ASSESSMENT OF NURSES’ KNOWLEDGE TOWARD PULMONARY EMBOLISM DISEASE IN CRITICAL CARE UNITS AT AL-HILA TEACHING HOSPITALS

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ABSTRACT

Pulmonary embolism is a common reason of cardiovascular death after coronary artery disease and stroke. Preventive thrombus development is a main nursing duty. Consequently, the best managing of pulmonary embolism is by preventive of risk factor and needs to be top qualified staff. This study aims to assess the nurses knowledge toward Pulmonary Embolism disease in critical care unit; and determine the relationships between nurse's knowledge and some demographic variables. A descriptive study using a purposive samples of (N=112) nurses who work in critical care units. This sample is distributed throughout three hospitals regarding to the Babylon Health Directorate. The overall substances, which are comprised in the questionnaires, (44) item distributed into four domain. The reliability of instrument which is used to determine by a per general study and the validity is accomplished through a list of experts. Data are gather through the use of a self-report techniques and the instrument. Data are investigated by the of statistical data analysis method.

Results

The findings revealed the nurses knowledge towards definition, causes, risks factors of pulmonary embolism were moderate knowledge. While, knowledge in terms of signs & symptoms, diagnostic test, treatment, nursing care plan and complication, the nurses showed poor level of knowledge. The overall knowledge were poor level. There were significance relationship between nurses knowledge and their education, years of experience in CCU and training at p-value <0.05.

Conclusion

More years of experience in critical care unit and training the staff on pulmonary embolism by local officials help raising professionals’ nurses

Recommendations:

The study recommended for continuing to Provide the health resources and exploiting young energies of nurses which indeed helps to develop their knowledge.

I. INTRODUCTION

Acute pulmonary-embolism is a dangerous clinical symptom of venous thrombo embolism, and fatal pulmonary embolism is a prevalent cause of sudden death syndrome, usually due to a deep venous thrombosis.

Deep vein thrombosis and pulmonary embolism impact an estimated 300,000 to 600,000 individuals each year, causing more than 100,000 fatalities directly and contributing to another 100,000 deaths, according to the Agency for Healthcare Research and Quality. Because pulmonary embolism might be a medical emergency in certain cases. PE affects 500,000 to 600,000 people in the U.s. each year, with 200,000 to 300,000 fatalities. (Marshall et al., 2011)
PE, after acute myocardial infarction (AMI) and stroke, is the 3rd more common cardiovascular illness, with an annual occurrence of 1–2 per 1,000 individuals (100–200 per 100,000 population). (Heit, 2008)

Venous thromboembolism (VTE)-related fatalities in Europe were expected to be 543,454 per year in 2001, AIDS (5,860), prostate cancer (63,636), breast cancer (86,831), and traffic accidents (53,599) together account for more than half of all deaths. Because of the challenging diagnosis depend frequently on the following characteristics, determining the correct yearly number of VTE episodes is difficult. The first is that VTE is frequently clinically quiet, with sudden tragic mortality (30–50 percent of patients) being the first symptom of the illness. (Goldhaber & Bounaimeaux, 2012)

The second is a clinical presentation that resembles the symptoms of numerous different diseases, leading to misdiagnoses. (Heit et al., 1999); PE identification during autopsy is challenging, requiring a thorough examination of the pulmonary vascular tree to discover tiny acute emboli or the remnants of chronic thromboemboli. (Pichereau et al., 2015); Finally, the disease's diagnostic tests' sensitivity and specificity remain low. (Di Nisio et al., 2016)

Obesity, immobility, cancer, surgery, cigarette use, pregnancy, trauma, oral contraceptive or hormone replacement treatment, and a past medical history of PE or a known hypercoagulation disease are all risk factors for PE. However, 30 percent of PE patients have no detectable provoking factors, and the mean age of PE patients ranges from 56 to 66 years, according to the “International Cooperative Pulmonary Embolism Registry (ICOPER), Emergency Medicine Pulmonary Embolism in the Real World Registry (EMPEROR)”, and Computerized Registry of Thromboembolic Disease registries. (Laporte et al., 2008)

PE and COVID-19 have a connection. PE is reported to occur in 2.6–8.9% of COVID-19 in hospitalized patients and up to one-third of those requiring intensive care unit (ICU) admission despite appropriate preventative anticoagulation. The direct and indirect pathogenic effects of COVID-19, such as complement activation, cytokine release, endothelial dysfunction, and intercellular communication, might explain this. (Danzi et al., 2020)

PE can show clinically as asymptomatic minor pulmonary-embolus with low death rate to a large PE leading in right ventricular (RV) failure, shock, and/or death. (Poissy et al., 2020)

Due to a lack of systematic postmortem investigations, many fatal pulmonary emboli go unnoticed, resulting in an underestimate of their occurrence. The significance of a timely diagnosis of this potentially fatal condition cannot be overstated; consequently, understanding the key characteristics associated with PE may help clinicians establish the diagnosis, allowing for a more effective treatment plan (Pollack et al., 2011).

1.1 Objectives of The Study.
1. To assess the nurse's knowledge of Pulmonary Embolism disease in the critical care unit.
2. To find out the relationships between nurse's knowledge and some demographic variables like age, gender, level of education, training session in the critical care unit, years of experience in nursing, and years of experience in the critical care units.

II. LITERATURE REVIEW

2.1 History of pulmonary embolism

Nothing is more sad than dying suddenly and unexpectedly from a large pulmonary embolus after a seemingly normal recovery from a minor medical condition or regular surgical treatment. More than 200,000 individuals die from pulmonary embolism every year in the USA, out of the approximately 650,000 persons who have pulmonary thromboembolic illness. Because many instances go undetected, this number is likely low. Pulmonary embolism is the most prevalent pulmonary disease discovered at autopsy in hospitalized patients and the leading cause of deaths in the USA. (Dalen, 2002; Judge et al., 2014).

The majority of DVTs begin in the calf and resolve on their own. Leg discomfort and symptomatic PE are uncommon in thrombi that stay limited to the calf. With the intensity of the starting prothrombotic stimulation, the likelihood of calf DVT spreading to the proximal veins and causing PE rises. (Kearon, 2003; Li et al., 2015).

2.2 definition
Pulmonary embolism (PE) can cause acute right ventricular failure, which is a life-threatening disease, due to pulmonary bed blockage. Early diagnosis is critical because the majority of patients die within the first few hours after presentation (Bělohlávek et al., 2013).

The risk of dying from a pulmonary embolism varies considerably based on a number of factors, including age, concomitant diseases, and the stability of the patient on presentation. Low-risk PE patients had a one year survival rate of nearly 95%. Patient with high-risk PE and hemodynamic instability, on the other hand, had a death rate of about 40 percent within 90 days. The fundamental pathophysiology of PE, risk factors for developing PE, and conventional diagnostic testing methods will be discussed in this review. We'll also go over risk classification for individuals with PE and how that affects treatment and outcomes. While no accurate epidemiological data is available, the incidence of PE is believed to be 60 to 70 in 100,000 in the general population, and that of venous thrombosis to be 124 in 100,000. (Prandoni et al., 2016)

Annual incidence rate of venous thrombosis and PE of around 0.5 to 1.0 in 1000 people are reported in European recommendations for the diagnosis and management of PE. (Members et al., 2008)

However, since silent PE may develop in up to 40 percent to 50 percent of individuals with deep vein thrombosis, the true statistics are likely to be much higher (DVT). (Members et al., 2008)

### 2.3 Causes of pulmonary embolism

When blood accumulates (or pools) in a specific region of the body, pulmonary embolism can develop (usually an arm or leg). Blood pooling is common during prolonged periods of inactivity, like following bed rest or surgery (Heit et al., 2005).

When a vein has been damaged, such as by a fracture or surgery (especially in the hip, pelvis, knee or leg). (Meinel et al., 2015)

As a result of some other health condition, like congestive heart failure, atrial fibrillation, or a heart attack, or a stroke.

When blood clotting factors are raised, enhanced, or, in certain circumstances, reduced. Those forms of cancer, as well as some women on hormone replacement treatment or birth control pills, might cause elevated clotting factors. Hereditary disorders can potentially result in abnormal or reduced clotting factors. (Francis, 2007)

The hospital mortality rates of PE in untreated PE patients and treated PE patients are approximately 30% and 8%, respectively. Unfortunately, two-thirds of all PE cases are diagnosed by autopsy. Pulmonary embolism causes death in approximately 16% of hospitalized patients. (Ye et al., 2014)

Barritt and Jordan published a study in 1960 that compared anti-coagulation to placebo for the treatment of pulmonary embolism and found a 26 percent death risk linked with untreated PE. In 1957, Barritt and Jordan conducted their research at the Bristol Royal Infirmary. This is the first and only placebo-controlled experiment to look at anticoagulant effectiveness in the treatments of PE. The study was not repeated since the results were so convincing. On the other hand, the stated death rate of 26 percent in the placebo group may underestimate real mortality insofar as diagnostic technology's sensitivity and specificity in 1957 may have only allowed for the identification of major PE. (Chatterjee et al., 2014)

### III. METHODOLOGY

#### 3.1 The Research Design

A descriptive design study was carried out in Al-Hilla Teaching Hospital, the study was conducted on groups of nurses in the different areas of the hospital (critical care units) to identify their levels of knowledge about pulmonary embolism disease. The research conducted between the period from 20 September 2020 to 10 September 2021.

#### 3.2 Sample of The Study

The rest sample consisted of (112) participants selected in Use of a non-probability sampling method, including nurses working in Critical care units at Imam Al Sadiq Teaching, Al Hilla General, and Marjan Hospitals.

#### 3.3 Setting of the Study
The research was carried out in the critical care units of Imam Al Sadiq Teaching, Al Hilla General Teaching Hospital, and Marjan Hospitals.

3.4 Instrument of The Study

The study instrument was a questionnaire designed to collect data, rebuilt and adapted to the sample collection, and validated. The questionnaire was divided into two parts that contain 50 items as follows:

Part I: socio-demographic characteristics of critical care nurses, which include eight items as follows:

- Gender
- Age
- Marital status
- Level of education
- Workplace (department name)
- The number of year of experiences in the nursing field
- The number of years of experiences in critical care units
- Training courses related to pulmonary embolism

Part II: Nurses' knowledge toward pulmonary embolism divided into 4 domain

The first domain: is an assessment of nurses' knowledge regarding pulmonary embolism, causes, and risk factors, it contains 16 items.

The second domain: is an assessment of nurses' knowledge of signs and symptoms and the diagnostic test of pulmonary embolism includes 13 items

The third domain: assessment of nurses' knowledge toward nursing care and treatment for patients with pulmonary embolism, includes 13 items.

The fourth domain is the assessment of nurses' knowledge toward complications of pulmonary embolism, including two items.

3.5 Reliability of The Questionnaire

Data were gathered out of (10) nurses is selected among those who are work at Marjan Hospital. Reliability investigating was used as a statistical analysis method to determine the concordance among the items of the questionnaire using the reliability coefficient. The tool had an acceptable level of inside consistency and determining by a Cronbach's alpha.

3.6 Data Collection Methods

The data was collected by using the instrument filled by the nurses after acquired the permission from the institution. The researcher takes oral and written agreement from each nurse to participate in this study. The time to answer the questions of the instrument with each participant takes about (15-20) minutes. The data collected from the date (5 March to 10 May /2021).

3.7 Approach of Statistic

The SPSS version 20, and Microsoft Excel (2010) were used to analyze the collected data of the study.

IV. RESULTS

4-1. Descriptive Statistic of Nurses Demographic Variables

<table>
<thead>
<tr>
<th>Demographic Variables</th>
<th>Rating</th>
<th>F=112</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age/years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-29</td>
<td>93</td>
<td>83.0</td>
<td></td>
</tr>
<tr>
<td>30-39</td>
<td>11</td>
<td>9.8</td>
<td></td>
</tr>
<tr>
<td>40-49</td>
<td>5</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>50 and older</td>
<td>3</td>
<td>2.7</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>112</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Mean± S.d=27±5.58</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>67</td>
<td>59.8</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>45</td>
<td>40.2</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>112</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>25</td>
<td>22.3</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>85</td>
<td>75.9</td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>2</td>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>112</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
This table represents the descriptive statistics of socio-demographic information of the nurses in term of frequencies and percentage. Out of (112) nurses participating in current study, their age ranged between 20-29 year old and made up (83.0 percent) of the total number of participants.

In terms of gender, male nurses were predominant and made up more than half in compared with female, it composes (59.8%).

Marital status related to the findings, nurses were demonstrated as married and constituted the higher percentage (75.9%), as well as, only small ration (1.8%) were divorced.

It is clear from the findings that more than half of the study sample were diplomas graduated, it reflected (57.1 percent) out total number, with a approximately similar percentage (40.2%) were Bachelor graduated.

The findings show the distribution of the studied sample according to workplace, results show that most of the participants in the study (53.6 percent) work in intensive care unit (ICU).

In regards with experience, most of them have less than 5 years as a experience in their nursing job and in less than one year in critical care unit, which composed of (82.1 and 52.7 percent) respectively.

Finally, the majority of the study participants were not attend training sessions and constituted (78.6 percent).

V. DISCUSSION

Findings in table (1) out of (112) nurses participating in present study, their ages ranged between 20 to 29 year old and made up (83.0 percent) of the participants total numbers of nurses, this result come because that majority of the they dealing directly with the patient is from those with this age groups. Because the participants action with the patient requires a high physical activity and the who is advanced age fail to dealing with the patient. This findings come in the same line with findings from Cairo University Hospitals. Illustrated findings confirmed that critical care nurses were within age 20-30 years due to those areas need young workers (Ali, 2013).

In terms of gender, male nurses were predominant and made up more than half in compared with female, it composes (59.8%), due to the condition of the nursing job, male nurses were accounted for most of the nursing members, and all nurses who work in critical care unit need to be young to cover all duties in this units. Also, this may be due to the fact that males cover night duties while females does not. This findings come with study conducted in Bagdad Teaching hospitals. Illustrated findings depict (57%) of nurses were male aged 26-30 years old (Mohammed et al., 2017).

Marital status related to the findings, nurses were demonstrated as married and constituted the higher percentage (75.9%), as well as, only small ration (1.8%) were divorced. This result come because most of these age groups are the age of marriage, especially after the completion of the study and appointment in the field of nursing.
It is clear from the findings that more than half of the study sample were diploma graduated, it reflected (57.1 percent) out total number, with a percentage (18.8 %) were Bachelor graduated, as being the diploma certification was considered the major part of staff nurses in health organizations, due to the large number of institutions that graduate such degrees. This finding is similar to findings showed that most of nurses deals with patients with deep vein thrombosis were diploma graduated (Boulton et al., 2015).

The findings show the distribution of the studied sample according to workplace, results show that most of the participants in the study (53.6 percent) work in intensive care unit (ICU). According to the hospital’s policy and distribution, as these wards need a large number of nurses.

In regards with experience, most of them have less than 5 years as a experience in their nursing job and in less than one year in critical care unit, which composed of (82.1 and 52.7 percent) respectively. The few years of nursing experience in critical care unit could be explained by the fact that have a frequent rotating from one unit to another within the hospital. This come agree with findings showed majority of nurses (90.6%) were diploma of nurses. And (56.3%) of the nurses have an experience less than 5 years, while not only of the study group had a relative training courses (Chatterjee et al., 2014). As well as, findings come with findings of Ali (2013), who stated in their findings that critical care nurses were have less than one year in their workplace due to frequent rotation majority of them (90.6%) were diploma of nurses. And (56.3%) of the nurses have an experience less than 5 years, while not only of the study group had a relative training courses.

The majority of the study participants were not attend training sessions and constituted (78.6 percent). The participating in a training session is reduced due to the lack of an effective role in the continuing education unit. A ninety-six percent of nurses deals with patents diagnosed with pulmonary embolism were not predicated in training workshop due to poor continuous training, that is dependent on diploma graduates (Elshamy et al., 2018).

Also, our findings of demographic variables come in the similar line with findings of study carried out in public hospitals in Sana'a City-Yemen. Their results of the study showed that 51 percent are males, and 52 percent are married, have work experience of less than five years, and do not participate in training courses (Al-Gunaid, 2020).

As well as, our findings come consisting with study conducted in Baghdad City at critical care unit. The findings of this study illustrated that (64percent) of the study samples were male and (58 percent) at age groups (20-29) year old, (52 percent ) were married, (46 percent) were graduate have diploma, (66 per cent) had (1-5 year) skill in critical units (Hadi & Abdul-Wahhab, 2016).

VI. CONCLUSION

In study findings and their discussion, this quantitative review used an assessment approach to pulmonary embolism knowledge with questionnaire objects, and concludes that:

1. Young Adult male nurses aged 20-29 with a diploma who have been employed ICU for less than 5 years without training.
2. Knowledge in terms of definition, causes, risk factors of pulmonary embolism, nurses were moderate knowledge.
3. Knowledge domain in terms of signs & symptoms and diagnostic test, treatment and nurses care plan, and complication of pulmonary embolism, nurses were poor knowledge.
4. Knowledge in terms of pulmonary embolism, nurses were unsatisfactory knowledge.
5. Nurses education, years of experience in CCU and training have been influenced their knowledge.
6. More years of experience in critical care unit and training the staff on pulmonary embolism by local officials help raising professionals’ nurses. Provide the health resources and exploiting young energies of nurses which indeed helps to develop their knowledge.
VII. RECOMMENDATIONS:
The present study could recommended, based on the above stated conclusion, that:

1. Involves nursing staff with continuous educational program duento prevention measures of pulmonary embolism with evidence-based strategies to enhance their knowledge and practices.

2. Reassessment and follow-up for nurses need to be applied after education session to monitor, evaluate and to promote their knowledge and practice to ensure their application in job.

3. In the critical care units, it is necessary to rely on the young energies of nurses who are bachelor’s degree graduated and distributed it in appropriate numbers in the critical care unit with expertise away from new appointments.

4. Health directorate need to be providing equipment and facilities in critical care unit to implementation of professional nursing practices, and should support the strength point in nurses knowledge to meet the patients needs.

5. Further research must be carried out to include the national level and evaluate nurses practice concerning pulmonary embolism.

REFERENCES