



KNOWLEDGE, ATTITUDE, AND PRACTICES ON INFECTION PREVENTION AND CONTROL AMONG HEALTH CARE WORKERS IN THE BIRTHING FACILITY AT TAGUM CITY

¹ Lodrita L. Mercado, ² Madeleine S. Tupas, ³ Morsid Kabang Tulao

¹Master of Arts in Nursing Candidate, ²Professor, ³Professor

¹Graduate Program of Davao Doctors College,

¹Davao Doctors Colleges, Inc., Davao City, Philippines

Abstract: The study aims to determine the knowledge, attitude, and practices of infection prevention and control of the healthcare workers in selected birthing facility in Tagum City utilizing a descriptive predictive research design. The study conducted among 69 health workers using a total enumeration method which utilized an adaptive questionnaire from Chitimwango (2017) that were subjected to validity (CVI=1.00) and reliability test with Cronbach alpha result of 1.00. Results revealed that most of the respondents are young female healthcare workers working in the labor room, with the majority of having less than 3 years and over 10 years of service. The healthcare workers demonstrate a high level of knowledge particularly the 5 moments of hand hygiene. It also revealed a high-level of attitude in terms of following the guidelines towards infection prevention and control. Moreover, adherence to their practice was high in PPE use. With the relationship between level of knowledge, attitude and practices on infection prevention and control among healthcare workers, results revealed that there is a significant, positive relationship between the level knowledge, attitude, and practices on infection prevention and control. The result implies that an increase in healthcare workers' knowledge and attitude also enhances their level of practice on IPC. Additionally, the level of knowledge did not significantly predict the level of practices on infection prevention and control. Conversely, the level of attitude showed a significant prediction on the level of practices among healthcare workers. Therefore, the results imply that an increase in the level of attitude would result in higher level of practices among healthcare workers.

Keywords: Infection Prevention and Control, Health, Predictive-Correlational, Tagum City, Philippines.

INTRODUCTION

The World Health Organization stated that the main reasons for health issues are poor environmental hygiene and waste disposal, inadequate infrastructure, lack of equipment and workforce, overcrowding, limited knowledge, poor infection control practices, and absence of national guidelines on health-care-associated infections (Adil Abalkhail et al., 2021). In healthcare delivery, healthcare-associated infections (HAIs) are the most common adverse outcome. In low- and middle-income countries, at least one in 10 patients contracts an infection while receiving care in health facilities (Lowe et al., 2021). This is why infection prevention and control (IPC) practices are paramount in healthcare settings, serving as the first line of defense against the spread of infectious diseases. Internationally, Ethiopia still contributes significantly to global maternal deaths. A study examined by Weldegiorgis and Feyisa (2021) revealed the low quality of intrapartum care in the Jabi Tehinan district of Northwest Ethiopia, highlighting ongoing challenges in addressing maternal mortality, particularly in Sub-Saharan Africa.

In addition, Lowe et al. (2021) carried out semi-structured interviews with healthcare professionals working in hospitals across various countries, such as the Democratic Republic of the Congo, Central African Republic, South Sudan, Mali, Nigeria, Lebanon, Yemen, and Afghanistan. The study identified barriers to infection prevention and control (IPC), such as inadequate hospital infrastructure, resource and workforce shortages, staff education gaps, insufficient in-service IPC training and supervision, and a large influx of visitors. These challenges mirror those observed in other resource-limited settings.

In a national context, a Pangasinan study by Ellasus and Lopez (2021) revealed that infectious disease prevention and control practices among healthcare personnel were only moderately implemented. Institutional protocols showed discrepancies, with a 72.36% orientation rate on infection prevention and control and a 67.48% attendance rate at training and workshops. The identified issues were perceived to have a slightly severe impact.

Maternal mortality in the Philippines remains a global health concern, and its association with infection prevention and control practices leaves a discontinuity of understanding due to a lack of research over some time. Poor settings and associated infection risks contribute to the issue, which the researcher observed in some birthing facilities. This study will investigate the knowledge, attitude, and practices on infection prevention and control among healthcare workers in selected lying-in clinics, aiming to address gaps and improve practices.

THEORETICAL FRAMEWORK

Three different theories anchored this study:

Florence Nightingale, recognized as the founder of modern nursing, introduced the Environment Theory, which profoundly impacted nursing practice. Developed during the Crimean War (1850) and detailed in her book "Notes on Nursing," this theory remains influential. It emphasizes modifying the patient's environment to achieve health objectives, focusing on fresh air, water, food, cleanliness, and light. Nightingale's ten major concepts, called Canons, cover ventilation and cleanliness. She advocated for specific nursing education to set standards for quality patient care. The theory's emphasis on environmental alteration aligns with assessing infection control practices among healthcare facility healthcare workers. Nightingale's advocacy for nursing education and dedication to environmental adaptation significantly shape nursing practices, reflecting the study's aim of evaluating infection control practices in health settings to render optimal care, resulting in fast healing and good recovery.

Nightingale's advocacy for specific nursing education becomes pertinent in examining healthcare workers' compliance. The study seeks to understand whether adherence to infection prevention protocols correlates with the level of education and training, providing insights into effective strategies. Aligned with Nightingale's patient-care theory of adapting to individual needs, the study focuses on healthcare workers. Aimed to explore how tailored infection prevention strategies, considering environmental factors, influence compliance and patient outcomes.

On the other hand, the Germ theory of disease of Hungarian obstetrician Ignaz Semmelweis observed that mothers in hospital wards staffed by physicians and medical students were more likely to suffer and die from puerperal fever after childbirth due to improper hand hygiene. Hand hygiene practices are paramount in reducing the cross-transmission of microorganisms, hospital-acquired infections, and the risk of occupational exposure to infectious diseases. Mortality and morbidity increase in the presence of hospital-acquired infections; thus, diligent hand hygiene is essential to providing safe, cost-efficient, quality care to our patients. Ignaz Semmelweis (1818–1865) was a proponent of the importance of handwashing in preventing disease transfer between patients by physicians. In this study, the germ theory of disease by Hungarian obstetrician Ignaz Semmelweis is relevant. This emphasized how vital hand hygiene procedures are in lowering the risk of occupational exposure to infectious diseases, limiting hospital-acquired infections, and reducing cross-transmission of germs.

The application of Semmelweis's germ theory to the study of knowledge, attitudes, and practices on infection control among healthcare workers in a birthing facility becomes evident. The study recognizes the significance of diligent hand hygiene practices in providing patients with safe, cost-efficient, and high-quality care. It echoes the longstanding emphasis physicians, including Semmelweis, placed on the importance of handwashing in preventing the spread of disease. This underscores the relevance of the study's focus on evaluating healthcare workers' adherence to hand hygiene protocols in the context of infection control and patient safety.

Lastly, the Health Beliefs Model (HBM) posits that individuals who believe in the effectiveness of recommended health activities and perceive a personal threat from an illness are likelier to adopt disease detection practices. The HBM encompasses six

concepts, with the first four being its fundamental principles, while the last two were added as the study of HBM evolved (LaMorte, 2022). The application and relationship of the HBM in this study involved understanding how healthcare workers respond to symptoms and their commitment to medical treatments related to infection prevention and control. Examining their beliefs in the effectiveness of recommended practices and their perception of personal threats from infectious diseases can offer insights into compliance with preventive measures. Moreover, the decision-making process of health care workers, influenced by weighing the benefits and drawbacks of specific health activities, aligns with the HBM's principles. As the study evolves, including all six concepts of the HBM, with the initial four as fundamental principles and the latter two integrated during its development, it contributes to a comprehensive understanding of factors influencing infection prevention and control practices among healthcare workers.

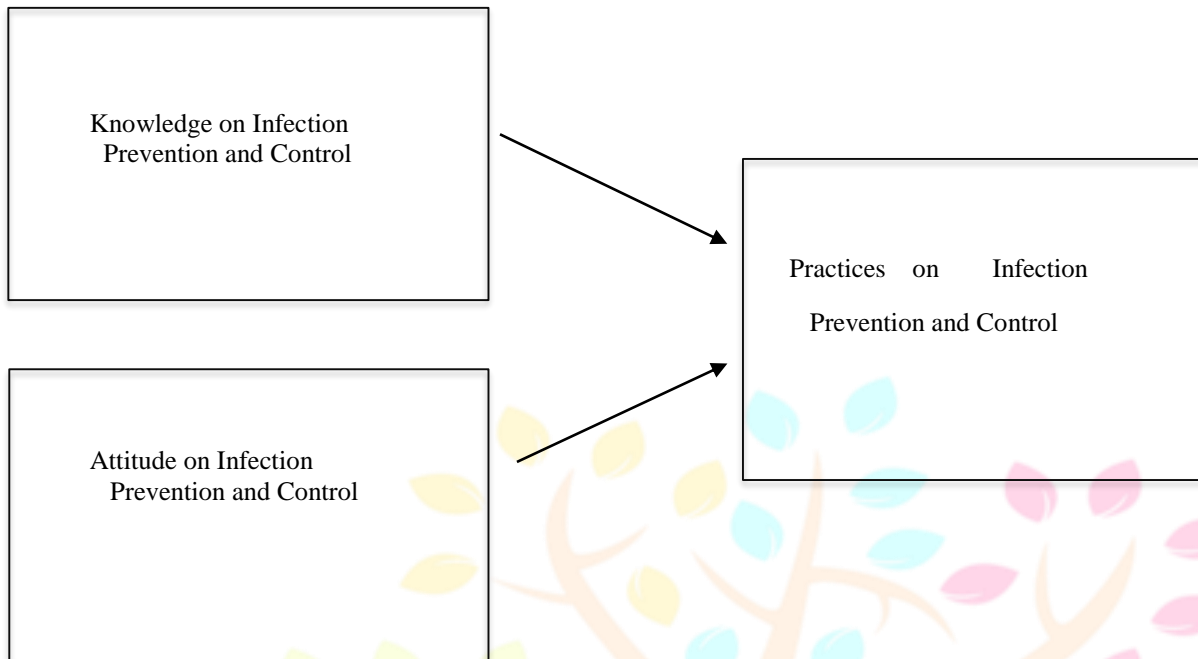
CONCEPTUAL FRAMEWORK**INDEPENDENT VARIABLES****DEPENDENT VARIABLES**

Figure 1. The Conceptual Framework of the Study

In the conceptual framework, the researcher identified two independent variables: knowledge of infection prevention and control and attitudes toward these practices. These factors are believed to affect the dependent variables, which is the implementation of infection prevention and control measures among healthcare workers in birthing facilities. The framework suggests that healthcare workers' knowledge and attitudes, such as hand hygiene and personal protective equipment usage, influence their behaviors. Therefore, understanding these relationships is crucial for effective infection control in healthcare.

Moreover, these data will be processed by profiling their age, sex, years of work experience, area of assignment, and training attended. Then, a survey questionnaire on infection control and practices and the compliance rate of the infection control unit among its workers will be used.

Statement of the Problem

The study aimed to determine infection prevention and control practices among healthcare workers in birthing facilities. Specifically, the study will answer the following questions:

1. What is the demographic profile of the respondents in terms of:

- 1.1 Age;
- 1.2 Sex;
- 1.3 Years of work experience;
- 1.4 Number of trainings attended; and
- 1.5 Area of assignment?
 - 1.5.1 Labor Room
 - 1.5.2 Delivery Room

2. What is the level of Knowledge on Infection Prevention and Control among Health Care Workers in Birthing Facility?

3. What is the level of Attitude on Infection Prevention and Control among Health Care workers in Birthing Facility?

4. What is the level of Practices on Infection Prevention and Control among Health Care Workers in Birthing Facility?

5. Is there a significant relationship between:

- 5.1 knowledge and practices; and
- 5.2 attitude and Practices?

6. Do the level of knowledge and attitude significantly predict the practices on infection prevention and control among health care workers?

Hypotheses

H₀₁: There is no significant relationship between the level of knowledge and practices.

H₀₂: There is no significant relationship between the level of attitude and practices.

H₀₃: There is no significant influence between knowledge and practices.

H₀₄: There is no significant influence between attitude and practices.

RESEARCH METHODOLOGY

This section outlines the study's research framework, setting, participants, metrics, ethical considerations, methodologies, and the approach to data analysis aimed at addressing the research question.

Research Design

This study employed a predictive-correlational design. The approach that has been chosen is considered to be the most appropriate for assessing the implementation of infection prevention and control measures among healthcare workers in the birthing facility located in Tagum City. This evaluation aims to thoroughly examine the effectiveness of the measures in place and identify any areas that may require improvement to ensure the safety of both healthcare workers and patients. The predictive-quantitative method is a research approach that combines elements of descriptive research within a cross-sectional design, utilizing quantitative data collection and analysis techniques. This method involved collecting numerical data at a specific point in time to provide a detailed depiction of the characteristics or behaviors of a population. The correlational research design was appropriate for this study because it used two quantitative variables to predict a relationship (Creswell, 2021).

The descriptive component focused on summarizing and presenting the main features of the collected data, such as means and standard deviations. Simultaneously, the analytical aspect involved applying statistical techniques to identify patterns, associations, or causal relationships among variables. Predictive correlational analysis is used to understand the relationship between hand hygiene and attitude toward guidelines. It involves gathering information from healthcare workers about their knowledge, feelings, and behavior, particularly after using gloves. This data can be analyzed using statistics to predict hand hygiene behavior, guiding efforts to improve infection prevention and control practices in the birthing facility. The main focus of predictive design was forecasting or predicting results, repercussions, expenses, or effects. It frequently poses questions about what might happen, how something might work, and its possible effects (Wollman, 2023). Lastly, a questionnaire was instrumental in comprehending and elucidating the factors influencing the perceptions of healthcare personnel, thereby enhancing the overall outcomes of the study.

Setting

The study was conducted in 11 Tagum City Davao del Norte birthing facilities. A birthing facility consists of a primary maternal healthcare provider and a Philhealth Accredited clinic, also known as a "lying-in" clinic, accommodating childbearing mothers. Midwifery Primary Care plays a crucial role in the birthing facilities of Tagum City, serving as the frontline service provider for expectant mothers. These facilities are the initial contact point for maternal healthcare, providing essential services from prenatal care to postnatal support. Family-centered care encourages involvement and provides facilities for partners and family members. Care continuity provides integrated services and continuous assistance, such as lactation consultants and postpartum support groups. These services create a supportive and empowering environment for a positive childbirth experience and promote the health of both mothers and babies. It is in different parts of Tagum City. Davao del Norte, a first-class city and capital of Davao del Norte, Philippines, is 55 km north of Davao City. Positioned at 7°26' N latitude and 125°48' E longitude, it is bordered by Asuncion, New Corella, Mawab, Maco, B.E. Dujali to the north, and Carmen to the southwest, facing Davao Gulf to the south,

Participants

The respondents of this study consisted of 69 health workers from 11 birthing facilities in Tagum City, Davao del Norte. This study employed a total enumeration technique. Total population sampling looks at all members of the population that share a specific set of criteria. The complete enumeration sampling method, a form of purposive sampling, involves examining every member of a population possessing specific traits. It is preferred when the population is small and well-defined, and some members may need to meet the criteria. Researchers opt for this strategy to eliminate bias from sampling techniques. However, beyond bias reduction, further investment in time and resources may be optional (Canonizado, 2021).

Extracting data from the entire population offers advantages such as a deeper understanding and reduced guesswork. However, sampling the entire population can be challenging due to the need for a comprehensive member list, which may be difficult to create. Errors in this process can compromise the study's validity. Verifying data accuracy remains a challenge even after compiling the list. Non-response in surveys can distort findings if non-respondents differ significantly from the population or have distinct traits (Haslam et al., 2024).

For participant selection, this study adhered to specific inclusion criteria: individuals aged between 21 and 60, working as midwives and nursing aides in a birthing facility, and expressing willingness to participate in the research. Exclusion criteria were based on the number of respondents from the pilot test. By encompassing a broad population of interest, the study aimed to minimize the risk of overlooking valuable insights from excluded individuals (Australian Bureau of Statistics, 2023). Additionally, participants who opted not to participate in the survey were free to decline without facing any consequences, penalties, or loss of benefits by the withdrawal criteria.

Measures

In this study, the researcher utilized four (4) parts of questionnaires given to the respondents. The initial section concentrated on the demographic profile of the survey participants, which includes the following: age, sex, years or length of service, number of training attended, and area of assignment.

The second, third, and fourth parts of the questionnaire consisted of 12 items about the knowledge, attitude, and practices of infection prevention and control, adapted from the study of Chitimwango (2017), utilizing a three-point Likert scale. The questionnaire's development involved a review of the literature and discussions with infection control specialists. The CDC and WHO guidelines on infection prevention and control were among the essential components of the survey's content.

Table 1. *Measures for Knowledge of Infection Control and Prevention Practices*

RATING	DESCRIPTION	INTERPRETATION
3	High	The respondent displayed competent knowledge on infection prevention and control practices.
2	Moderate	The respondent displayed fair knowledge on infection prevention and control practices.
1	Low	The respondent displayed poor knowledge on infection prevention and control practices.

Table 2. *Measures for Attitude of Infection Control and Prevention Practice*

RATING	DESCRIPTION	INTERPRETATION
3	High	The respondent displayed a positive attitude of infection prevention and control practices.
2	Moderate	The respondent displayed an average attitude of infection prevention and control practices.
1	Low	The respondent displayed a negative attitude of infection prevention and control practices.

Furthermore, the three (3) sets of questionnaires underwent content validation by the three experts in the field of interest, indicating that they are highly valid.

Ethical Consideration

The researcher ensured ethical compliance by securing approval from the Chair of the Master of Arts in Nursing Program at Davao Doctors College and obtaining a letter of permission from the ethics committee. The willingness of respondents to provide informed consent determined their voluntary participation in the study.

Social Value. The findings of this study will contribute to the current structures of knowledge and attitude regarding infection control and prevention practices, which aims for an extensive evaluation for the benefit of society. The result of the study will be disseminated to the medical community, with particular attention placed on the people involved who would benefit from the most significant advantages.

Risks and Benefits. Participants were fully briefed on the research details, their right to refuse participation, the researcher's obligations, and potential advantages and risks. Data collection activities involving examining feelings and experiences were acknowledged as delicate and personal, respecting participants' rights to be free from injury and distress. Rest assured that the study will only be used for the study's purposes. Researchers can increase comprehensive infection control and prevention methods by using the study's findings to assist in implementing intervention measures.

Privacy and Confidentiality. Participants' rights to privacy were protected in line with the Data Privacy Act of 2012. The researcher and participants maintained professional engagement, refraining from interactions that could compromise privacy. Only the author and statistician had exclusive access to data collection forms in physical and digital formats. Records were securely stored for three years and then appropriately disposed of. Findings and results presentations excluded personal information; participants were anonymized with unique codes (001 to 069).

Voluntary Participation. Prospective participants were informed of their right to self-determination, allowing them to decide freely whether to participate without pressure or unfair treatment. This encompassed the freedom to ask questions, withhold information, and opt out. Participants could withdraw from the study, and any supplied information would be erased or excluded from the final paper.

Procedures

The gathering of the data was done in the following steps:

1. The researcher submitted a letter requesting permission to conduct the study, which was addressed to the Program Chair of the Master of Arts in Nursing at Davao Doctors College, Inc.
2. Once permission to conduct the study was granted, the survey questionnaires, which measure the level of knowledge, attitude, and practices on infection prevention among midwives, were sent to the three research experts for content validation.
3. As soon as the survey questionnaires were validated, a pilot study was conducted to test their reliability. The results from this pilot study underwent Cronbach's alpha reliability testing for the analysis.
4. After determining the legitimacy and dependability of the research questionnaires, the researcher secured permission to conduct the study from the participating institution and the selected respondents.
5. The researcher then distributed the questionnaires to the participating staff midwives. As initiated, staff midwives were requested to fill out the test questionnaires in the birthing facility's conference room.
6. The data provided was collated, analyzed, and interpreted; consequently, an intervention program was formulated based on the generated findings.

7. The frequency and percentage were used to calculate the demographic profile. The mean and standard deviation, on the other hand, were calculated to determine the level of knowledge, attitude, and practices on infection prevention and control among staff midwives.
8. Spearman-rho. A nonparametric test was used to gauge the strength of the relationship between variables, assessing the significant correlation between the IV and DV.
9. In addition, with the assistance of an expert statistician, all completed survey questions were retrieved, tabulated, and evaluated.
10. The data were encoded, then statistically treated, analyzed, and interpreted by the statisticians.
11. Record Keeping: Documentation is crucial in recording all record-keeping activities, including any questionnaire changes or choices, ensuring transparency and reproducibility. Retention involves following institutional or ethical guidelines to store questionnaires and records securely, either physically or electronically. When questionnaires and associated records are no longer necessary, disposal should be done securely and in compliance with data protection regulations and ethical standards.

Data Analysis

From the data gathered, the researcher tabulated, analyzed, and interpreted the results by utilizing the following:

Frequency and Percentage. This tool was employed to describe the demographic profile of healthcare workers, encompassing age, sex, years of work experience, area of assignment, and attended training.

Mean. These tools were utilized to characterize the level of infection control and prevention practices and compliance, distinguishing between high and low compliance. The arithmetic average was computed, starting with the mean of the distribution.

Standard Deviation. To calculate the data collection's average level of variability. It indicates the average deviation of each result from the mean. Values are often distant from the mean when the standard deviation is high, while they are grouped near the mean when the standard deviation is low.

Spearman-rho. This nonparametric test was applied to gauge the strength of the relationship between variables, assessing the significant correlation between the level of knowledge, attitude, and practices in infection prevention and control.

Nonparametric Regression Analysis (Kernel) When certain presumptions necessary for parametric regression techniques are not given, these techniques are employed. These are valuable techniques for data with contradicting or small sample sizes.

Scope and Limitations of the Study

This study examined healthcare workers' adherence to infection prevention and control protocols in birthing facilities in Tagum City, primarily through survey questionnaires. However, it faces several limitations. Firstly, the findings may only be relevant to Tagum City's birthing facilities, limiting their applicability elsewhere. Secondly, relying on self-reported data could introduce response bias. Additionally, the study may not capture real-time fluctuations in compliance due to its static data collection approach. Time constraints also impact the depth of data collection, analysis, and assessment, compromising the study's thoroughness and robustness of the findings.

RESULTS AND DISCUSSION

This chapter delves into the heart of the study, meticulously examining the research findings and their significance. The results are presented in clear and concise tables.

1. What is the demographic distribution of respondents in terms of age, sex, number of trainings, length of service, and area of assignment?

Table 1. The Demographic Profile of the Respondents

Demographic Profile	Frequency (n=69)	Percentage
Age:		
25-30 y.o	28	40.6%
31-35 y.o	11	15.9%
36-40 y.o	5	7.2%
41-45 y.o	25	36.2%
Total	69	100%
Sex:		
Male	8	11.6%
Female	61	88.4%
Total	69	100%
No. of training:		
0-2 times	19	27.5%
3-4 times	13	18.8%

5-6 times	13	18.8%
7-8 times	1	1.4%
9-10 times	2	2.9%
>10 times	21	30.4%
Total	69	100%
Length of service:		
1-3 yrs	25	36.2%
4-6 yrs	19	27.5%
10 yrs & above	25	36.2%
Total	69	100%
Area of assignment:		
Delivery Room	15	21.7%
Labor Room	54	78.3%
Total	69	100%

Table 1 summarizes the demographics of the 69 respondents. The majority are aged 25-30 (40.6%), while the smallest group is 36-40 (7.2%), suggesting a young workforce. Females dominate (88.4% - 61 respondents), with males at (11.6% - 8 respondents), likely due to the field's appeal to women in maternal health roles.

Also, most respondents attended more than ten training courses (30.4% - 21 respondents), indicating a solid commitment to professional development. The least frequent training attendance was 7-8 courses (1.4% - 1 respondent).

Furthermore, regarding service length, respondents are split between 1-3 years (36.2% - 25 respondents) and ten or more years (36.2%—15 respondents), showing a mix of newcomers and veterans.

Finally, the Labor Room has the highest frequency and percentage (78.3%—54 respondents), while the Delivery Room has the lowest frequency and percentage (21.7% —15 respondents), reflecting specialized training in labor and postpartum care within the birthing facility.

2. What is the level of knowledge on infection prevention and control among healthcare workers in birthing facilities?

Table 2. Level of Knowledge on Infection Prevention and Control.

Items	M	SD	Interpretation
1. Infection can be transmitted by medical equipment such as syringes, needles, catheters, stethoscopes, thermometers, etc.	2.75	0.43	High
2. Infection is an infection that the patient comes with from home.	2.54	0.61	High
3. know the World Health Organization's '5 moments of hand hygiene	2.80	0.41	High
4. Some instruments can be stored in an antiseptic solution for up to 36 hours	2.59	0.52	High
5. If there are limited beds available, patients with communicable diseases may be admitted in the same room as other patients	2.19	0.77	Moderate
6. Microorganisms are destroyed by sterilization	2.72	0.45	High
7. Bathing every day is a universal precaution.	2.59	0.60	High
8. Standard precautions apply to all patients regardless of their diagnosis.	2.71	0.46	High
9. I am familiar with infection guidelines.	2.74	0.44	High

10. All staff and patients should be considered potentially infectious.	2.72	0.45	High
11. You can handle body fluids with bare hands if gloves are not available.	2.25	0.72	High
12. I know how to prevent and control infections.	2.70	0.46	High
Overall	2.61	0.53	High

Note: 2.35-3.00---High; 1.68-2.34---Moderate;1.00-1.67---Low; M- Mean; SD- Standard Deviation.

Table 2 highlights the knowledge level of infection prevention and control (IPC) among healthcare workers in Tagum City's birthing facilities. The overall mean score of 2.61 (SD = 0.53) indicates a high level of IPC knowledge, with consistent responses reflected in the low standard deviation for the "5 Moments of Hand Hygiene." However, there was significant variation in responses regarding patient room-sharing, indicating room for improvement.

Key knowledge areas scored highly, such as the "5 Moments of Hand Hygiene" (mean 2.80, SD 0.41), transmission by medical equipment (mean 2.75, SD 0.43), and familiarity with infection guidelines (mean 2.74, SD 0.43). These results reflect a solid understanding of IPC among staff nurses, in line with Thazha et al. (2022), who emphasize the importance of IPC knowledge for effective practices.

Hand hygiene is crucial in preventing cross-contamination, hospital-acquired infections, and occupational exposure to infectious diseases (Mitchell, 2020). Abalkhail et al. (2021) support the importance of standard precautions.

Conversely, the item on admitting patients with communicable diseases in shared rooms received the lowest score (mean 2.19, SD 0.77), indicating moderate knowledge. This means a positive finding that the Health Workers have a solid foundation in core IPC principles. This suggests that birthing facilities may not always follow guidelines recommending private rooms for such patients to minimize transmission risks, as highlighted by the CDC (2020).

The findings suggest that healthcare workers understand IPC principles well, especially in critical areas like transmission routes and standard precautions. However, improving knowledge in lower-score areas, such as co-rooming protocols, can enhance infection prevention and patient safety.

3. What is the level of attitude on infection prevention and control among healthcare workers in birthing facilities?

Table 3. Level of Attitude on Infection Prevention and Control.

Items	M	SD	Interpretation
1. I do not have to wash my hands if I use gloves.	2.17	0.71	Moderate
2. Policies and procedures on infection control should be adhered to at all times.	2.68	0.47	High
3. I should attend in-service training/workshops related to infection prevention and control regularly	2.74	0.44	High
4. I am aware that patients expect me to wash my hands before touching them, and after touching them.	2.64	0.51	High
5. I feel that infection control policies and guidelines are enough in the birthing facility.	2.71	0.46	High
6. It is not my responsibility to comply with infection guidelines.	2.48	0.53	High
7. The workload affects my ability to apply infection prevention guidelines.	2.59	0.55	High
8. Infection prevention guidelines are essential to this birthing facility.	2.74	0.44	High
9. I have enough time to comply with infection prevention guidelines.	2.72	0.45	

			High
10. Following the prevention guidelines will reduce infection rates in birthing facilities.	2.77	0.43	High
11. I should follow the procedure guidelines of the birthing facility.	2.71	0.46	High
12. I feel that needles should be recapped after use and before disposal.	2.51	0.61	High
Overall	2.62	0.50	High

Note: 2.35-3.00---High; 1.68-2.34---Moderate;1.00-1.67---Low; M- Mean; SD- Standard Deviation.

Table 3 delves into the level of attitude toward infection prevention and control within a birthing facility. The mean score is 2.62, with a standard deviation of .50, indicating a highly positive attitude. This implies a generally positive attitude towards IPC practices and a good understanding of core principles. However, while there is firm adherence to protocols, there is a notable deviation in using gloves without handwashing. Also, the highest mean score of 2.77 (SD = 0.43) indicates that following infection prevention guidelines can reduce infection rates in a birthing facility. With the same mean of 2.74 (SD = 0.43), regularly attending in-service training and workshops is essential for maintaining this attitude. This aligns with the World Health Organization's (2021) statement that infection control prevents or stops infection spread in healthcare settings. The following guidelines: The significance of training is also mentioned (Item 3; M = 2.74, SD = 0.44). Regular IPC training attendance is positively viewed, as seen by the high mean score with a low SD. As Hotake et al. (2020) noted in their study on hand hygiene compliance, this is essential for maintaining current knowledge and abilities.

However, the study reveals a moderate knowledge gap among healthcare workers regarding hand hygiene protocols, with the lowest mean score of 2.17 and a standard deviation (SD) of 0.71. This highlights the importance of handwashing even when donning and doffing gloves, indicating a need for educational interventions. Gould et al. (2020) emphasize the limitations of gloves in preventing HAIs and the necessity of educational interventions to address these knowledge gaps.

4. What is the level of practices on infection prevention and control among healthcare workers in birthing facilities?

Table 4. Level of Practices on Infection Prevention and Control.

Items	M	SD	Interpretation
1. I always wash my hands before and after direct contact with the patients.	2.42	0.67	Moderate
2. I always put on a mask and glasses when performing invasive and body-fluid procedures.	2.70	0.46	High
3. I feel that infection control policies and guidelines are enough in the birthing facility.	2.75	0.43	High
4. I attend in-service training/workshops on infection prevention and control yearly as required.	2.62	0.52	High
5. Perineal preparation is aseptically done before and after the procedure.	2.49	0.68	High
6. Screening of patient's protocol to detect high-risk patients and referral to the next level of care.	2.57	0.53	High
7. Vaccination is always provided to staff.	2.54	0.61	High
8. Donning and doffing of Personal Protective Equipment is always properly observed.	2.74	0.44	High

9. Infection prevention does not improve patient outcomes.	2.71	0.46	High
10. I wear personal protective equipment when handling linen.	2.72	0.45	High
11. I shake the linen out to release dust from the linen.	2.57	0.61	High
12. The latest infection and prevention guidelines are always observed.	2.57	0.56	High
Overall	2.62	0.53	High

Note: 2.35-3.00---High; 1.68-2.34---Moderate;1.00-1.67---Low; M- Mean; SD- Standard Deviation.

Table 4 explores the level of practices in infection prevention and control. The overall mean score (2.62) and SD of 0.53 describe highly practiced IPC protocols. This suggests satisfactory performance in IPC practices among nurses in the birthing facility. The 0.53 standard deviation reveals exemplary implementation in practices with a homogenous stance on the adequacy of infection protocols and guidelines. However, the study showed a moderate practice gap among healthcare workers regarding washing hands before and after direct patient contact.

Among the statements in infection prevention and control practices, the highest mean score (2.75) with (SD = 0.43) found that healthcare workers in a birthing facility feel that infection control policies and guidelines are sufficient. A mean score (2.74) with (SD = 0.44) found that donning and doffing of personal protective equipment is observed correctly. This study aligns (Shafiq et al., 2021) with research highlighting the importance of clear and accessible policies for effective infection prevention and control (IPC) implementation, as consistent adherence to these guidelines is crucial.

Moreover, tailoring IPC protocols to suit the specific needs of a healthcare facility, such as a birthing unit, can boost adherence (Alhumaid et al., 2020). Confidence in protocols and ongoing leadership support are vital to improving adherence, as mentioned by Fisher et al. (2021). Regularly using PPE shields healthcare workers from virulent pathogens by preventing exposure to bodily fluids and respiratory droplets (Weber et al., 2020; Kalantary et al., 2020).

The study found the lowest mean score (2.42) with a higher standard deviation (SD = 0.67), indicating a moderate level of compliance among nurses in birthing facilities with handwashing procedures. This suggests a need for varied and improved staff practices. The World Health Organization (2020) emphasizes that frequent hand washing is the best defense against healthcare-associated infections, even after using gloves. Studies conducted in 2020 by Kampf et al. and Gould et al. further highlight the importance of washing hands after glove use. Although gloves provide a barrier, hand washing is essential to eliminate any remaining bacteria and prevent the spread of infection.

5: Is there a significant relationship between Knowledge and Practices and Attitudes and Practices?

Table 5: Test of Relationship between Health Care Worker's Level of Knowledge, Attitude and Practices on Infection Prevention and Control.

Independent Variables	Practices			
	r_s	p-value	Decision on Ho	Remarks
Knowledge	.799	<.000	Reject H ₀₁	significant
Attitude	.854	<.000	Reject H ₀₂	significant

Note: p<0.05 (Significant); S-Significant; r_s = rho; DV-Practices.

Table 5 illustrates the relationship between healthcare workers' knowledge, attitudes, and practices concerning infection prevention and control (IPC). The results indicate a significant, positive correlation between knowledge ($r_s = .799$, $p < .001$), attitudes ($r_s = .854$, $p < .001$), and IPC practices. These findings lead to rejecting the null hypothesis (H₀₁) since the p-values are below the 0.05 alpha significance level. This suggests that as healthcare workers' knowledge and attitudes improve, their adherence to IPC practices also increases.

Furthermore, the high correlation ($r_s = .799$) between knowledge and practices signifies that healthcare workers with a deeper understanding of IPC principles are more likely to implement them effectively. Asemahagn et al. (2020) also found that knowledge about infection prevention and control is associated with better compliance in healthcare settings. Similarly, Alene et al. (2022) observed a positive link between IPC knowledge and adherence to practices such as handwashing protocols. As Luo et al. (2021) highlighted, continuous education is crucial for maintaining and updating knowledge, ultimately improving adherence to IPC practices among healthcare workers in birthing facilities.

The even stronger correlation ($r_s = .854$) between attitude and practices suggests that healthcare workers with positive attitudes towards IPC are more likely to translate those beliefs into action or practice. This aligns with the Health Belief Model, which posits that positive attitudes toward a health behavior increase the likelihood of performing that behavior (Rosenstock et al., 2020). Moreover, the study by Wang et al. (2023) found that IPC practice was indirectly affected by knowledge through the mediation of attitudes. By

Healthcare facilities can further encourage consistent practice by fostering positive attitudes that emphasize the personal and professional benefits of infection prevention and control practices.

The findings stress the need for holistic IPC training. Beyond knowledge transfer, fostering positive attitudes toward IPC is crucial. Training programs should emphasize IPC's value in safeguarding patients and healthcare workers, integrating interactive elements and peer learning. As Lee et al. (2024) proposed, continuous monitoring and competency assessments are vital for maintaining proficiency in IPC practices.

6. Do the level of knowledge and attitude significantly predict the practices on infection prevention and control among healthcare workers?

Table 6. The Influence of the Level of Knowledge and Attitude on the Practices on Infection Prevention and Control.

PRACTICES	Observed Estimate	Bootstrap SE	Z	P-value	Decision on Ho	Remarks
Mean						
PRACTICES	2.612	0.048	54.50	0.000		
Effect						
KNOWLEDGE	0.230	0.236	0.97	0.331	Accept H ₀₃	Not Significant
ATTITUDE	0.813	0.189	4.30	0.000	Reject H ₀₄	Significant

Note: Significant if p-value <.05; R²= 0.8472; IV-Knowledge, Attitude; DV- Practices.

The study found that knowledge results (OE=0.230, p=.331) did not significantly predict infection prevention and control practices. However, attitude level is strongly influenced by practices among healthcare staff. A higher altitude level (OE=0.813, p=.000) led to higher practices. Nonparametric regression analysis confirmed these findings, with attitude accounting for 84.72% of practice variance, which can be explained by the level of attitude as indicated by an r-square of 0.8472. This indicates that 15.28% of the variation can be ascribed to factors other than the independent variable.

The study's results had an intriguing finding on the influence of healthcare workers' knowledge and attitude on their infection prevention and control (IPC) practices. While a robust positive association between attitude and practices is evident, the lack of a statistically significant link with knowledge warrants further exploration.

The significant positive effect of attitude ($\beta = 0.813$, $p = 0.000$) aligns with the Health Belief Model (Rosenstock et al., 2020). This model proposes that having a favorable outlook toward a healthy behavior, such as following IPC practices, raises the probability of engaging in that behavior. Research by (Ghaffari et al., 2020) supports this notion. They found that nurses with a more substantial perceived susceptibility to infections and greater perceived severity of complications were more likely to follow hand hygiene protocols.

However, the non-significant association with knowledge ($\beta = 0.230$, $p = 0.331$) requires further investigation. Several factors could contribute to this result. How knowledge was measured in the study might not have captured its practical application. Research by Houben et al. (2020) and Cohen et al. (2021) underscores the significance of grasping the rationale behind IPC practices for better adherence. Merely assessing factual recall, rather than practical application, may explain this discrepancy.

Additionally, there may be a limit to the effectiveness of knowledge alone; beyond a certain point, further increases in knowledge may only improve practices if accompanied by a positive change in attitudes.

The study highlights the necessity for comprehensive IPC training that goes beyond theoretical lessons. Interactive programs that include case studies and role-playing are essential for practical application. Addressing attitudinal barriers by emphasizing the benefits of IPC and providing continuous education is essential. Neuwirth et al. (2021) stress the importance of these strategies to address evolving IPC challenges. By recognizing the impact of knowledge and attitude and adopting a comprehensive training approach, healthcare facilities can foster a safety culture and reduce the risk of healthcare-associated infections (HAIs).

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter summarizes the research investigation, providing a description of its results as well as the researcher's conclusions and suggestions based on these discovered findings.

Summary

This study aimed to investigate the knowledge, attitudes, and practices related to infection prevention and control (IPC) among healthcare workers in a birthing facility in Tagum City, Philippines. The research utilized a predictive correlational design

to forecast the relationship between variables. The respondents comprised 69 healthcare workers, and the sampling technique employed was complete enumeration, meaning all individuals within the population were included in the study without sampling.

To gather data, the researcher utilized a modified survey questionnaire adapted from Chitimwango (2017) that was validated and reliability tested with Cronbach's alpha results of (0.952) knowledge, (0.997) attitude, and (0.982) practice indicators, all of which exceeded 0.90. According to George and Mallery (2003), this indicates the questionnaire's excellent internal consistency and reliability. Data collection took place between February and March 2024.

This study employed a well-designed and validated tool to survey all healthcare workers in the birthing facility. It sought to understand their current knowledge, attitudes, and practices regarding Infection Prevention and Control. These findings can be used to identify areas for improvement and ultimately enhance infection prevention efforts within the facility.

Summary of Findings

1. Most of the respondents were primarily female (88.4%), with the majority falling between the ages of 25-30 (40.6%) and 41-45 (36.2%). Over half (51.2%) had attended at least five training sessions, with a significant portion attending ten or more. In terms of experience, the participants were evenly divided between those with 1-3 years (36.2%), 4-6 years (27.5%), and ten or more years (36.2%) of service. The study focused heavily on labor and delivery areas, with 78.3% of participants working in Labor Rooms and 21.7% working in Delivery Rooms.
2. The study reveals an overall mean score of 2.61 and a standard deviation 0.53. healthcare professionals in Tagum City's birthing facilities are highly knowledgeable regarding infection prevention and control (IPC). Specifically, critical aspects such as the "World Health Organization's five moments of hand hygiene" (mean score of 2.80, SD of 0.41) garnered high mean scores, and the transmission by medical equipment, a (mean score of 2.75, SD of 0.43)", also the familiarity with infection guidelines, (mean score of 2.74, SD. of 0.41). This aligns with findings from Thazha et al. (2022), highlighting the critical importance of healthcare workers' knowledge in ensuring effective IPC procedures in healthcare settings. Thus, hand hygiene practices are paramount in reducing cross-contamination of microorganisms and health institutions' acquired infections (Mitchell, 2020). Moreover, it is supported by the study of Abalkhail et al. (2021) that a cornerstone of IPC is to know standard

precautions that are set for universal guidelines that healthcare workers must adhere to when caring for all patients, regardless of a patient's suspected or confirmed diagnosis. Conversely, item 5, regarding "When there are limited beds available, patients with communicable diseases may be placed in the same room as other patients." received the lowest mean score (2.19, SD = 0.77), with a description of "moderate" level of knowledge. This suggests that the birthing facilities place patients with communicable diseases in different rooms than they could. The guidelines provided by the Centers for Disease Control and Prevention (CDC) (2020) stressed the importance of isolating patients with infectious diseases in private rooms. In such cases, strict adherence to suitable protocols becomes even more crucial to curtail the transmission of infections (Islam et al., 2020). Overall, the findings suggest that a good understanding of IPC principles among healthcare workers needs further education, particularly for core concepts like transmission routes and standard precautions. However, focusing on areas with lower scores and higher standard deviations, like co-rooming protocols, can strengthen their preparedness to prevent infections and ensure patient safety.

3. Overall, the findings revealed highly positive attitudes toward IPC practices (mean score = 2.62, SD = 0.50), which was described as high. This indicates strong adherence and commitment, particularly to policies and procedures (statement 2), attending IPC training (statement 3), and following guidelines to reduce infection rates (statement 10). However, a slightly lower score for statement 1 (washing hands after using gloves) suggests some potential uncertainty, which could be addressed through health education.
4. Overall, the findings indicated a high level of practice (mean score = 2.62, SD = 0.53). Healthcare workers in birthing facilities consistently used personal protective equipment (PPE) when necessary and believed strongly in the importance of infection prevention and control (IPC) for patient outcomes. They also kept up to date with IPC guidelines. However, nurses showed only moderate compliance with handwashing procedures, indicating a need for improvement in hand hygiene practices.
5. Overall, Knowledge and Practice had a strong positive correlation ($r_s = .799, p < .000$) between knowledge of IPC principles and the actual practices used by healthcare workers. This suggests that healthcare workers with a better understanding of IPC are more likely to implement these practices effectively.
6. **Attitude and Practices:** A stronger positive correlation ($r_s = .854, p < .000$) was identified between positive attitudes towards IPC and adherence to IPC practices. This indicates that healthcare workers who value IPC are more likely to follow recommended protocols consistently.
7. **Knowledge and Practices:** The findings surprisingly revealed that the level of knowledge ($OE=0.230, p=0.331$) did not exhibit a statistically significant direct influence on practices. This led to accepting the null hypothesis ($H_{02.1}$), suggesting that simply knowing may not directly translate into consistent practice. Other factors besides knowledge influence how healthcare workers implement IPC protocols.
8. **Attitude and Practices:** In contrast, the level of attitude ($OE=0.813, p=0.000$) demonstrated a significant favorable influence on practices. This led to rejecting the null hypothesis ($H_{02.2}$). The strong positive correlation ($p\text{-value} < 0.05$) suggests that healthcare workers with more positive attitudes towards IPC are more likely to translate that attitude into action by following recommended practices.

Conclusions

Based on the summary of the findings above, the following conclusions have been made:

1. The study participants were primarily female (88.4%), with a concentration in the age groups of 25-30 (40.6%) and 41-45 (36.2%). This suggests focusing on nurses or midwives in a relatively young to middle-aged range. The majority had attended at least five IPC training sessions, indicating a commitment to ongoing education. Experience levels were well-distributed across 1-3 years, 4-6 years, and 10 or more years, reflecting a blend of new and seasoned healthcare workers. The study primarily focused on

labor and delivery areas, with a higher representation working in labor rooms (78.3%) than in delivery rooms (21.7%). This suggests a specific interest in understanding IPC practices in the context of childbirth.

2. Knowledge of the Infection Prevention and Control (IPC) Principle. The overall mean score (mean = 2.61) on IPC knowledge indicates a good understanding of core principles. Strengths were evident in areas like hand hygiene, transmission through medical equipment, and the universality of standard precautions. However, a lower score for co-rooming practices suggests some uncertainty in this area. This highlights a potential need for targeted educational interventions to address this knowledge gap.

3. Attitudes Towards IPC Practices. The results indicated a generally positive attitude towards IPC practices (mean score = 2.62) with a description of high. This was reflected in a solid commitment to policies and procedures, attendance at IPC training sessions, and following guidelines to reduce infection rates. A slightly lower score for handwashing after using gloves suggests a potential area for improving clarity or reinforcing the importance of this specific practice.

4. Adherence to IPC Practices. Overall, adherence to IPC practices was high (mean score = 2.62). Participants reported consistent use of personal protective equipment (PPE), a strong belief in the importance of IPC for patient outcomes, and staying current with infection prevention guidelines. However, handwashing practices scored moderately, suggesting that this is an area where improvement is needed. This finding aligns with the observation in the attitudes section regarding handwashing after gloves.

5. Relationship Between Knowledge, Attitude, and Practices. The study identified positive correlations between knowledge, attitude, and adherence to IPC practices. This means that healthcare workers with a more substantial knowledge base and positive attitudes were likelier to follow recommended IPC protocols.

6. Influence of Knowledge and Attitude on Practices. Interestingly, the study found that attitude more substantially influenced practices than knowledge. This suggests that more than simply knowing may be needed to ensure consistent implementation. Encouraging positive attitudes towards IPC is more likely to translate into action.

Recommendations

Based on the findings and conclusions gathered and reached, the following recommendations are suggested:

1. Healthcare Workers. The findings revealed some issues with handwashing practices; thus, it is recommended to maintain and strengthen positive attitudes towards IPC practices by recognizing the vital role you play in preventing infections and keeping patients safe. Also, focus on improving handwashing practices, especially after using gloves and utilizing readily available hand sanitizer stations, follow proper handwashing techniques outlined in training materials, and do not hesitate to ask for clarification if needed. Furthermore, participate actively in ongoing IPC training sessions. Stay informed on the latest guidelines and best practices to ensure effective infection prevention.

2. Birthing Facility Administrators. Birthing facility administrators should address the potential for rooming in with other patients by expanding room capacity to minimize contamination risks. Additionally, implementing continuing education programs tailored to labor and delivery staff on infection prevention and control (IPC) practices is crucial. Materials and communication channels should resonate with nurses and midwives, focusing on hand hygiene. Investing in hand sanitizer stations, educational posters, and direct observation with feedback can improve compliance and foster a safety culture, emphasizing the significance of IPC practices.

3. Health Institutions. The findings revealed that healthcare workers have to wash their hands if they use gloves; it is essential to collaborate with birthing facilities to share best practices and resources related to IPC in labor and delivery settings. Also, advocate for ongoing research on effective strategies to promote positive attitudes towards IPC among healthcare workers and develop standardized training modules on co-rooming practices for patients with communicable diseases and disseminate them to birthing facilities.

4. Department of Health (DOH). Since the findings revealed moderate handwashing before and after direct contact with patients, it is essential to note that they should provide grants or funding opportunities for birthing facilities to implement targeted interventions to improve hand hygiene practices. Develop national guidelines or recommendations specifically focused on IPC in labor and delivery settings and conduct regular monitoring and audits of IPC compliance in birthing facilities to ensure adherence to best practices.

5. Birthing Facility Patients. Since there are concerns regarding the healthcare workers' adherence to infection prevention and control, it is essential to let them ask questions about the birthing facility's IPC protocols. You should feel empowered to request clarification on any aspect of your care and practice good hand hygiene at the birthing facility. This includes washing hands before and after feeding your newborn, using the restroom, and changing diapers.

6. Future Researchers. Explore the most effective methods for fostering positive attitudes towards IPC among healthcare workers. This could involve investigating the impact of motivational interviewing, peer support programs, or recognition and reward systems. Further research on specific knowledge gaps identified in this study, such as co-rooming practices, will also be conducted. Develop targeted educational interventions based on the findings.

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