**Adherence to infection prevention and control measures among Nursing Students in Department of Nursing Sciences Rivers State University**

**Abstract**

Infection has been among the main causes of demise and disability for centuries, and at present, it still constitutes a growing challenge to health and social progress. The study examined Adherence to infection prevention and control measures among nursing students in the Department of Nursing Sciences, Rivers State University. A descriptive design was used with a sample size of 222 nursing students equal to the total population selected via census sampling techniques. An existing standard scale with minor modification and a self-structured questionnaire were used to collect data on two different formats of 4-point Likert rating scale having been found to have a reliability of .83 using Cronbach analysis. Data collected were entered into Statistical Package for Social Sciences (SPSS) version.25 and analyzed using descriptive and inferential statistics. Mean, standard deviation, simple regression analysis and Pearson Product Moment Correlation analysis were used to answer the research questions and tested the hypothesis respectively. The findings revealed that nursing students demonstrated a high level of adherence to infection prevention and control measures evidenced by an overall mean score of 3.11±1.04, which falls within the high adherence range. In addition, the study revealed that there exist positive (2.89±.97) factors influencing adherence to infection prevention and control measures. It further revealed no significant relationship between the level of adherence and factors influencing adherence to infection prevention and control measures among nursing students at p˂0.05 alpha level hence, the calculated p-value .202 is greater than the criterion p-value of 0.05 alpha level with 220 degrees of freedom and correlation coefficient r-value of .086. In light of the result, nursing students should be routinely trained on the various levels of infection prevention and control measures before commencement of clinical experience every semester, irrespective of the level of study. This will promote optimal adherence to all levels of IPC. In addition, relevant authorities are strongly advised to collaborate and advocate for measures in ensuring that the identified factors affecting nursing student’s adherence to infection prevention and control measures in the health facilities are curbed.

**Keywords:** Adherence, Infection prevention and control measures, Nursing students

**Introduction**

Infection is the infiltration and growth of microorganisms in bodily tissues, which may be clinically undetectable or result in localized cellular damage [8], have been among the main causes of demise and disability for centuries, and at present, it still constitutes a growing challenge to health and social progress [18, 21]. Generally, infections are caused by bacteria, fungi, parasites and viruses and are transmitted either directly or indirectly (vector-borne) as they pass from person to person, however some are transmitted by animals, insects and inanimate objects like beddings, bedpans and urinals. Infections present with various signs and symptoms while others can be asymptomatic based on the type of pathogen that caused the infection. Often, symptoms frequently include fever and fatigue among others ranging from mild to severe symptoms [16].

The World Health Organization (WHO) opined that infection remains the most frequent negative impact in healthcare service delivery worldwide which endangers the health of both patients and healthcare service providers thus, leading to an increasing number of deaths as well as financial losses for the healthcare system [19]. About two million people globally are affected by these infections out of whom approximately 100,000 die annually [23]. In Africa, it is reported that there is dearth of data on the burden of infections however, according to a comprehensive analysis conducted in the region, its magnitude is thought to be significantly higher than that of developed countries [1]. In Nigeria, a report has it that following the complexity of infection diagnosis and the requirement for resources and expertise in monitoring activities to guide intervention, the burden of infections remains underreported or even not known [9]. Nevertheless, healthcare personnel can prevent these infections by adhering to evidence-based Infection Prevention and Control (IPC) procedures and guidelines, thereby preventing avoidable adverse events that do not need to happen [11].

Infection Prevention and Control measures, encompasses the strategies, protocols, and actions designed to prevent or reduce the likelihood of spreading infectious diseases within healthcare settings [23]. The standard IPC guidelines established by the Centers for Disease Control and Prevention (CDC) outline several vital practices. These practices encompass the maintenance of proper hand hygiene and the implementation of universal precautions to prevent exposure to blood and other bodily fluids. Furthermore, essential components of IPC include effective cleaning and disinfection, sterilization of medical equipment and instruments, as well as surface decontamination. The guidelines also highlight the appropriate use of disinfectants and the application of aseptic techniques. Safe waste disposal, careful handling of sharp objects, management of soiled linens, and patient isolation are further measures recommended to maintain a safe healthcare environment [4]. These comprehensive protocols are essential to mitigate the spread of infections and safeguard both healthcare workers and patients from potential health risks, thereby enhancing overall patient safety and care quality within medical facilities. Implementing these guidelines rigorously can significantly contribute to the control and prevention of infectious diseases in various healthcare contexts. This is supported by the International Federation of Infection Control who documented that IPC measures are an essential component of the healthcare system hence, adhering to standard guidelines by health personnel is recommended [15].

Adherence is the degree of accuracy and consistency in adhering to prescribed standard protocol to achieve the intended result. Furthermore, it is the extent to which certain behavior is in accordance with set instructions or healthcare advice [7]. In the context of IPC measures, adherence is utmost in preventing occurrences of healthcare related infections thereby improving patients’ safety and as well contributes to healthcare professionals’ safety. A global report on infection prevention and control measures has shown that a good IPC program strictly adhered to by health care professionals, could reduce 70% of infections in the healthcare settings [22].

Nursing students represent a crucial segment of future healthcare professionals and constitute a significant portion of any nation's healthcare system. During their professional training, they engage in clinical practice, spending considerable time interacting with patients, which increases their risk of exposure to infectious diseases [6]. Consequently, it is essential for nursing students to diligently follow different IPC measures. This adherence is crucial for minimizing the risk of infection transmission between students and patients while they acquire nursing skills and provide care within healthcare facilities. By implementing effective IPC practices, nursing students can protect themselves and their patients from potential infections, fostering a safer healthcare environment. Additionally, understanding and adhering to these measures not only enhance their learning experience but also prepare them for their future roles as healthcare providers. Nevertheless, assessment of adherence to IPC measures among nursing students in the Department of Nursing Sciences, Rivers State University is not known as being a new department in the university’s medical college. More so, there is paucity of data among the nursing student population in the state, especially in a time of emerging and reemerging infectious diseases, therefore, necessitating the need to study nursing student adherence to IPC measures in Department of Nursing Sciences, Rivers State University, Nigeria.

**Materials and Methods**

The various materials and methods used for the study are explained under the following headings:

**Research Design**

The design for the study was the descriptive design. This design enables an investigator to describe certain variables in relation to the population under study without manipulating any independent variables.

**Area of the Study**

The study was carried out in the Department of Nursing Sciences, Rivers State University. It is a [government-owned](https://en.wikipedia.org/wiki/Government-owned) institution located at Nkpolu-Oroworukwo, Port Harcourt, the capital of Rivers State, Southern Nigeria.

**Population of the Study**

The target population for the study consisted of all 222 nursing students in 300-500 levels of the Department of Nursing Sciences, Rivers State University during the 2023/2024 academic session that were presently in the clinical phase of the nursing programme. This was distributed as 93, 74 and 55 for 300, 400 and 500 levels respectively.

**Sample Size/Sampling techniques**

A sample size of all the 222 nursing students in 300-500 levels of the Department of Nursing Sciences, Rivers State University during the 2023/2024 academic session were utilized in the study. This constitutes 100% of the total population in the study. Hence, the census sampling technique was applied. The criteria for the application of census sampling techniques are provided as indicated under the inclusion criteria.

**Inclusion criteria**

1. Clinical nursing students in 300-500 levels of the Department of Nursing Sciences, Rivers State University.
2. Clinical nursing students willing and available to participate in the study.
3. Clinical nursing students not too ill to participate.

**Instruments for Data Collection**

A self-structured instrument titled; Adherence to Infection Prevention and Control Measures among Nursing Students’ Questionnaire (AIPCMNSQ) was constructed. The AIPCMNSQ instrument has two separate sectors A and B. The first sector A sought information on the demographic data of the respondents, alternatively, Sector B sought information on adherence to IPC measures among nursing students in the department of nursing sciences. Sector B was further re-categorized into two (2) different distinct sub-sectors that contained twenty (20) and ten (10) items each for the first and the second sector as 1-20 and 21-30 that sought information on level of adherence and factors influencing adherence to IPC measures among nursing students in the department respectively. All items were measured on a two different format of a 4-point Likert rating scale of Always (A) = 4-points, Sometimes (ST) = 3-points, Seldom (S) = 2-points and Never (N) = 1-point for item 1-20. While items 21-30 were rated as Strongly Agreed (SA) = 4-points, Agree (A) = 3-points, Disagree (D) = 2-points and Strongly Disagree (SD) = 1-point. However, it is pertinent to note that; items 1-20 of section B were adapted from an existing standard precaution scale [14]. The level of adherence to infection prevention and control measures was determined using weighted mean score category and interpreted as follows: “Very high: 3.26 - 4.00, High: 2.51 - 3.25, Moderate: 1.76 - 2.50, and Low: 1.00 - 1.75”.

**Methods of Data Collection**

Data was collected using a face-to-face approach following approval from the ethical committee of the Rivers State University. Informed consent was obtained from the respondents and information guiding the filling of the instrument were thoroughly explained to them.

**Method of Data Analysis**

The data collected were analyzed using descriptive and inferential statistical tools with the help of a software package programme; Statistical Package for Social Sciences (SPSS) version 25. A simple percentage was used to analyze the demographic data of the respondents. Mean and standard deviation was deployed to answer research question one and two while model summary of simple regression analysis was utilized to answer research question three. The hypothesis was tested using Pearson Product Moment Correlation Coefficient (PPMC) analysis at 0.05 level of significance.

**Results**

The results of the analysis of data are presented in Tables 1 to 5 below.

**Analysis of Demographic Data**

**Table 1: Percentage Distribution of Respondents by Gender, Age, Year of Study, Programme of Study, Religion and Marital Status**

|  |  |  |  |
| --- | --- | --- | --- |
| **S/N** | **Demographic details** | **Frequency** | **Percentage** |
|  | **Gender** |  |  |
| **1** | Male | 48 | 22 |
| **2** | Female | 174 | 78 |
|  | **Age** |  |  |
| **3** | 18-23 years | 138 | 62 |
| **4** | 24-29 years | 75 | 34 |
| **5** | 30-35 years | 9 | 4 |
|  | **Year of Study** |  |  |
| **6** | Year 3 | 93 | 42 |
| **7** | Year 4 | 74 | 33 |
| **8** | Year 5 | 55 | 25 |
|  | **Programme of Study** |  |  |
| **9** | Generic  | 211 | 95 |
| **10** | Post Basic | 11 | 5 |
|  | **Religion** |  |  |
| **11** | Christianity | 213 | 96 |
| **12** | Islam | 6 | 3 |
| **13** | Traditional | 3 | 1 |
| **14** | Others | 0 | 0 |
|  | **Marital Status** |  |  |
| **15** | Single | 209 | 94 |
| **16** | Married | 13 | 6 |
| **17** | Divorced | 0 | 0 |
|  | **Total** | **222** | **100** |

The data presented in Table 1 indicates that 48 (22%) of the total respondents were male and 174 (78%) were female nursing students. This implies that female nursing students were more in number than their male counterparts in the study. The data presented also shows that 138 (62%) of the total respondents were within 18-23 years, 75 (34%) were within 24-29 years and 9 (4%) were within 30-35 years of age. This implies that nursing students within 18-23 years of age were more in number than their other respondents in the study. The data further reveals that 93 (42%) of the total respondents were in year 3, 74 (33%) were in year 4 and 55 (25%) were in year 5 nursing students. This implies that nursing students in year 3, were more in number than their other colleagues in the study. The data presented still indicates that 211 (95%) of the total respondents were in generic and 11 (5%) were in a post basic programme of study. This implies that nursing students in the generic programme of study were more in number than those in the post basic programme of study. It was also revealed that, 213 (96%) of the total respondents were of Christianity, 6 (3%) were from Islamic religion, 3 (1%) were of Traditional religion and 0 (0%) were in other forms of religion. This implies that nursing students from Christianity religion were more in number than their other categories of respondents in the study. Finally, the data presented indicates that 209 (94%) of the total respondents were single, 13 (6%) were married and 0 (0%) were divorced/separated marital status nursing students. This implies that nursing students with single marital status were more in number than the other respondents in the study.

**Table 2: Mean and standard deviation scores of** **respondents on the level of adherence to IPC measures among nursing students**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/N** | **Level of adherence** | **Mean** | **SD** | **Decision** |
| **1** | I wash my hands between patients' care.  | 3.46 | .77 | Sometimes |
| **2** | I change gloves between patients' care. | 3.29 | .70 | Sometimes |
| **3** | I decontaminate my hands after patients care. | 3.62 | .66 | Always |
| **4** | I only use water for hand washing. | 2.73 | 1.10 | Sometimes |
| **5** | I use alcoholic hand rub as an alternative to soap and water if my hands are not visibly soiled. | 3.04 | .83 | Sometimes  |
| **6** | I cover my wound with waterproof dressing before caring for patients. | 2.92 | 1.17 | Sometimes  |
| **7** | I take a shower in case of extensive splashing even after I have put on personal protective equipment. | 2.54 | 1.21 | Sometimes |
| **8** | I wear gloves when I am exposed to body fluid, blood products and any excretion of patients. | 3.72 | .61 | Always  |
| **9** | I wear a face mask alone and sometimes in combination with goggles, face shield and apron whenever there is a possibility of splash or splatter. | 3.12 | .90 | Sometimes  |
| **10** | I wear a protective gown and apron when exposed to blood, body fluids and any patient excretion.  | 3.09 | 1.04 | Sometimes  |
| **11** | My mouth and nose are covered when I wear a mask. | 3.50 | .87 | Always  |
| **12** | I reuse a surgical mask and disposable personal protective equipment.  | 2.78 | 1.13 | Sometimes  |
| **13** | I remove personal protective equipment in a designated area. | 2.95 | 1.01 | Sometimes  |
| **14** | I decontaminate surfaces and devices after use. | 3.39 | .74 | Sometimes  |
| **15** | I wear gloves to decontaminate used equipment with visible soils. | 3.40 | .87 | Sometimes  |
| **16** | I clean up spillage of blood or other body fluids immediately with disinfectants. | 3.50 | .80 | Always  |
| **17** | I recap the needle after giving an injection. | 2.72 | 1.22 | Sometimes  |
| **18** | I put used needles and scalpels in a sharps box. | 3.58 | .70 | Always  |
| **19** | The sharp box is disposed of when it is full. | 1.54 | .75 | Seldom  |
| **20** | Waste contaminated with blood, body fluids, secretion and excretion are placed in red plastic bags irrespective of the patient’s infectious status. | 3.18 | .97 | Sometimes  |
|  | **Grand Mean/SD** | **3.11** | **1.04** | **High**  |

 N = 222; Weighted mean categories: “Very high: 3.26 - 4.00, High: 2.51 - 3.25, Moderate: 1.76 - 2.50, and Low: 1.00 - 1.75”.

The data presented in Table 2 reveals that, respondents’ always adhere to the items with mean scores of 3.62, 3.72, 3.50, 3.50 and 3.58. Regarding items with mean scores of 3.46, 3.29, 2.73, 3.04, 2.92, 2.54, 3.12, 3.09, 2.78, 2.95, 3.39, 3.40, 2.72, and 3.18, respondents affirmed adhering to these levels sometimes. Meanwhile, the respondents seldom adhere to the item statement with a mean score of 1.54. However, on the whole, the data revealed a grand mean score of 3.11. This implies that there exists a high level of adherence to IPC measures among nursing students in the Department of Nursing Sciences, Rivers State University. Hence, the grand mean score of 3.11 falls within the high adherence range.

**Table 3: Mean and standard deviation scores of** **respondents on the factors influencing adherence to IPC measures among nursing students**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/N** | **Factors influencing Adherence** | **Mean** | **SD** | **Decision** |
| **21** | Unavailability of infection prevention and control materials  | 3.29 | .77 | Agree |
| **22** | Tasking nature of hand washing | 2.43 | .96 | Disagree |
| **23** | There is not enough time to practice IPC measure  | 2.64 | .98 | Agree |
| **24** | Unavailability of colour codes for waste disposal in the wards | 3.09 | .93 | Agree |
| **25** | Increased workload | 3.12 | .80 | Agree |
| **26** | Inconvenient location of washing hand stand and alcohol-based hand sanitizer | 2.66 | .95 | Agree |
| **27** | Lack of knowledge and training on infection prevention control measures before clinical posting  | 2.56 | 1.12 | Agree |
| **28** | Lack of superior support and supervision on infection prevention and control guidelines  | 3.03 | .89 | Agree |
| **29** | Negative role modelling from health personnel  | 3.02 | .90 | Agree |
| **30** | Poor nurse/patient ratio  | 3.01 | .95 | Agree |
|  | **Grand Mean/SD** | **2.89** | **.97** | **Agree** |

Cut-off average = 2.50; N = 222;

The data presented in Table 3 reveals that, all item mean scores except item 22 were greater than the cut-off mean score of 2.50 with mean scores of 3.29, 2.43, 2.64, 3.09, 3.12, 2.66, 2.56, 3.03, 3.02 and 3.01 respectively. This further implies that all items were accepted as factors influencing adherence to IPC measures except that of item 22. However, on the whole, the grand mean score of 2.89 was also greater than the cut-off mean score of 2.50 which implies that there exist positive factors influencing adherence to IPC measures among nursing students in the department of nursing sciences, Rivers State University.

**Table 4: Model summary of simple regression analysis of the correlation between level of adherence and factors influencing adherence to IPC measures among nursing students’**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables** | **N** | **R** | **R2** |
| Level of adherence  | 222 | .086 | 0.0074 |
| Factors influencing adherence |  |  |  |

The data presented in Table 4 shows a correlation coefficient r-value of 0.086 with a correlation coefficient square (r2) value of 0.0074. This implies that the r-value of 0.086 depicts a weak positive correlation while the R2 value of 0.0074 indicates that .74% of the total variance of factors influencing adherence can be attributed to the level of adherence to IPC measures among nursing students. Consequent upon the relationship between the two variables, the Pearson Product Moment Correlation coefficient (PPMC) analysis is carried out in order to authenticate if the relationship is significant or not (see Table 5).

**Table 5: Pearson Product Moment Correlation coefficient (PPMC) analysis of the relationship between level of adherence and factors influencing adherence to IPC measures among nursing students’**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Level of****adherence** | **Factors influencing** **adherence**  |
| Level of adherence | Pearson Correlation | 1 | .086 |
|  | Sig. (2-tailed) |  | .202NS |
|  | N | 222 | 222 |
| Factors influencing adherence | Pearson Correlation | .086 | 1 |
|  | Sig. (2-tailed) | .202NS |  |
|  | N | 222 | 222 |

NS = Not Significant at 0.05 alpha level; Degree of Freedom (df) = 220; N = 222

The data presented in Table 5 reveals that, the Pearson Product Moment Correlation coefficient (PPMC) analysis is not significant at p < 0.05 alpha level, because the calculated p-value of .202 is greater than the criterion p-value of 0.05 alpha level with 220 degrees of freedom and correlation coefficient r-value of .086. Therefore, the null hypothesis, which states that, there is no significant relationship between level of adherence and factors influencing adherence to IPC measures among nursing students in the department of nursing sciences, Rivers State University is accepted.

**Discussion**

**Level of adherence to IPC measures among nursing students’**

The findings in Table 2 revealed a high level of adherence to infection prevention and control measures among nursing students with an overall mean score of 3.11 hence, the score lies within the high adherence level. This indicates that nursing students’ adherence supports infection prevention and control efforts, reinforcing the conclusion that nursing students demonstrate a high adherence level to infection prevention and control practices. Specific adherence behaviors reportedly carried out always include decontaminating hands after patient interactions, wearing gloves when exposed to bodily fluids, covering their mouth and nose when wearing mask, immediately addressing any spills of blood or bodily fluids with disinfectants, and disposing of used needles and scalpels in sharps boxes. The adherence behaviors further noted by nursing students sometimes include washing hands between patient care, changing gloves between patients, using only water for hand washing, and utilizing alcohol-based hand rubs when hands are not visibly soiled and covering wounds with waterproof dressings before providing care. Nursing students also reported that they sometimes shower in cases of extensive splashing even while wearing personal protective equipment, use facemasks sometimes paired with goggles, face shields, and aprons whenever there is a risk of splashing, wearing protective gowns and aprons when handling blood and body fluids. Additionally, students reported adhering sometimes to reusing surgical masks and disposable personal protective equipment (PPE), removing PPE in designated areas, decontaminating surfaces and equipment after use, and wearing gloves when cleaning used equipment that is visibly soiled. They recapped needles after administering injections while waste contaminated with blood and bodily fluids are disposed of in red plastic bags, regardless of the patient's infectious status sometime. However, nursing students seldom dispose of sharps boxes once full. The findings of this study are consistent with those of Kaushal and Clement [13], who reported a high level of compliance with infection prevention and control (IPC) measures among nursing students, at 89.8% (n=150). Similarly, the study is in keeping with Bekele et al. [4], Mutaru et al. [17], and Bouchoucha et al. [5] wherein positive adherence rates of 61.08%, 65.8%, and 80%, respectively were reported. Additionally, Kacan [12], found a mean score of 65.63 ± 4.92, indicating a strong adherence level within that study. These results collectively underscore the overall trend of nursing students demonstrating a positive commitment to IPC practices, reinforcing the importance of these measures in their training and clinical practice.

In contrast, the findings of this study differ from those of Olorunfemi et al. [20], who reported that the level of compliance with infection prevention and control measures (IPC) among nursing students was low, with a mean score of 14.17 (2.80), suggesting it does not significantly contribute to IPC efforts. This discrepancy may stem from differences in the target populations; Olorunfemi et al. [20] focused specifically on nursing students assigned to burns and medical-surgical units of a teaching hospital, while the present study included all clinical nursing students regardless of their specific placement. Additionally, the current research addressed all aspects of IPC measures, whereas the earlier study concentrated solely on hand hygiene practices. Similarly, findings from Akinwaare et al. [1], also contradict the present study, as they reported that only 43% of nursing and medical students adhered to IPC measures, indicating that this low adherence rate does not support effective infection control. These variations highlight the need for further exploration of factors influencing adherence among different groups of nursing students. The differences observed between this study and previous research may be linked to several factors, particularly the methods of data collection and the composition of the study populations. For instance, the prior studies utilized an interview guide and included both nursing and medical students, whereas this study relied on a questionnaire and focused solely on nursing students. Additionally, while the current research covered all aspects of compliance with infection prevention and control (IPC) measures, earlier studies primarily evaluated hand hygiene practices and the use of personal protective equipment. More so, this study's findings do not align with those of Ayele et al. [3], who reported a low overall level of compliance, with almost half of the nursing students not adhering to standard precautions. Despite the study comprehensively assessing all levels of adherence to IPC measures, the lower compliance observed may be attributed to differences in sample size, the level of nursing students surveyed, and the number of institutions involved compared to the present research. These variations underscore the importance of context when interpreting adherence levels among nursing students in different settings.

**Factors influencing adherence to IPC measures among nursing students**

The result in Table 3 reveals that, there exist positive factors influencing adherence to IPC measures among nursing students. Hence, the grand mean score of 2.89 was greater than the cut-off average score of 2.50. The observed factors influencing compliance with infection prevention and control measures among nursing students’ includes; unavailability of infection prevention and control materials, there is not enough time to practice IPC measure, unavailability of colour codes for waste disposal in the wards, increased workload, inconvenient location of washing hand stand and alcohol-based hand sanitizer, lack of knowledge and training on infection prevention control measures before clinical posting, lack of superior support and supervision on infection prevention and control guidelines, negative role modeling from health personnel and poor nurse-patient ratio. However, it is also noted that, tasking nature of hand washing was not part of the factors. The finding of this study is in accordance with the findings of Bekele et al. [4], who also stated that factors such as insufficient supply of resources, working experience and shortage of staff are actually the major factors influencing compliance with infection prevention and control measures among nursing students. Also, in keeping with the present study, is the findings of Appiah et al. [2] and Hamed et al. [10]. While the former identified factors such as increased workload, lack of support from seniors and inadequate resources as major factors, they later noted high nursing work schedule, negative role model and inconvenient location of alcohol-based hand rub dispenser as the most commonly reported factors influencing compliance with infection prevention and control measures. This similarity is not surprising because most health facilities both local and international are under-staffed due to brain drain. Also, most of the basic resources needed to promote infection prevention and control measures are readily not available and when they are, it is in limited supply. In addition, the findings are consistent with the findings of Akinwaare et al. [1], wherein factors such as unavailability of infection prevention control materials, time constraints and waste disposal colour codes were identified as influencing factors except the cumbersome process involved in maintaining hand hygiene as a factor. This may be explained in respect to differences in healthcare facility settings when it concerns performing hand hygiene.

**Relationship between level of adherence and factors influencing adherence to IPC measures among nursing students’**

The result in Table 4 reveals that, there is a weak positive relationship between the level of adherence and factors influencing adherence to IPC measures among nursing students with a correlation coefficient r-value of .086. This indicates very low magnitude with a positive direction. The positive relationship between level of adherence and factors influencing adherence to IPC measures among nursing students’ means that, as scores of levels of adherence increase, there is a corresponding increase in factors influencing adherence to IPC measures among nursing students’ scores and the revision is the case.

However, when the Pearson Product Moment Correlation Coefficient (PPMC) analysis was applied to test the null hypothesis as shown in Table 5, it revealed a calculated p-value of .202 which is greater than the criterion p-value of 0.05 alpha level with 220 degrees of freedom and correlation coefficient r-value of .086. This result indicates that there is no significant positive relationship between the level of adherence and the factors influencing adherence to infection prevention and control measures (IPC) measures among nursing students. The findings of this study align with those of Bouchoucha et al. [5], who also reported a significant negative relationship between the level of adherence and the factors affecting adherence to IPC measures. In addition, it is in keeping with the findings of Mutaru et al. [17], who equally reported that the level of adherence is not statistically significantly related to identified factors influencing adherence to IPC measures among nurses. On the other hand, the current finding is not in alignment with that of Ayele et al. [3], who stated that level of adherence is positively related significantly to factors influencing adherence to IPC measures among nursing students. This disparity may be attributed to the fact that the current study utilized a population size of 222 nursing students, whereas previous research adopted almost double (423) the sample size. This variation in population size can significantly influence the outcomes and relationships observed in the study, affecting the generalizability of the findings. Additionally, factors such as differences in methodologies, data collection techniques, and the specific context of each study could contribute to the discrepancies in results. Also, the present study used nursing students from a particular university in their 3rd, 4th and 5th year of study, meanwhile the previous study utilized nursing students from four governmental universities that are in their 3rd and 4th year of study.

The degree of relationship between level of adherence and factors influencing adherence to IPC measures among nursing students in the department of nursing sciences, Rivers State University was found to be .086. The coefficient of alienation was found to be .9926. This value suggests a lack of correlation between the level of adherence and the factors influencing compliance with infection prevention and control measures among nursing students in the school. Consequently, this indicates that the degree of relationship was .086, which points to a minimal association between these variables. Such a finding emphasizes that other factors beyond those assessed in this study may play a more significant role in influencing adherence levels among nursing students. The percentage of relationship or the coefficient of determination was obtained as .74%. This shows the magnitude of the relationship between level of adherence and factors influencing adherence to IPC measures among nursing students in schools. This value reflects a very low relationship between the two variables in the study. Consequently, the percentage reduction in the error of prediction (r²) for the level of adherence and the factors influencing adherence with infection prevention and control measures (IPC) measures among nursing students was calculated and found to be .74%. This means that understanding the scores related to adherence levels can reduce the prediction error of the factors influencing adherence to IPC measures among nursing students by .74%, and vice versa. It further means that factors influencing adherence to IPC measures among nursing students in schools can be predicted from the knowledge of scores of levels of adherence by only .74%. This result also authenticates the very low relationship between level of adherence and factors influencing adherence to IPC measures among nursing students in the school. However, the percentage of error in predicting the level of adherence based on the factors influencing adherence, and vice versa, was determined to be 99.26%. This indicates that only .74% of the scores for adherence levels can be accurately predicted from the knowledge level of adherence and factors influencing adherence to IPC measures among nursing students. Conversely, 99.26% of the variance in adherence levels remains unexplained when referencing the scores of the factors influencing adherence among nursing students. Consequently, it is important to emphasize that the relationship between the level of adherence and the factors influencing adherence to IPC measures among nursing students was found to be statistically insignificant. Furthermore, the strength of this relationship was very low, and the percentage of one variable being able to predict the other was similarly minimal.

**Conclusion**

In light of the result, the following conclusion was provided. That there exists a high level of adherence to IPC measures among nursing students in the department. Nevertheless, gaps were observed in some of the levels such as "I recap needles and scalpels after use," "I reuse surgical masks and disposable personal protective equipment," and "I only use water to wash my hands." However, it is important to note that used needles should never be recapped to prevent the risk of needle-stick injuries. Additionally, disposable surgical masks and protective gear should not be used again, as this practice can facilitate the transmission of infections. Moreso, water alone should not be used and where it is not available, alcohol-based hand sanitizers can be used. Adhering optimally to IPC measures is crucial for ensuring the safety of both healthcare workers and patients. The study further concludes that there exists positive factors influencing adherence to IPC measures including, the availability of essential infection prevention and control materials, unavailability of colour codes for waste disposal in the wards, increased workload, lack of superior support and supervision on IPC guidelines among others. Finally, the study concludes that level of adherence does not have a significant relationship with factors influencing adherence to IPC measures among nursing students in the department of nursing sciences, Rivers State University.

**Recommendation**

The following recommendations were put forward:

1. Nursing students should be routinely trained on the various levels of IPC measures before commencement of clinical experience every semester, irrespective of the level of study. As a result, this will promote optimum adherence to all levels of IPC.

* 1. The hospitals management board, primary healthcare board, clinically oriented academic institutions and other relevant stakeholders in the society should strongly collaborate to advocate for effective measures to curb the identified factors influencing adherence to IPC measures among nursing students.
	2. Nursing students should continuously observe the various levels of adherence to IPC measures even though the factors identified are significantly not related to their degree of adherence with infection prevention and control measures.

**Ethical Approval**

An application letter and a copy of the research proposal was submitted to the ethical committee of Rivers State University to give approval before commencement of data collection, ethical approval with reference number **RSU/FBMS/REC/24/051** was issued from the ethical committee of the university. All ethical principles were strictly followed throughout the period of the study.

**CONSENT**

Census sampling technique was employed, and all participants provided written informed consent prior to their inclusion in the study.

**DISCLAIMER (ARTIFICIAL INTELLIGENCE)**

The author(s) hereby declare that no generative AI technologies, such as Large Language Models (e.g., ChatGPT, Copilot) or text-to-image generators, were used in the writing or editing of this manuscript.

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