



Nurses' performance Regarding to Care of Patients With Meningitis

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Abstract

Background: Meningitis is a serious condition that affects the central nervous system, Nurses play an active role in the control and management of meningitis through early observation, diagnosis. **Aim** to assess nurses' performance regarding to care of patients with meningitis **Research Design:** Descriptive exploratory design was be utilized in this study. **Settings:** Helwan Fever Hospital in Helwan city, Egypt. **Sample:** convenience sample of all available (60) nurse worked at meningitis words and intensive care unit . **Tools:** Tool (1): Self structured questionnaire include. **Part I:** Nurses demographic characteristics data. **Part II:** Nurses knowledge assessment questionnaire. Tool (II): observational check list regarding lumber puncture. **Results:** The study finding revealed that as regards nurse's knowledge about care of patients with meningitis, 75% of the studied nurses had a satisfactory level of total knowledge, while 25% of them had an unsatisfactory level of total knowledge, 28.3% of the studied nurses had adequate level of observational check list regarding lumber puncture, while 71.7% of them had in-adequate level of observational check list regarding lumber puncture **Conclusion:** In light of the current study, it can be concluded that, three quarters of the studied nurses had unsatisfactory level of total knowledge regarding care of patients with meningitis, while only one-quarter of them had satisfactory level. **Recommendations:** Global educational standards should be applied to develop the nurses' skills by giving chance to nurses to participate with training sessions in developed country to improve nursing skills and receiving updates concerning care.

Key words: *Nurses' performance, Meningitis*

Introduction

Meningitis is caused by an infectious process in the meninges, whose etiological cause may be bacterial, viral, fungal, or parasitic. Bacteria and viruses are the most common causes of meningitis, but bacterial meningitis is usually severe and common. Accurate and timely identification of the etiological agents is vital to initiate public health measures and appropriate management (Tigabu et al., 2021).

Meningitis is divided clinically into acute and chronic diseases. A number of infectious agents can cause acute meningitis, which manifests over the course of hours or days. Chronic meningitis has an onset that may last for weeks to months, but is generally determined when symptoms, signs, and the cerebrospinal fluid remain abnormal for at least 4 weeks. Headache, stiffness in the neck, fever, photophobia and vomiting are common clinical signs of acute meningitis. The patient becomes agitated and frequently prefers to lie still as this develops within hours or minutes. Neck stiffness and a positive Kernig's sign usually appear within hours (Abdel Monem et al., 2021).



Acute meningitis can be classified as pyogenic or bacterial meningitis, tuberculosis meningitis, aseptic meningitis caused by virus, fungus or protozoa (toxoplasmosis). Inflammation of meninges may occur due to primary infection or due to metastatic spread from nearby or distant pyogenic focus, infection may occur due to extension of local bacterial infection from sinusitis, pyogenic foci media or from bacteremia through hematogenous (Mohammed et al., 2019).

Bacterial meningitis is a medical emergency characterized by inflammation of the meninges in response to bacterial infection. Untreated, its mortality approaches 100%, and even with current antibiotics and advanced intensive care, the mortality rate of the disease is approximately 5–10%. Worldwide, the risk of neurological sequel in survivors following hospital discharge approaches 20%. Early diagnosis and appropriate management of the patient with meningitis is therefore critical (Rajan & Karen, 2019).

The early recognition of the pathology's signs and symptoms, such as acute pain, changes in the mental state, nausea, and vomiting, still in the disease's first hours, and the early handling are vital to achieve qualified assistance because the therapeutics' early beginning may decrease the morbidity and mortality, which will reflect in the improvement of the patient's prognosis and the reduction of complications (Moura et al., 2020).

Prevention and control of infections are important concerns for all types of health care agencies. The infection control practitioner is usually a nurse with advanced training in infection control practices and spread of infections. An assessment of the knowledge, attitude and practice of standard precautions by healthcare workers is a prerequisite for initiating and implementing a successful infection prevention and control strategy in any health facility. Knowledge and training in standard precautions and high-risk perception have all been associated with improved compliance with standard precautions among health workers (Barrera et al., 2019).

The nurse should be explained the procedure and its risks to the patient and informed consent obtained if relevant in the practice setting. The description should include how the procedure will be performed, why it is being performed, what complication may occur, and how these can be treated (Dowding et al., 2020).

As well, nursing personnel play an active role in the control and management of meningitis through early observation, diagnosis, and following an infection control technique. Therefore, nurses should be trained through continuous educational programs to upgrade their knowledge level and improve their practical skills regarding the control and management of meningitis (Hussien et al., 2021).

Significance of the Study:

Meningitis can affect anyone of any age so, morbidity and mortality rates are even highly in developing countries. Meningitis in the world at approximately 10000000 cases 250,000 deaths cases from all meningitis (WHO, 2021). At Helwan fever hospital in 150 cases in 2021, 54 case in 2023. Statistic report of acute meningitis at emergency unit in 170 cases in 1 sep-2016 to 1-sep- 2017 (hospital record at Assiut university hospital). Importance of nursing role in patients care with meningitis, so the aim of this study to assess nurses' performance regarding to care of patients with meningitis.

Aim of the Study:

This study aims to assess nurses' performance regarding to care of patients with meningitis.

Research questions:

- 1-What is the level of nurse's knowledge regarding to care of patients with meningitis?
- 2- What is the level of nurses practice regarding to care of patients with meningitis?

Operational Definitions:

Nurses Performance: Nurses' knowledge and practice, it is a process of performing a task measured against pre-set known standards of accuracy and completeness.

**Subject and Methods:****Subject:**

A convenience sample of all available nurses at Helwan Fever Hospital.

The subject and methods for this study will portray under four main designs as follows:

I-Technical item.

II-Operation item.

III-Administrative item.

IV-Statistical item.

Technical item:

The technical design includes the research design, setting, subjects and tools which will be used for data collection in the study.

Research design:

Descriptive exploratory design provides the least control over variables. The data collected either contribute to the development of theory or explain phenomena from the perspective of the persons being studied (De Villiers, et al., 2019).

Setting:

This study was conducted at Helwan Fever Hospital in meningitis wards and intensive care unit.

Sampling:

A convenient sample of all nursing staff working in selected settings (70 nurses) was included in the study. It is a non-probability sampling method where all units are selected for inclusion in the sample. The researchers selected this type of sampling due to the availability of the nurses at a given time and the willingness of the studied nurses to participate in this study (Stratton, 2021)

Tool for data collection:

Data were collected using the following tools:

Tool (I): patient's structured interview questionnaire:

This tool will be developed and filled in by the investigator based on review of related literature. It will include the following two parts.

Part I: Nurses demographic characteristics data:

It will include demographic data of patients as: gender, age, marital status, and occupation, level of education and years of experience...etc. (Mohammed & Sumaya, 2017).

Part II: Nurses knowledge assessment interview questionnaire:

It will be used to assess nurse knowledge regarding care of patient with meningitis. It includes knowledge about definition, types, signs, symptoms, causes, high risk for meningitis, vaccination, complications, diagnosis and treatment ... etc. (Shivani & Rashmi, 2019).

Scoring system :**1) Knowledge regarding caring for patient with meningitis.**



This tool consisted of (71 items) with a total grade (71). One grade was given for correct and zero grade for incorrect answers. Subject responses were calculated in the scoring system. knowledge regarding **caring for patient with meningitis** was classified in to:

- **Satisfactory knowledge:** if the total score was equal or more than 75%, it means equal or more than 54 points.
- **Unsatisfactory knowledge:** if the total score was less than 75%, it means less than 54.

Tool (II): observational check list regarding with lumbar puncture:

This tool will adopted by (Ros et al., 2022).

It covers all the steps procedure of nursing care for patients with lumbar puncture.

2) Observational check list regarding lumbar puncture.

This tool consisted of (13 items) with a total grade (26). Two grades were given for done & complete, one grade was given for done & incomplete step, and zero grade for not done step. Observational check list regarding lumbar puncture was classified in to:

- **Adequate level:** if the total score was equal to or more than 75%, it means equal to or more than 19.5 \approx 20 points.
- **In-adequate level:** if the total score was less than 75%, it means less than 19.5 \approx 20 points.

II- Operational Item:

It included preparatory phase, content validity and pilot study and field work.

Preparatory phase:

It was included reviewing of past, current, national and international related literature and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals and magazines to develop tools for data collection.

Reliability:

The tool's reliability was examined using international consistency and tested to determine the extent to which the tools items are intercorrelated with each other internal consistency is measured by Cronbach's alpha coefficient, which is one of the most popular reliability statistics for measuring internal consistency by (Abdelwahab et al., 2023).

Knowledge regarding caring for patient with meningitis	
No of items	Alph Cronbach test
71	0.992
Observational check list regarding lumbar puncture	
No of items	Alph Cronbach test
13	0.963

Pilot study:

A pilot study was carried out including 10% of the studied nurses (6 nurses) at the previously mentioned setting to test the applicability, feasibility, relevance and clarity of the tools used and to determine the needed time for the application of the study tools. The nurses who were included in the pilot study were included to the sample because no modification was done after conducting pilot study.

Field work:

The actual field work of data gathering was 6 months period starting from the first of March 2023 to the end of August 2023. At the beginning, the investigator introduced herself to the studied nurses and explained the

purpose of the study to gain their cooperation. The data collected through interview with the studied nurses a the group for 20-30 minutes to assess their knowledge regarding to factors associated with meningitis, then the researcher was interviewing with each nurse individually for 10-15 minutes to assess their practice to ward lumbar puncture. The researcher was available two days per week from 8 AM to 2 PM in the previously mentioned settings.

Ethical considerations:

In addition, 32 a committee 20/11/2022 an approval was obtained from the directors of the hospital, either medical or nursing before starting the study. Also, informed consent was sought and obtained from each participating subject prior to data collection, they were informed about the purpose and expected outcomes of the study and they assured that, the study was harmless, and their participation was voluntary, and they had the right to withdrawal from the study at any time without any reason. They also assured that, anonymity and confidentiality were guaranteed, as well the gathered data was used for the research purpose only. Ethics, values, culture and believes were respected.

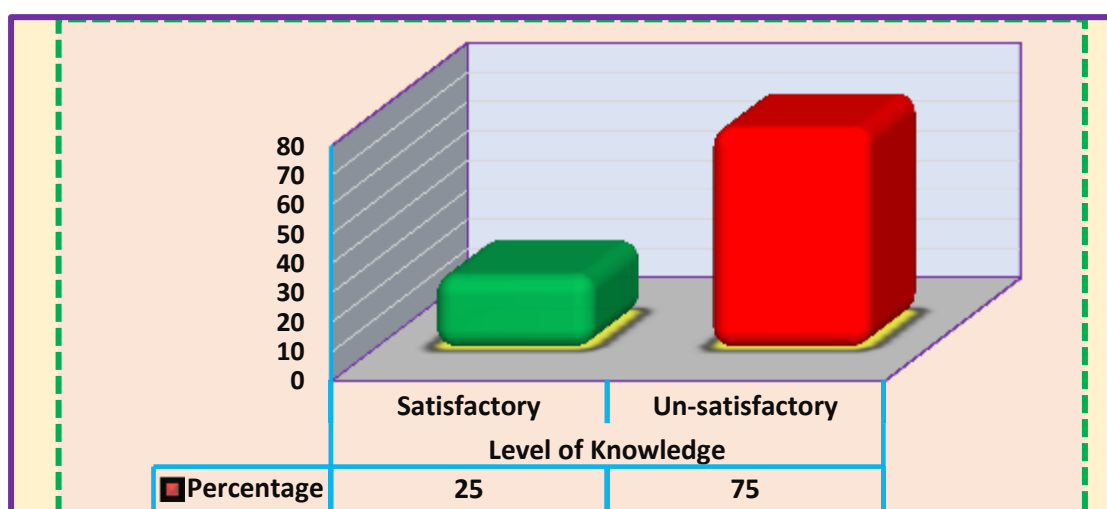
III- Administrative Item:

To carry out the study, an official permission was obtained from the Dean of Faculty of Nursing Helwan University, explaining the aim and objectives of the general manager either medical or nursing for obtaining cooperation and permission to conduct the study and collect data. Individual oral consent was obtained each newly graduate nurse in the study.

IV-Statistical Item:

Data entry and analysis were performed using SPSS statistical package version 25. Categorical variables were expressed as number and percentage while continuous variables were expressed as (mean \pm SD). Chi-Square (χ^2) was used to test the association between row and column variable of qualitative data. The Fisher exact test was used with small, expected numbers. T independent test was used to compare mean in normally distributed quantitative variables at two groups. Pearson correlation was done to measure correlation between quantitative variables. For all tests, a two-tailed p-value ≤ 0.05 was considered statistically significant, P-value ≤ 0.01 was considered highly statistically significant. While p-value > 0.05 was considered not significant

Results:



$$\chi^2=15.0, P=0.000 \quad \text{Ratio}= 0.3:1$$

Figure (1): Percentage distribution of nurse's knowledge regarding care of patient with meningitis (n=60)

Fig (1) showed that more than two-thirds (75%) of the studied nurses had a satisfactory level of total knowledge regarding care of patients with meningitis. While only one-quarter (25%) of them had an unsatisfactory level. Moreover, the satisfactory to unsatisfactory ratio is 0.3:1. In addition, there is a highly statistically significant difference between satisfactory and unsatisfactory level at $P=0.001$.

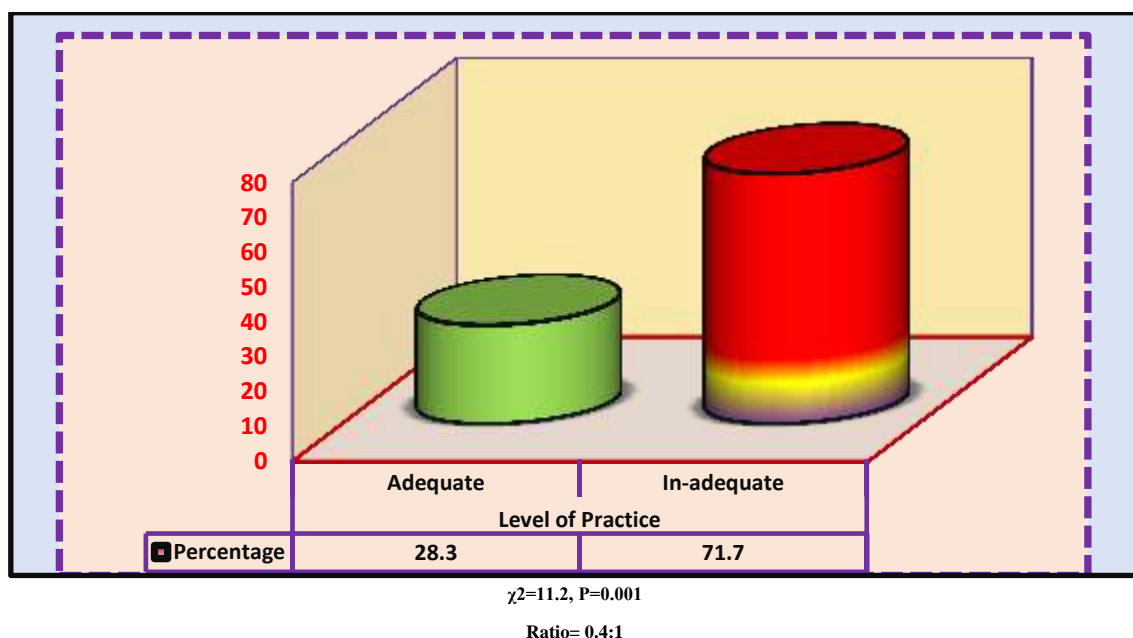


Figure (2): Percentage distribution of nurse's practice regarding lumbar puncture for patient with meningitis (n=60)

Fig (2) showed that more than two-thirds (71.7%) of the studied nurses had an inadequate level of total practice regarding lumbar puncture for patients with meningitis. While only more than one quarters (28.3%) of them had an inadequate level. Moreover, the adequate to inadequate ratio is 0.4:1. In addition, there is a highly statistically significant difference between adequate and inadequate level at $P=0.001$.

Discussion:

Part (I): Level of nurse's knowledge regarding care of patients with meningitis.

Pertaining to the studied nurse's knowledge regarding anatomy and function of the central nervous system, the current study demonstrated that most of the studied nurses had incorrect answer in relation to the items of composition of central nervous system, the layer of membrane definition, the inner layer definition, the outer layer definition, the middle layer definition, composition of meninges layers and function of the brain. This could be due to lack of appropriate courses in the curricula of institutions. This result was congruent with **Hussien et al, (2021)** who conducted a study entitled "Effective of educational instruction of nurses knowledge regarding meningitis and universal precaution measures at selected department" and reported that, the most of studied nurses had unsatisfactory level of knowledge about anatomy and physiology of the central nervous system.

Considering the studied nurse's knowledge regarding general definition of meningitis, the present study results clarified that more than three quarters and more than two-thirds of them had incorrect answer in relation to the items of definition regarding acute meningitis in relation to its development, definition regarding acute meningitis in relation to its developing inflammation of the meningeal layers, definition regarding acute meningitis in relation to its rate and severity and definition of chronic meningitis respectively. In the same



line with a study carried out by **Oladele et al., (2020)** who studied tackling cryptococcal meningitis in Nigeria, one-step at a time; the impact of training and reported that most of the studied sample had poor knowledge regarding meningitis before training program.

As regard the studied nurse's knowledge regarding general causes and risk factor of meningitis, the current study reflected that, most of them and more than three quarters of them in addition to more than two-thirds of them had incorrect answer in relation to the items of immunosuppressant drugs as a risk factor, aids, alcohol as a risk factor, general bacterial cause of meningitis, general viral cause of meningitis and delayed treatment is the risk of permanent brain damage respectively.

Regarding the studied nurse's knowledge about meningitis clinical manifestation and mode of transmission, the present study indicated that more than two-thirds of the studied nurses had incorrect answer in relation to the items of later signs of bacterial meningitis, droplets bacterial meningitis (coughing, sneezing), food transmission of bacterial meningitis and contact transmission of bacterial meningitis.

This result was in harmony with **Li et al., (2020)** who carried out a study to evaluate impact of an educational program on reducing health care-associated meningitis or ventriculitis in the neurosurgical intensive care unit and reported that more than half of the studied nurses had low level of knowledge about mode of transmission and manifestations of meningitis. Correspondingly, a study done by **Link et al., (2023)** who studied "Lack of education, knowledge, and supplies are barriers to cryptococcal meningitis care among nurses and other healthcare providers in rural Uganda" and stated that nurses had the least amount of knowledge about meningitis with less than half of them knowing the cause and moods of transmission.

Considering the studied nurse's knowledge regarding diagnostic measure for patient with meningitis, the present study portrayed that more than three quarters and two-thirds of them had incorrect answer in relation to the items of CT-scan of the head indication, the chest x ray indication, the most accurate diagnostic measures for meningitis and the most observable sign with physical examination respectively. This result was compatible with a study carried out by **Rababa et al., (2022)** to assess nurses' knowledge, attitudes, practice, and decision-making skills related to sepsis assessment and management. They reported that the participating nurses reported poor knowledge about sepsis assessment.

Regarding the studied nurse's knowledge about medical and nursing management of patient with meningitis, the present study illustrated that more than three quarters and more than two-thirds of the studied nurses had incorrect answer in relation to the items of observation of signs of meningeal irritation, indication of steroid medication, the most position allow accurate measurement of the opening pressure, frequency of skin assessment and the best treatment for deterioration of conscious level in patients with meningitis respectively. This result was supported by **Chua et al., (2023)**, who studied nurses' knowledge and confidence in recognizing and managing patients with sepsis and declared that most of the studied nurses had inadequate knowledge about management of patients with sepsis.

Part (II): Level of nurse's practice regarding care of patient with meningitis.

In relation to nurse's practice regarding pre-care phase of lumbar puncture for patient with meningitis, the present study demonstrated that most of and about two-thirds of the studied nurses didn't explain procedure to the patient and surgical hand washing respectively. This might be attributed to the absence of any resources or programs for continued nursing education. Also, might be related work overload. Correspondingly, a study conducted by **Hamad et al., (2022)** to evaluate the effect of instructional module on nursing pitfalls related to the management of children having lumbar puncture and reported that more than half of nurses did not wash their hands and did not explain before the procedure



Considering the nurse's practice regarding lumbar puncture in relation to ongoing-care phase for patient with meningitis, the present study showed that three-quarters of them didn't encourage the patient to relax and breathe normally. Conversely, **Dunaway et al., (2021)** stated in a research entitled "Emergency nurses' guidance to neonatal Lumbar punctures" that nurses had satisfactory practice during lumbar puncture procedure. This discrepancy may be related to difference between both study subjects' level of knowledge, work experience and attending training courses.

As regard nurse's practice of lumbar puncture in relation to post-care phase for patient with meningitis, the current study declared that three fifths of them did not encourage increased fluid intake prevent post procedure headache. Additionally, more than two-thirds of them didn't "completely apply a small dressing to the present site, and the tube of CSF is sent to the laboratory immediately, instructs the patient to lie in prone position to reduce leakage of CSF and observe any complication that may occur and bandages were placed over the injection site after the procedure", respectively.

In the same field, a study conducted by **Abd EL-Fatah, (2023)** who studied the effect of evidence-based guidelines on nurses' knowledge and practice regarding management of post lumbar puncture headache in children with meningitis and mentioned that most of the studied nurses had inadequate practice regarding post lumbar puncture care.

Considering the total mean score of nurse's practice regarding care of patient with meningitis, the present study revealed that the total mean score of nurse's practice was $\bar{x} + SD = 13.40 + 6.09$ (total score was 26 point) with a highly statistically significant difference between adequate and inadequate mean scores. Similarly, a study performed by **Binay et al., (2022)** about meningitis and nursing care according to the model of nursing based on activities of living, and declared that most of the studied nurses had unsatisfactory practice regarding care patients with meningitis.

In addition, the current study indicated that more than two-thirds of the studied nurses had inadequate level of total practice regarding lumbar puncture for patients with meningitis, while only more than one quarter of them had adequate level. Moreover, the adequate to inadequate ratio was 0.4:1. In addition, there was a highly statistically significant difference between adequate and inadequate level. This could be due to a lack of lumbar puncture in-service training programs, procedural manuals, regulations, guidelines, and procedure. All of which should be available in the workplace. Also, this may be related to lack of nurses' knowledge and experience. These findings were congruent with **Abdelwahab et al., (2023)** who affirmed that most of the studied nurses had incompetent practice in managing lumbar puncture for patients with meningitis. Likewise, these results were in agreement with a study adopted by **Hamad et al., (2022)** stated that majority of the studied nurses had unsatisfactory level of total performance regarding lumbar puncture.

Conclusion:

In light of the current study, it can be concluded that, three quarters of the studied nurses had unsatisfactory level of total knowledge regarding care of patients with meningitis, while only one-quarter of them had satisfactory level. As well, more than two-thirds of the studied nurses had an inadequate level of total practice regarding lumbar puncture for patients with meningitis, while only more than one quarter of them had an inadequate level. So, the study answered the research questions "What is the level of nurses' knowledge regarding of patients care with meningitis?" and "what is the level of nurses' practice regarding of patients care with meningitis?"



Recommendations:

Based on the findings of the study results, the following recommendations were advocated:

1. Global educational standards should be applied to develop the nurses' skills by giving chance to nurses to participate with training sessions in developed country to improve nursing skills and receiving updates concerning care.
2. Providing educational guidelines, posters and pamphlets about meningitis and should be available at each nursing stations in wards and encourage nurses to get use from them.
3. Further studies can be carried out in other settings and places with consideration to wide range sample characteristics to be more representative and to get extra results.

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