/2018.

[2] Young M, Chang K, Kwang-Ho H, Myeong Soo L, In-Hyuk H, Dong Wuk S, Byung Kwan C, Geun-Sung S, and Byung-Cheul S. Acupuncture for Acute Postoperative Pain after Back Surgery: A Systematic Review and Meta-analysis of Randomized Controlled Trials. Pain Pract 2015; 15(3): 279–91.

[3] João B, Diego P, Diego R, Stephanie do N, Kenard da S, and Érica B. Clinical evaluation of the post-laminectomy syndrome in public hospitals in the city of São Luís, Brazil. BMC Res Notes 2015; 8: 451.

[4] Garcia J, Rodrigues D, Leite D, Nascimento Câmara S, Silva Martins K, and Moraes É. Clinical evaluation of the post-laminectomy syndrome in public hospitals in the city of São Luís, Brazil. BMC research notes, (2015). 8 (1), 451.

[5] Lateef f. Patient expectations and the paradigm shift of care in emergency medicine. J emerg trauma shock 2011. 4(2): 163–7.

[6] William F, Fernando L, Roxanna A. Post-laminectomy pain.. American Academy of Physical Medicine and Rehabilitation 2019. Available at https://now.aapmr.org/post-laminectomy-pain/PM&R. Retrieved on: 10/2/2019.

[7] Basak S. Knowledge and Attitudes of Nurses and Their Practices Regarding Postoperative Pain Management in Bangladesh. A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Nursing Science (International Program) Prince of Songkla University. 2010.

[8] Sue c. Delaune and Patricia k. Ladne. Fundamentals of nursing: standards and practice, ch. (4) fourth edition, delmarcengage learning company, USA 2011. P 66.

[9] Carpenter, J, Hines, S. and Lan, V. Guided Imagery for Pain Management in Postoperative Orthopedic Patients: An Integrative Literature Review. Journal of Holistic Nursing, 2017. 35(4), pp. 342-51.

[10] Ram, D. Factors related to postoperative pain management among nurses in Jigme Dorji Wangchuck national referral hospital, Thimphu, Bhutan. Master Thesis,Faculty of Nursing, Burapha University. 2013.

[11] Chatchumni M, Namvongprom A, and Mazaheri M. Thai Nurses' experiences of post-operative pain assessment and its' influence on pain management decisions Chatchumni et al. BMC Nursing (2016) 15:12.

[12] Manwere A, Chipfuwa T, Mutsa M and Chironda G. Knowledge and Attitudes of Registered Nurses towards Pain Management of Adult Medical Patients: A Case of Bindura Hospital. Health Science Journal 2015, 9 (4): 3.

[13] Nugent P, & Vitale B. Fundamentals of Nursing: Content Review Plus Practice Questions: F. A. Davis Company. 2013.

[14] Twycross, A. What is the impact of theoretical knowledge on children"s nurses" post-operative pain management practices? An exploratory study. Nurse Education Today, 2007. 27 : 697-707.

[15] Kirkpatrick L, & Feeney B. A simple guide to IBM SPSS statistics for version 20.0. Student ed. Belmont, Calif. Wadsworth, Cengage Learning. 2013.

[16] Samarkandi O. Knowledge and attitudes of nurses toward pain management. Saudi journal of anaesthesia 2018 ;12(2): 220-26.

[17] Qadire M, Al Khalaileh M. Effectiveness of educational intervention on Jordanian nurses' knowledge and attitude regarding pain management. Br J Med Med Res 2014; 4:1460–72.

[18] Al-Khawaldeh OA, Al-Hussami M, Darawad M. Knowledge and attitudes regarding pain management among Jordanian nursing students. Nurse Educ Today. 2013; 33: 339–45

[19] Almalki M, Fitzgerald G, Clark M. The nursing profession in Saudi Arabia: An overview. Int Nurs Rev. 2011; 58: 304–11.

[20] Hossain S. Nurses' Knowledge and Attitudes, and Pain Management Practice of Post-Operative Children in Bangladesh A Thesis Submitted in Partial Fulfillment for the Requirement for the Degree of Master of Nursing Science (International Program(Prince of Songkla University 2010.

[21] Parthenopi P, Chrysoula L, and Areti T. Nurse Competence. Sanitas Magisterium 2016. 2 (2). 97–101

[22] Allcock N. Factors affecting the assessment of postoperative pain: A literature review. Journal of Advanced Nursing, 1996. 24: 1144-51.

[23] Erkes E, Parker V, Carr R, & Mayo R. An examination of critical care nurses' knowledge and attitudes regarding pain management in hospitalized patients. Pain Management Nursing, 2000. 2: 47-53.

[24] Lui L, So W, Fong D. Knowledge and attitudes regarding pain management among nurses in Hong Kong medical units. J Clin Nurs. 2008; 17(15):2014-21.

[25] Harsoor S. Emerging concepts in post-operative pain management. Indian J Anaesth, 2011. 55(2):101-3.

[26] Shoqirat N. 'We are nurses, they are doctors': barriers to nurses' roles in pain management following surgery in Jordan. International journal of nursing practice, (2015). 21(2), 200-6.