

# Knowledge of 3rd Year Degree Nursing Students at a University Regarding Contributing Factors of Neonatal Sepsis, Windhoek, Namibia

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## Abstract

### Introduction

Neonatal Sepsis is the blood infection that occurs in an infant younger than 90 days old. Early onset is seen in the first week of life and late onset sepsis occurs after 1 week through 3 months of age. The symptoms are breathing problems, low blood sugar, reduced body movements, vomiting, decreased bowel movements, jaundice and the possible complications are disability and. Neonatal sepsis is a public health problem that causes death or disability in infant younger than 90 days old unless proper antibiotic treatment is given on time.

### Methods

A self-administered questionnaire was distributed to 73 3rd year nursing students from UNAM main campus. The study had a 100% response rate, with most of the 3rd year nursing students being female, and also not being enrolled in practicing nursing before.

### Results

The study found that most of the 3rd year nursing students had sound knowledge of the factors contributing to neonatal sepsis as the study found that most students were aware that prematurity and low-birth-weight were contributing factors of neonatal sepsis. The 3rd year nursing students were also knowledgeable that pre-mature rupture of the membranes is one of the contributing factors of neonatal sepsis, and that babies with low-birth-weight were at risk of being infected with neonatal sepsis. Findings also show that 3rd year nursing students had sound knowledge of when neonatal sepsis occurs and when to diagnose it.

### Conclusion

The study concluded that 3rd year nursing students at UNAM main campus has good knowledge about the contributing factors of neonatal sepsis. However, the 3rd year nursing students still need to improve their knowledge on the management practices of neonatal sepsis as some of the students chose to remain neutral at questions that assessed the management practices of neonatal sepsis. Recommendations were made based on the findings.

**Keywords:** Neonatal, Sepsis, Nursing, Students.

## 1. Introduction

Neonatal sepsis, also known as early or late neonatal sepsis, is the systemic reaction to infection in a new-born infant younger than one month of age. Another research defines neonatal sepsis as sepsis, or infection caused by a systemic bacterial infection, is a leading cause of morbidity and mortality in children [1,2].

In neonatal sepsis hypothermia and fever are examples of vital sign abnormalities, fever is more common in term babies, whereas hypothermia is more common in preterm babies. Tachycardia or bradycardia may be present, as well as symptoms of poor perfusion such as chills and pale extremities and a fast pulse. Wheezing, nasal flaring, use of accessory muscles of

breathing, cyanosis, and periods of apnoea are all common respiratory symptoms and signs in new-born sepsis. Lethargy, seizures, irregular respiration, a high-pitched cry, hypertonia, hypoactive deep tendon reflexes, and abnormal primitive reflexes are all neurological symptoms and indicators for neonatal sepsis. Reduced eating, vomiting, diarrhoea, jaundice, abdominal distension, and hepatosplenomegaly are all gastrointestinal symptoms. Petechial, impetigo, cellulites, and abscess are examples of skin conditions are also signing of neonatal sepsis [3].

The main focus of this study on knowledge of 3rd year nursing students at UNAM regarding contributing factors of neonatal

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sepsis. This chapter presents the background of the study, statement of the problem, aim of the study, research objectives, significance of the study and terminologies.

## 2. Background

Neonatal Sepsis is the blood infection that occurs in an infant younger than 90 days old. Early onset is seen in the first week of life and late onset sepsis occurs after 1 week through 3 months of age. The symptoms are breathing problems, low blood sugar, reduced body movements, vomiting, decreased bowel movements, jaundice and the possible complications are disability and death. Neonatal sepsis is a public health problem that causes death or disability in infant younger than 90 days old unless proper antibiotic treatment is given on time. Altogether, Neonatal Sepsis is a cause of sickness and death in neonates despite recent advancement in health care delivery [4,5].

Sepsis is a life-threatening organ failure caused by a dysregulated host response to infection. Despite the fact that neonates are most sensitive to sepsis, several nations lack estimates for this age range. According to the Global Burden of Disease (GBD) Study 2016/2017, there are 1.3 million (95% CI 0.8 to 2.3) yearly incident cases of new-born sepsis worldwide, with 203 000 (95% CI 178 700 to 267 100) sepsis-attributable deaths [6]. According to an estimated four million new-born deaths occur each year around the world. Infections are responsible for roughly 36% of these deaths. The warning signs and symptoms are frequently mild, and they can be easily mistaken for non-infectious reasons. Despite the fact that the neonatal period only lasts 30 days, it accounts for 40% of all mortality in children under the age of five [1].

According to it is known that internationally around 60% of neonatal deaths are connected to Neonatal sepsis. It was emphasized by the United Nations Children's Fund in 2017 that if the current situation remains in all countries, it will be impossible for the world to realize the goal of cutting neonatal deaths by two-thirds by 2026 [7,8].

Prematurity, birth asphyxia, and new-born infections are the three primary contributors to the global burden of neonatal fatalities (in order of size). In developing nations, where new-born sepsis accounts for 30-50 percent of all neonatal deaths, the toll is higher (Jha, Keshav, Singh, Kumar & Prakash, 2020). Sub-Saharan Africa had the highest neonatal mortality rate among the Sustainable Development Goal (SDG) areas in 2018, with 28 deaths per 1000 live births, followed by Central and Southern Asia with 25 deaths per 1000 live births. A child born in Sub-Saharan Africa is ten times more likely than a child born in a high-income nation to die in the first month [9]. According to every year, 1.12 million new-borns die in the African region [9]. Prematurity and low birth weight are the most common causes, as are infections, a lack of oxygen at birth, and birth trauma. Nearly 80% of deaths in this age range are caused by these causes about 1.7 neonates, particularly in Sub-Saharan Africa (SSA), face a variety of deadly clinical problems, particularly infectious illnesses, that require immediate management.

Numerous contributing factors have been acknowledged to incline neonates to sepsis and have been found to be related to delivery practices, or other neonatal diseases [4]. Although rarely, a few maternal factors such as maternal fever, instrumental delivery, and foul-smelling liquor may also contribute to neonatal sepsis. While low birth weight and prematurity are among the predisposing neonatal factors reported globally [4]. The Health Ministry in Namibia developed a Maternal Health Policy Framework in 2009, which has the following objectives: to provide quality maternal health care services at all levels of health care delivery; to increase the utilization of maternal and neonatal health services [7]. Again, the Maternal Health Policy Framework failed to assess knowledge and attitudes towards neonatal sepsis in order to achieve the policy's objectives. Which calls for an assessment into knowledge of 3rd year nursing students at UNAM regarding contributing factors of neonatal sepsis.

## 3. Aim

The aim of the study was to assess and describe knowledge of 3rd year nursing students at UNAM regarding contributing factors of neonatal sepsis.

## 4. Method

The variable under study was knowledge of 3rd year nursing student as the independent variable and the factors contributing to neonatal sepsis as the dependent variable. The researcher used descriptive research methodology to observe, describe and document aspects of the situation as it presently exists.

## 5. Survey

To collect quantitative data, the researcher created a self-administered structured questionnaire in English language. It was a report instrument that used paper and pencil or a pen to obtain quantitative data. It is the simplest and least expensive way to collect quantitative data [10]. It was divided into four sections: Section A: contained the 3rd year degree nursing student's socio-demographic information. Sections B assessed the knowledge regarding contributing factors on neonatal sepsis based on Likert scale 1. Strongly agree, 2. Agree 3. Neutral 4. Disagree, 5. Strongly disagree.

## 6. Interview Schedule

### 6.1 Ethical Approval

Ethical clearance was obtained through the structures of the University of Namibia. Therefore, the following ethical considerations were written, informed consent was obtained from each participant after the procedure was explained and risks were pointed out after adequate information were conveyed, possible risks were pointed out. Voluntary participation without penalty for withdrawal was pointed out.

### 6.2 Data Collection

Data collection is the process of gathering and measuring the information on variable of interest [10]. Physical forms were printed out and distributed to students at their allocated stations, in the Khomas region, at the University of Namibia main campus, Katutura State Hospital, and Windhoek Central Hospital, when

the internet was insufficient. The procedure of gathering the data took up to one week to complete, plus or minus 10 -15 minutes per participant, and within the hours of 07:00-16:00pm, depending on when students have time available. A standardized self-administered questionnaire was used by the researcher to collect data.

### 6.3 Data Analysis

The data will be analysed using a statistical method by the researcher. The process of arranging and adding meaning to data is known as data analysis [10]. It involves organizing, categorizing, and summarizing data in order to come at a

conclusion and present evidence. The researcher used Microsoft Office 2016 to analyse data and present it in the form of tables, charts, and graphs.

## 7. Results

### 7.1 Demographics

#### 7.2 Age group

The respondents were asked to indicate their age groups. Results show that 66 (90.4%) of the respondents fell between the ages of 18 and 23, while 7 (9.6%) were over the age of 29. None of the respondents were aged between 24 and 28 years. Figure 1 illustrates the age groups below figure 1.

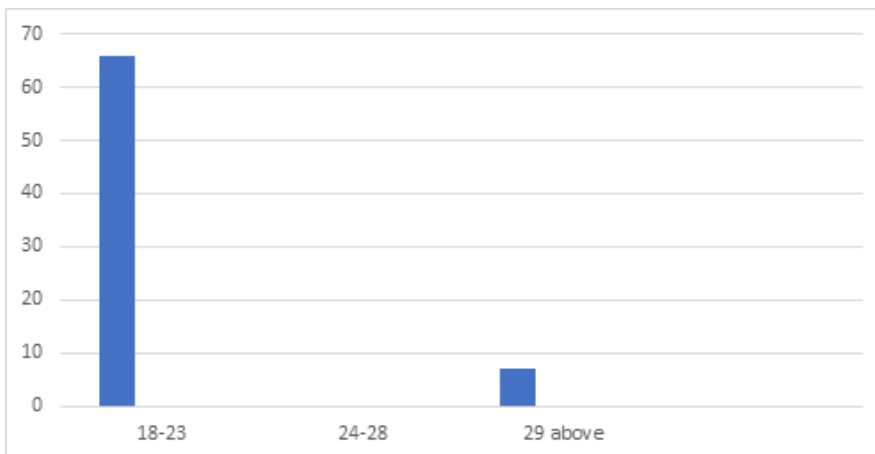


Figure 1: Age groups

### 7.3 Gender

Respondents Figure 2 also indicated their gender on the questionnaires. Results show that 65 (89%) of the respondents were female, while only 8 (11%) were male. Figure 2 illustrates the genders results below.

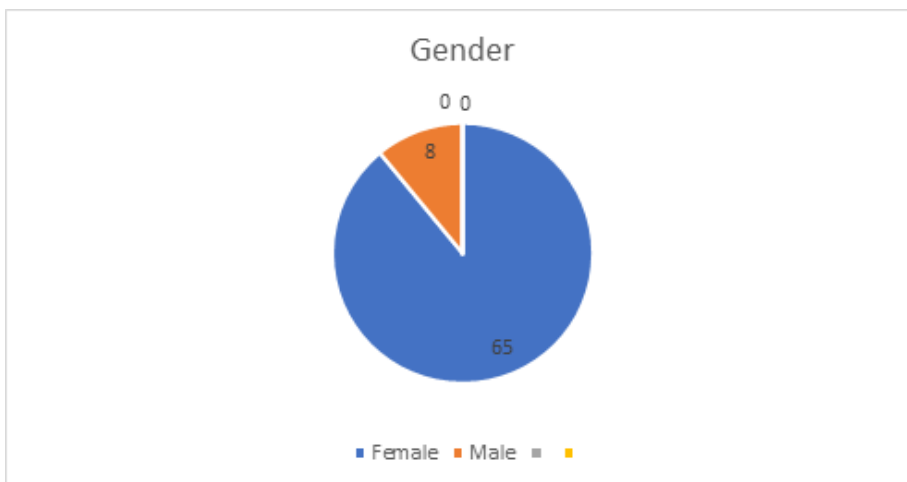


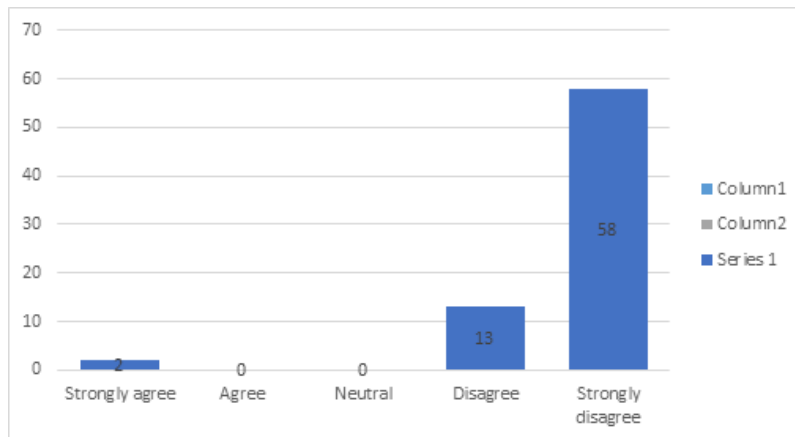
Figure 2: Gender

Assess the knowledge of 3<sup>rd</sup> year degree nursing students regarding the contributing factors of neonatal sepsis

This section presents results from the section that attempted to fulfil the objectives of the study. Respondents were asked to base their responses based on the sepsis based on Likert scale by Strongly agreeing, Agreeing, being Neutral, Disagreeing or Strongly disagreeing.

*Babies with low weight are not susceptible of becoming infected because their immune system is not weak*

The respondents were asked if babies with low weight are not susceptible of becoming infected because their immune system is not weak, results show that only 2 (2.7%) respondents strongly agreed, while the other 13 (17.8%) disagreed, and a record 58 (79.5%) strongly disagreed, figure 3 shows the findings below.

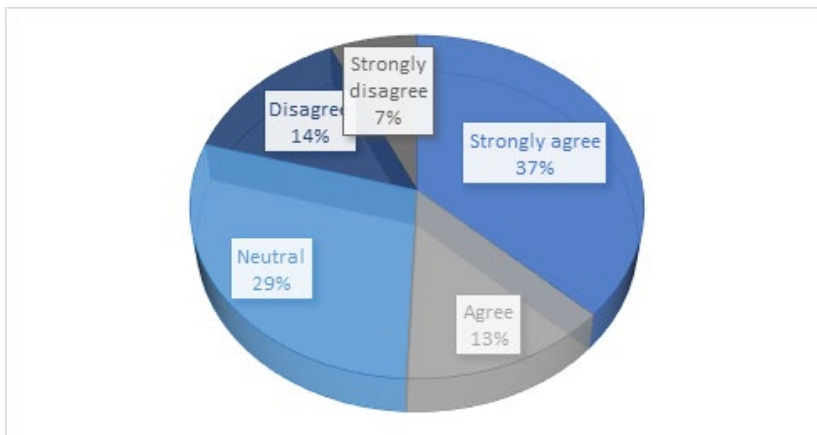


**Figure3:** Babies with low weight are not susceptible of becoming infected because their immune system is not weak

*Group B streptococcus is one of organism that causes neonatal sepsis within 72 hours*

Respondents were tested if they were aware that Group B streptococcus is one of organism that causes neonatal sepsis

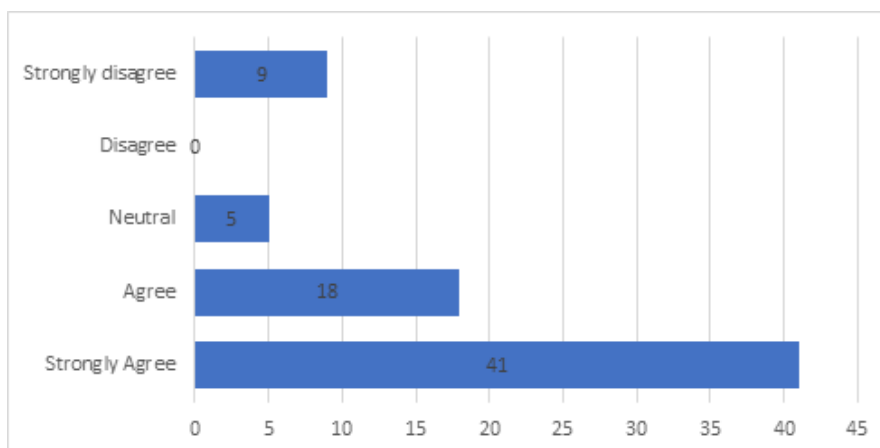
within 72 hours or not. Results show that 27 (37%) respondents strongly agreed, 10 (13%) agreed and another 10 (14%) also disagreed, 21 (29%) remained neutral, and 5 (7%) strongly disagreed with the statement. Figure 4 illustrates the findings below.



**Figure 4:** Group B streptococcus is one of organism that causes neonatal sepsis within 72 hours

*Prematurity is regarded as one of the risk factors*

Respondents were asked if prematurity is regarded as one of the risk factors of neonatal sepsis, results show that 41 (56%) respondents strongly agreed, 18 (24.7%) agreed, 5 (6.8%) remained neutral. None of the respondents disagreed, but 9 (12.5%) strongly disagreed, as illustrated by Figure 5 below.



**Figure 5:** Prematurity is regarded as one of the risk factors

*Pre-mature rapture of the membranes is one of the contributing factors of neonatal sepsis*

that 61 (83.6%) of the respondents strongly agreed, while 6 (8.2%) also just agreed, while 3 (4.1%) remained neutral and the other 3 (4.1%) disagreed. None of the respondents strongly disagreed. Results are shown in Table 1 below.

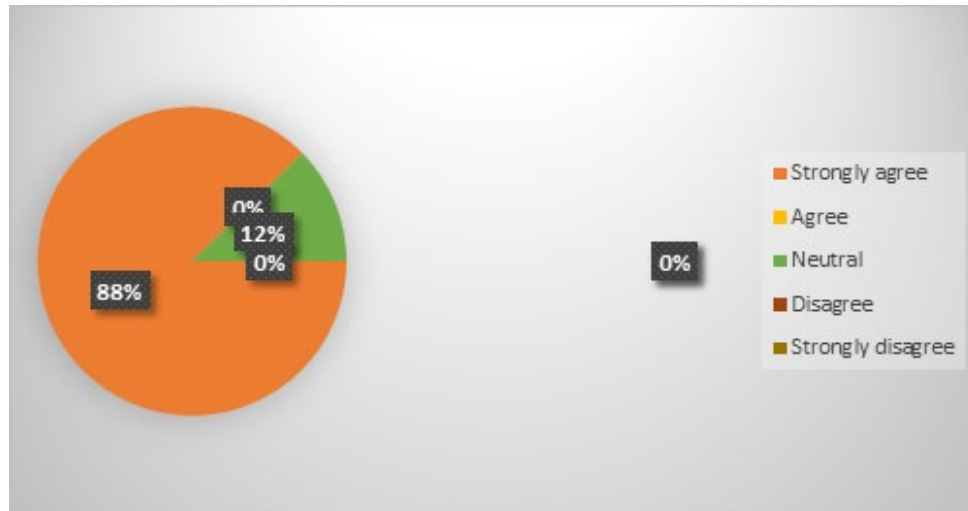
Respondents were asked if pre-mature rapture of the membranes is one of the contributing factors of neonatal sepsis, results show

| Response          | No. of respondents | Percentage (%) |
|-------------------|--------------------|----------------|
| Strongly agree    | 61                 | 83.6%          |
| Agree             | 6                  | 8.2%           |
| Neutral           | 3                  | 4.1%           |
| Disagree          | 3                  | 4.1%           |
| Strongly disagree | 0                  | 0%             |
| Total             | 73                 | 100%           |

**Table 1: Pre-mature rapture of the membranes is one of the contributing factors of neonatal sepsis**

*Babies with low weight are more at risk for neonatal sepsis*

Respondents were asked if babies with low weight were more at risk of neonatal sepsis, results show that 64 (88%) respondents strongly agreed, while the other 9 (12%) remained neutral. None of the respondents agreed, disagreed or strongly disagreed. Figure 6 shows the results below.



**Figure 6: Babies with low weight are more at risk for neonatal sepsis**

*Neonatal sepsis is best described by infants born before 37 weeks' gestation*

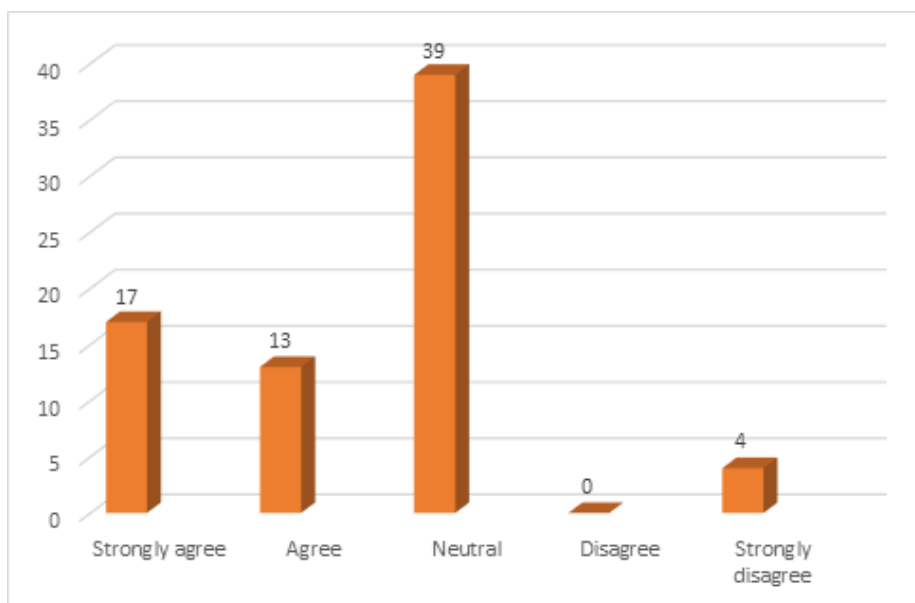
Respondents were asked if Neonatal sepsis is best described by infants born before 37 weeks' gestation, results show that 5 (6.8%) respondents strongly agreed, 29 (39.7%) agreed, 15 (20.5%) remained neutral, 10 (13.7%) disagreed, and 14 (19.3%) strongly disagreed. Table 2 below shows the results.

| Response          | No. of respondents | Percentage (%) |
|-------------------|--------------------|----------------|
| Strongly agree    | 5                  | 6.8%           |
| Agree             | 29                 | 39.7%          |
| Neutral           | 15                 | 20.5%          |
| Disagree          | 10                 | 13.7%          |
| Strongly disagree | 14                 | 19.3%          |
| Total             | 73                 | 100%           |

**Table 2: Neonatal sepsis is best described by infants born before 37 weeks' gestation**

*Group B streptococcus bacteria are one of the organisms that cause neonatal sepsis within 24 hours after birth*

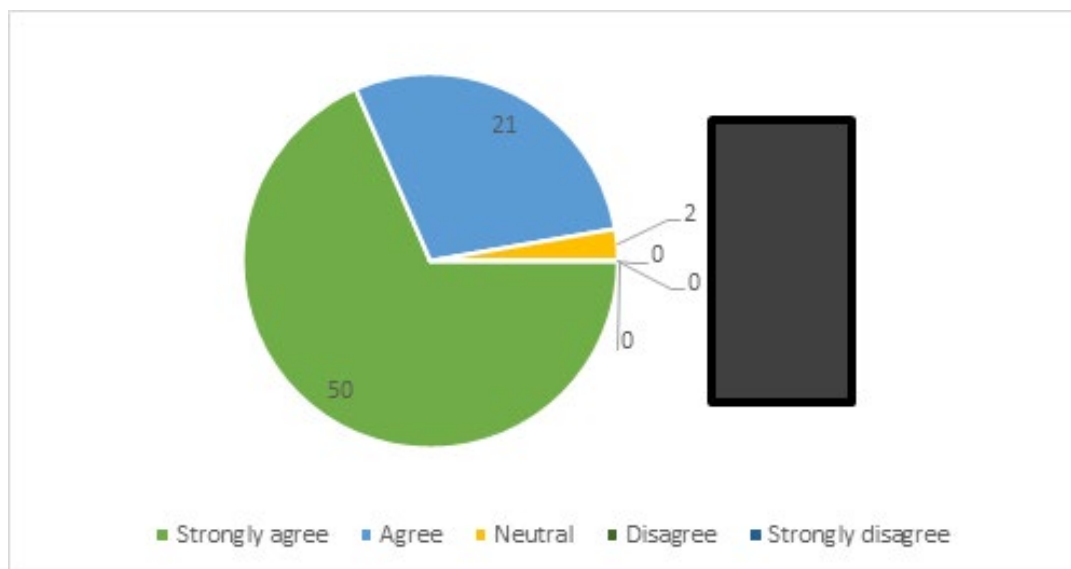
Respondents were asked if Group B streptococcus bacteria are one of the organisms that cause neonatal sepsis within 24 hours after birth. Results show that 17 (23.3%) respondents strongly agreed, 13 (17.8%) agreed, 39 (53.4%) remained neutral, while 4 (5.5%) strongly disagreed. None of the respondents disagreed. Figure 7 below shows the results.



**Figure 7:** Group B streptococcus bacteria are one of the organisms that cause neonatal sepsis within 24 hours after birth

*Providing clean place for birth can prevent neonatal sepsis*

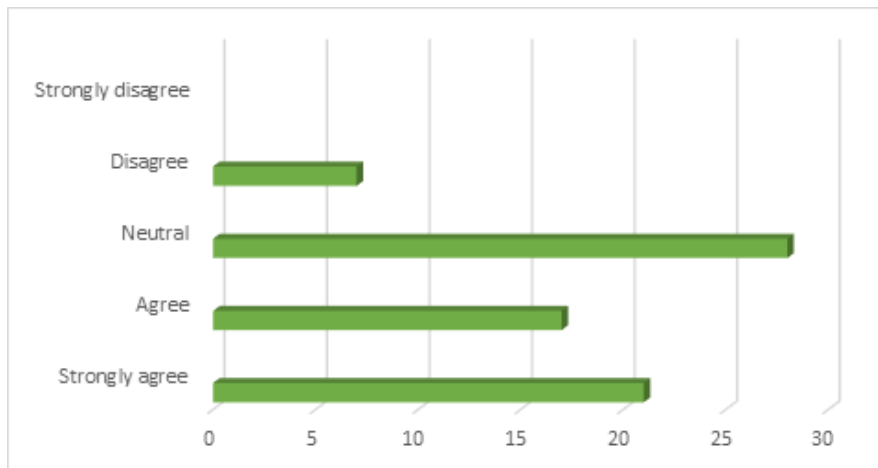
Respondents were asked if providing a clean place for birth can prevent neonatal sepsis. Result show that 50 (68.5%) respondents strongly agreed, 21 (28.8%) agreed, and only 2 (2.7%) were neutral. None of the respondents disagreed or strongly disagreed. Figure 8 presents the results below.



**Figure 8:** Providing clean place for birth can prevent neonatal sepsis

*Full examination done on pregnant woman during ANC visits can prevent neonatal sepsis*

Respondents were asked if full examination done on pregnant woman during ANC visits can prevent neonatal sepsis, results show that 21 (28.7%) respondents strongly agreed, 17 (23.3%) agreed, while 28 (38.4%) remained neutral on the question, and only 7 (9.6%) disagreed, as illustrated by Figure 9.



**Figure 9:** Full examination done on pregnant woman during ANC visits can prevent neonatal sepsis

*Hand washing with soap when caring for new born babies in neonatal unit is mandatory*

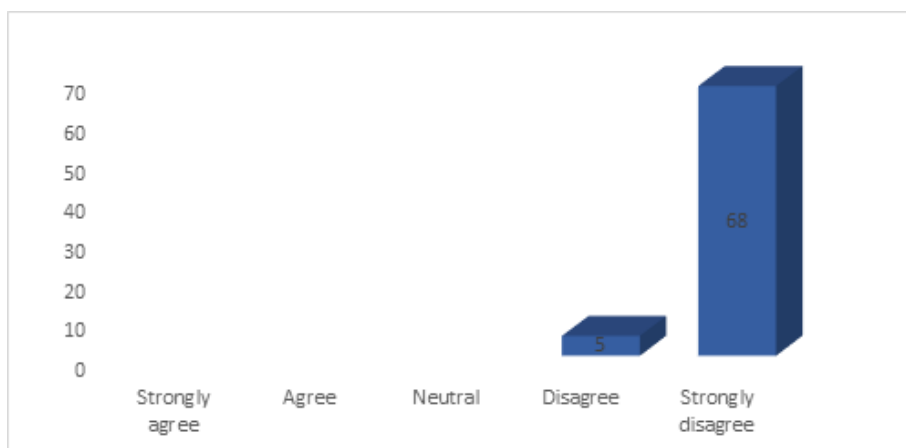
Respondents knowledge was tested on the issue of whether hand washing with soap when caring for new born babies in neonatal unit is mandatory or not. Results show that all the respondents had agreed altogether with the statement as shown by Table 3 below.

| Response          | No. of respondents | Percentage (%) |
|-------------------|--------------------|----------------|
| Strongly agree    | 54                 | 74%%           |
| Agree             | 19                 | 26%            |
| Neutral           | 0                  | 0%             |
| Disagree          | 0                  | 0%             |
| Strongly disagree | 0                  | 0%             |
| Total             | 73                 | 100%           |

**Table 3:** Hand washing with soap when caring for new born babies in neonatal unit is mandatory

*Babies under Phototherapy treatment should be fully clothed*

Respondents were asked if babies under Phototherapy treatment should be fully clothed, results show that 68 (93.1%) respondents strongly disagreed and only 5 (6.9%) disagreed. None of the respondents strongly agreed, agreed, or were neutral. Results are shown in Figure 10 below.



**Figure 10.** Babies under Phototherapy treatment should be fully clothed

*Mothers are not allowed to visit their new born babies in neonatal unit to prevent cross infections*

Respondents were asked if mothers are not allowed to visit their

new born babies in neonatal unit to prevent cross infections. Results show that 5 (6.8%) respondents strongly agreed, 12 (16.4%) were neutral, while 28 (38.4%) disagreed and another 28 (38.4%) strongly disagreed.



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## 8. Discussion

### 8.1 Demographic Data

The study had sampled 73 respondents, and 73 questionnaires were handed out and all returned to the researcher, the study had a 100% response rate. Over 90% of the respondents were between the ages of 18 and 24, which indicate that most of the 3<sup>rd</sup> year nursing students were relatively young and youthful. Almost 90% of the 3<sup>rd</sup> year nursing students were female, and only a few were male. This indicates that the nursing student population is dominated by female students. Of the 73 respondents, only 2 were previously enrolled as nurses, while the remaining 71 were new to the profession. This suggests that most of the 3<sup>rd</sup> year nursing students at UNAM main campus have little experience in nursing. Despite most of the nursing students being new to the profession, over 90% of them had worked in the neonatal unit before, suggesting that they have experience with regards to neonatal issues and setting.

### Knowledge of 3<sup>rd</sup>Year Degree Nursing Students Regarding the Contributing Factors of Neonatal Sepsis

In an attempt to assess the knowledge of 3<sup>rd</sup> year degree nursing students regarding the contributing factors of neonatal sepsis, the nursing students were asked if babies with low weight are not susceptible of becoming infected because their immune system is not weak, findings show that most of the nursing students disagreed of the statement as altogether 71 students disagreed and strongly disagreed. This finding agrees with the finding made by when it was revealed that premature and low-birth-weight new-borns have a weakened immune system, making them more susceptible to infection [11]. This shows that the 3<sup>rd</sup> year nursing students were correct by disagreeing with the statement.

Nursing students were also asked if group B streptococcus is one of organism that causes neonatal sepsis within 72 hours, findings revealed that 50% of the nursing students agreed that group B streptococcus is one of organism that causes neonatal sepsis within 72 hours, while another 36% disagreed. However, this finding could not be verified nor denied by the controlled literature reviewed in this study. Hence, a general conclusion could not be made regarding group B streptococcus being one of organism that causes neonatal sepsis within 72 hours. The 3<sup>rd</sup> year nursing students were also asked if prematurity is regarded as one of the risk factors, findings indicate that most of the students were agreement as 56% strongly agreed and over 24% also agreed. This finding is confirmed by as it was found that prematurity and low birth weight are commonly associated with new-born sepsis and mortality [11]. Hence, most of the students were knowledgeable with regards to prematurity being regarded as one of the risk factors.

The 3<sup>rd</sup> year nursing students were also assessed if they were aware if pre-mature rapture of the membranes is one of the contributing factors of neonatal sepsis, findings revealed that over 80% of the respondents strongly agreed to the statement. This finding has been confirmed by who stated that pre-rupture of membrane (PROM) was one of the maternal factors relate to the development of new-born sepsis, because of the risk

of ascending infection, prolonged leaking and premature membrane rupture are considered major risk factors for neonatal sepsis [12]. Similarly, the students were also assessed if they were aware whether babies with low weight are more at risk for neonatal sepsis or not, findings show that 88% of the students strongly agreed with the statement. According to it is true that babies with low weight are more at risk of neonatal sepsis as they found that prematurity and low birth weight are the most common causes of neonatal sepsis [9].

Another assessment scale for the knowledge of 3<sup>rd</sup> year nursing students was if neonatal sepsis is best described by infants born before 37 weeks' gestation. Results show that even though 46.7% of the students altogether strongly agreed and agreed, 20% of the remained neutral as they were unsure if they should agree or disagree. The controlled literature supports the students were who in agreement with the statement, as revealed that prematurity is one of the primary contributors to the global burden of neonatal sepsis. Therefore, students who agreed that neonatal sepsis is best described by infants born before 37 weeks' gestation, were actually right [13].

Student nurses were also asked if providing clean place for birth can prevent neonatal sepsis, results show that altogether 97.3% of the 3<sup>rd</sup> year nursing students agreed of the statement. This finding is supported by when they revealed that good delivery practices can prevent neonatal sepsis. Students' knowledge was also assessed through the statement that can full examination done on pregnant woman during ANC visits can prevent neonatal sepsis [4]. Findings reveal that over 50% of the students were positive and in agreement that full examination done on pregnant woman during ANC visits can prevent neonatal sepsis. However, this finding could not be confirmed nor denied by the controlled literature in this study. Students were also asked if hand washing with soap when caring for new born babies in neonatal unit is mandatory, results show that 100% of the students agreed with the statement. Students were also asked if babies under Phototherapy treatment should be fully clothed, results show that over 90% of the 3<sup>rd</sup> year student nurses strongly disagreed. Finally, students were asked if mothers are not allowed to visit their new born babies in neonatal unit to prevent cross infections. Results show that altogether 3<sup>rd</sup> year nursing students disagreed. Generally, these findings indicate that 3<sup>rd</sup> year UNAM nursing students have good knowledge on the prevention of neonatal sepsis. This is opposed to the findings of who found that knowledge of nursing students was low and poor [14].

## 9. Conclusion

The aim of the study was to assess and describe knowledge of 3<sup>rd</sup> year nursing students at UNAM regarding contributing factors of neonatal sepsis. The study had two objectives, which were: to assess knowledge of 3<sup>rd</sup> year nursing students at UNAM regarding contributing factors of neonatal sepsis, and describe knowledge of knowledge of 3<sup>rd</sup> year nursing students at UNAM regarding contributing factors of neonatal sepsis. A self-administered questionnaire was distributed to 73 3<sup>rd</sup> year nursing students from UNAM main campus. The study had a



100% response rate, with most of the 3rd year nursing students being female, and also not being enrolled in practicing nursing before.

The Knowledge of 3rd year degree nursing students regarding the contributing factors of neonatal sepsis was assessed. Findings revealed that most of the 3rd year nursing students had sound knowledge of the factors contributing to neonatal sepsis as the study found that most students were aware that prematurity and low-birth-weight were contributing factors of neonatal sepsis. The 3rd year nursing students were also knowledgeable that pre-mature rupture of the membranes is one of the contributing factors of neonatal sepsis, and that babies with low-birth-weight were at risk of being infected with neonatal sepsis. Findings also show that 3rd year nursing students had sound knowledge of when neonatal sepsis occurs and when to diagnose it.

This study therefore concludes that 3rd year nursing students at UNAM main campus have good knowledge about the contributing factors of neonatal sepsis. However, the 3rd year nursing students still need to improve their knowledge on the management practices of neonatal sepsis as some of the students chose to remain neutral at questions that assessed the management practices of neonatal sepsis.

### Limitations

The study was confined to the 3rd year nursing student of the University of Namibia main campus only on their knowledge regarding contributing factors on neonatal sepsis. However, the study also faced time constraints because it was time consuming to collect data from such a large research population, as it required a lot of time and attention to gather information.

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### Authors Contribution Funding

No funding was done for this study.

### Availability of data and materials

Data will be available on request from the corresponding author.

### Declarations

#### Ethics Approval and Consent to Participate

Written informed consent was obtained from the participants prior to data collection to partake in this study. Ethical clearance was obtained from the School of Nursing and Public Health at the University of Namibia research ethics committee to conduct the study. The following ethical principles, respect for a person, justice, maleficence and beneficence were adhered and respected throughout the study according to guidelines.

### Consent for Publication

None

### Competing Interest

The authors declared no conflict of interest.

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