Assessment of knowledge and Practices of Midwives in Labor Room Regarding Infection Control in the Main Governmental Hospitals at Sana'a city

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Abstract

Background: Infection control is a more substantial area of concern in labor and delivery room where nosocomial infection can be acquired in the maternal and child health facility. This study aimed to assess knowledge and practice of midwives in labor room regarding infection control. Design: A descriptive cross-sectional design was conducted. Setting: five main governmental hospitals at Sana’a city. Subjects: 84 midwives who work in delivery rooms were selected. Tools: two tools were used tool I: structured questionnaire consist of two parts, part 1: demographic data and part 2 to assess their knowledge related to universal precaution, tool II: checklist was used to assess the practice. Results: the total knowledge about universal precaution and infection control, slightly more than half of the subjects had good knowledge whereas few had poor knowledge. The majority of them had excellent practice for universal precaution and the there was no statistical significant between total knowledge score and total practice score. Conclusion: The total score of midwife’s knowledge related to universal precaution of infection control in the delivery units was fairly enough and the majority of them had excellent score of practice. Recommendations: There should be active hospital infection control committees set up, combined with maternal death reviews, audits, training and feedback on infection rates.

Keywords: Infection Control, Universal Precaution, Midwives & Practice

Introduction

Maternal mortality is unacceptably high and it is presently a major public health challenge worldwide including Yemen, about 295 000 women died during and following pregnancy and childbirth in 2017. From 2000 to 2017, the global maternal mortality ratio declined by 38 per cent – from 342 deaths to 211 deaths per 100,000 live births, according to UN inter-agency estimates. This translates into an average annual rate of reduction of 2.9 per cent. While substantive, this is less than half the 6.4 per cent annual rate needed to achieve the Sustainable Development global goal of 70 maternal deaths per 100,000 live births. (WHO, 2019).

In the context of the Sustainable Development Goals (SDG), countries have united behind a new target to accelerate the decline of maternal mortality by 2030. SDG 3 includes an ambitious target: “reducing the global MMR to less than 70 per 100 000 births, with no country having a maternal mortality rate of more than twice the global average” (USAD 2015, WHO 2015)

Women in Yemen at reproductive age represent around one sixth of the population (4,000, 000) (Ministry of Public Health & Population 2012). 42% of deaths among women at reproductive age are attributed to maternal causes, it is ranked number one among other causes of death (Al Serouri et al., 2012). The maternal mortality ratio is one of the highest in the Middle East, approximately 148 maternal deaths per 100,000 according to the Yndhs (2013). Despite the improvement in reduction of the maternal mortality rate from 301 maternal deaths/100,000 live births in 2000 to 164 maternal deaths/100,000 live births in 2017 with overall reduction by 46%. Yemen is still far away from attaining the Millennium development Goal 5. (WHO 2019) The MMR is still high in rural areas compared to urban areas (167 compared to 97). A study conducted in Al Muklla city 2010, shows that the maternal mortality through the period of 2000- 2010 shows an average of 106 maternal deaths per 100,000 live births. Additionally, the lifetime risk of maternal death in Yemen is 1 in 39; this is very high compared to 1 in 1800 in developed countries. (Dawood, et al., 2015)

The main causes of maternal deaths in Yemen are similar to the global situation. The majority of deaths occurred between the third trimester and the first week after delivery. Around 80% of maternal deaths are attributed to direct causes and 20% are attributed to indirect causes. Direct causes are,
Hemorrhaging 39%, obstructed labor 23%, infection 19% and eclampsia 19%. Maternal deaths could happen at home, on the way to the health facility and in the health facility (Ministry of Public Health & Population 2012).

The majority of deliveries In Yemen are done at home. Only 36% of the delivery is supervised by skilled providers. (WHO, 2008) The United Nations Children's Fund (UNICEF) stated that “every two hours, a mother and six newborns die in Yemen due to complications in pregnancy or childbirth as pre-eclampsia and postpartum hemorrhage. (Middle East Monitor, 2019)

Despite advances in patient care and global progress towards reducing maternal mortality, sepsis remains a common and potentially preventable cause of direct maternal death globally. Sepsis accounts for approximately 15% of all maternal deaths (Lapinsky, 2013). In the developed world about one to two percent develops uterine infections following vaginal delivery. This increases to five to thirteen percent among those who have more difficult deliveries and 50 percent with C-sections before the use of preventative antibiotics (Cunningham, 2014). In 2015, these infections resulted in 17,900 deaths down from 34,000 deaths in 1990 (GBD 2015, GBD 2013). They are the cause of about 10% of deaths around the time of pregnancy (WHO, 2015)

Infection can be defined as the invasion of an organism’s body tissues by disease-causing agents, their multiplication, and the reaction of host tissues to the infectious agents and the toxins they produce. (Wikipedia, 2019)

Infection prevention refers to procedures/practices used to minimize the risk of spreading infections, especially in hospitals and health care facilities. (Medical dictionary, 2019)

Significance of the study
In an individual healthcare, staff practice, which is driven by their knowledge, plays a decisive role in the success of infection control programmes. (Duerink et al., 2013) However, similar to what has been experienced in some developing countries, because of poor infection control (IC) practices in labor and delivery units, with an increase in the use of health facilities, it could be excepted that the rates of puerperal sepsis will be on the rise. Few interventions have targeted the prevention of infection during labor and postnatal, and to the best of the researcher's knowledge, no studies on staff knowledge and reported practices of hospital infection control in Yemen have been published so far. Therefore this study aimed to assess knowledge and practice of midwives in labor room regarding infection control. This study will serve to highlight infection control practices hence will be useful for informing and designing subsequent interventions to reduce the rate of infections and associated maternal mortality in health facilities.

Aim of the study
Assess knowledge and practice of midwives in labor room regarding infection control.

Research hypothesis
Nurses who have good knowledge related to infection control measures will have good practices in labor room

Patients and Methods

Research Design
A descriptive cross-sectional design was used for present study.

Settings
The study was done at five main governmental hospitals in Sana'a city-Yemen. Al-Thora Hospital, Al-Gomhori Hospital, Al-Sabeen Hospital, 48 Hospital, Zayed Hospital. These hospitals were chosen because they are the main hospitals in Sana'a City that provide maternity care.

Subjects
A convenience sampling was used to include 84 midwives who gave direct care to mothers and newborn babies in delivery units were selected.

Inclusion criteria
Midwives who work in delivery units and willing to participate were included for the study

Yemeni nationality
Has a certificate in midwifery

Exclusion criteria
Midwives who not willing to participate in the study

Tools of data collection
Two tools were used for data collection after reviewing of the related literature.

Tool I: Structured questionnaire consist of two parts;
Part (1): demographic characteristics to assess midwife age, level of education, work experience, etc.

Part (2): questions related to midwife's knowledge about universal precautions and infection control before, during and after normal vaginal labor, such as definition of infection control, definition of IC universal standards, rout of infection in labor units, equipment to prevent infection in labor units, and importance of infection control.

Scoring system for knowledge: a score of one was given for correct answer and a zero for incorrect answer, the possible range of total scores was zero to 31 which were classified as follows: excellent knowledge (75% or more correct answer). good knowledge (50% to less than 75% correct answers). Poor knowledge (less than 50% correct answer)
Tool II: Checklist to assess midwives practice related to application of universal precautions before, during and after normal vaginal delivery, it was developed by the researchers after review the literatures to assess hand washing, wearing and removing sterile gloves, wearing mask and apron, I.V cannulation, and insertion of urinary catheter, changing gloves, cleaning, disinfection and sterilization of instruments.

Scoring system was coded as follows: No = 0: if the item not done, sometimes =1: if the item was done some times, Yes = 2: if the item was done. The possible range of total scores of practices was zero to 68 which were classified as follows: excellent practice (75% or more), good practice (50% to less than 75%). Poor practice (less than 50%)

Validity
Content validity was ascertained by a group of (5) expert from maternity health. Their opinions were elicited regarding the tools format layout, and scoring system

Administrative approval
Permission was obtained from the directors of hospitals at Sana'a Governorate.

Ethical consideration
A formal consent was obtained orally from midwife before being involved in the study. The nature and purpose of the study was explained. The researchers was informed the midwife that there is no risk or cost for participation, and the participation is voluntary.

Pilot study
After developing the tools, a pilot study was conducted on 10% of the total number of midwives. A pilot study was conducted for purpose to testing clarity, completeness, and to determine the time involvement.

Methods
Procedure
Data was collected over a period of four months started on beginning of July till end of October of 2018, for two days a week. The researchers introduced themselves to the eligible midwife and briefly explained the nature of the study and started to ask the midwife for their knowledge about IC, and then the researcher asked the midwife for their practice in labor, this step took about 20 to 30 minutes for one session for each midwife during a day shift. Before starting this study, it was necessary to secure the approval of authorities in the setting of the study. Confidentiality of the data will be asserted. Explanation of the aim and methodology of the study was done by the researchers.

Statistical analysis
Data entry was done using compatible personal computer. The statistically analysis was done using SPSS-20 statistical software package and Excel for figures. The content of each tool was analyzed, categorized and then coded. Qualitative studied variables were compared using Chi-square test. Pearson correlation analysis was used for assessment of the inter-relationships between the total scores of midwives’ knowledge and practice about infection control. Statistical significance was used at (P. value 0.05)
Results

Table (1): Distribution of the study subject according to demographic characteristics.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>29.25±4.643</td>
<td></td>
</tr>
<tr>
<td><strong>Qualification</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diploma 2 years</td>
<td>19</td>
<td>22.6</td>
</tr>
<tr>
<td>Diploma 3 years</td>
<td>52</td>
<td>61.9</td>
</tr>
<tr>
<td>Bachelor</td>
<td>12</td>
<td>14.3</td>
</tr>
<tr>
<td>Msc</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>Total</td>
<td>84</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Years of experience in labor room</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;5 years</td>
<td>49</td>
<td>58.3</td>
</tr>
<tr>
<td>5-10 years</td>
<td>23</td>
<td>27.4</td>
</tr>
<tr>
<td>&gt;10 years</td>
<td>12</td>
<td>14.3</td>
</tr>
<tr>
<td>Total</td>
<td>84</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>In-services training in infection control</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>38</td>
<td>54.2</td>
</tr>
<tr>
<td>No</td>
<td>45</td>
<td>45.8</td>
</tr>
<tr>
<td>Total</td>
<td>83</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Figure (1): Distribution of study subjects according to their total score of knowledge.

Figure (2): Distribution of study subjects according to their total score of practice.
Table (2): Distribution of study subjects according to the relation between total score of knowledge and total score of practice.

<table>
<thead>
<tr>
<th>Item</th>
<th>Knowledge score</th>
<th>Practice score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge score</td>
<td>Pearson Correlation 1.000</td>
<td>-.006- .959</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practice score</td>
<td>Pearson Correlation -.006-</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table (3) Distribution of study subjects according to the relation between work- experience in labor room and total score of practice.

<table>
<thead>
<tr>
<th>Practice score</th>
<th>Work - Experience in labor room</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;5 years</td>
<td>5-10 years</td>
</tr>
<tr>
<td></td>
<td>No.</td>
<td>% Within practice</td>
</tr>
<tr>
<td>Good</td>
<td>5</td>
<td>55.6</td>
</tr>
<tr>
<td>Excellent</td>
<td>44</td>
<td>58.7</td>
</tr>
<tr>
<td>Total</td>
<td>49</td>
<td>58.3</td>
</tr>
</tbody>
</table>

Table (4) Distribution of study subjects according to the relation between mean of practice and available of utilities mean.

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean ± SD</th>
<th>t. test</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice Mean</td>
<td>2.5277±.26253</td>
<td>88.244</td>
<td>83</td>
<td>.000</td>
<td>2.52766</td>
<td>2.4707- 2.5846</td>
</tr>
<tr>
<td>Available of utilities Mean</td>
<td>2.4141±.36945</td>
<td>59.888</td>
<td>83</td>
<td>.000</td>
<td>2.41409</td>
<td>2.3339- 2.4943</td>
</tr>
</tbody>
</table>

Table (5) Distribution of study subjects according to the relation between mean of practice and mean of infection control standards related to hospitals.

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean ± SD</th>
<th>t. test</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital's standards mean</td>
<td>2.2993±.32259</td>
<td>65.326</td>
<td>83</td>
<td>.000</td>
<td>2.29932</td>
<td>2.2293- 2.3693</td>
</tr>
<tr>
<td>Practice mean</td>
<td>2.5277±.26253</td>
<td>88.244</td>
<td>83</td>
<td>.000</td>
<td>2.52766</td>
<td>2.4707- 2.5846</td>
</tr>
</tbody>
</table>

Table (1): Shows the distribution of the study subjects according to their demographic data, it was observed that the mean age was 29.25±4.643. Almost two third (61.9%) have a 3 years diploma in midwifery and 58.3% had work experience in delivery room less than 5 years with 45.8% of them with no training in infection control.

Figure (1): Show the distribution of the study subjects according to total score of knowledge about universal precaution and infection control, 52.4% had good knowledge whereas only 8.3% had poor knowledge.

Table (2): Show the distribution of the study subjects according to the relation between total knowledge score and total practice score, there were no statistical significant differences.

Table (3): Show the distribution of the study subjects according to relation between work experience and total practice score. Again there was no statistical
difference between the work experience and total practice score.

**Table (4):** Show the distribution of the study subjects according to relation between mean of practice and mean of availability of utilities. There was a statistical significant difference between mean of practice and mean of availability of utilities in the delivery units

**Table (5):** Show the distribution of the study subjects according to the relation between mean of practice and mean of infection control standards. There was a statistical significant difference between mean of practice and mean of infection control standards related to hospitals.

**Discussion**

Infection Control is a most important field to concern in labor and delivery room as mothers and neonates are vulnerable to get infections from the surrounding environment of the hospital. The chances of infection increases, if the precautions are not taken appropriately, especially by nursing and midwifery staffs who is the prime person, responsible for taking care of mothers and neonates in the Hospital.

Infection control is a more substantial area of concern in labor and delivery room because mothers might be exposed to infection due to multiple examinations by health care providers during the process of labor. (Chan, 2014, CIA 2015, WHO 2010)

This study was done to assess the knowledge and practices of midwives in the delivery units regarding to infection control.

As regard to their work experience in the delivery units, slightly more than half of them with less than 5 years of experience. This result similar to the results of a study done in Iran by Tabatabaei, (2016) infection control practices and program management in labor and delivery units, which found that almost half of the midwives had a work experience of less than 5 years.

The present study revealed that the majority of midwives had excellent score of infection control practice in the delivery units. This high score it can be related to that the assessment of practices was by self-report and it may not reflex the actual practices and when compared with the total knowledge, it revealed no statistical significant relation between them.

**Benita, et al., (2014)** findings depicts the frequency and percentage distribution of of practice on infection control in labor unit among health care personnel in which (60%) and (100%) had good practice on clean birthing room environment and in safe waste management respectively, (96.67%) and (100%) had excellent practice on infection control during labor and birth and in safe waste management respectively.

The total knowledge score of midwives as found from the present study was good among slightly more than half of them and this may be related to that around half of study subjects had conducted training workshop about infection control. This results in agreement with the result of Lien, et al., (2018) "knowledge and self-reported practices of infection control among various occupational groups in a rural and an urban hospital in Vietnam" which found that the main score of knowledge for their subjects was good knowledge of infection control among the majority of hospital staff.

**Conclusion**

The total score of midwife’s knowledge related to universal precaution of infection control in the delivery units nearly half of them had good score and one third had excellent whereas only 8.3% had poor.

Regarding practice of universal precaution to prevent infection, the majority of them had excellent score and the rest had good score.

**Recommendations**

- Operational strategies, guidelines and protocols for infection control based on international standards should be available and update to all health-care facilities providing maternity care.
- Appropriate policy for maintaining and sustaining infrastructure and supplies essential to infection control in maternity units, such as soap, 24-h running water, antiseptic solutions, antiseptic hand rubs, facemasks and hand gloves, should be developed and implemented in all health facilities.
- Hospital infection control polices, a common antibiotic policy, aseptic precautions in the labor room and general improvement in hygiene and cleanliness should be maintained to controlling sepsis.

**References**


