Insights into Healthcare and Education

By

Donkor W.
Ajumoke O. O.
Wafaa Mahmoud Elboraey Elsayed
Mr. George Tibi
Okwuosa J. C.

Printed in USA

First edition published in 2023

CARI Journals and Books Publishers

journals@carijournals.org

https://carijournals.org

ISBN:

International Journal of Health, Medicine and Nursing Practice

Vol 4 No 2 (2022)

Table of Contents

Assessing Patients' Knowledge, Attitude and Practices on Healthcare Associated Infections at Ajumako Hospital: Ghana

[1*]Donkor W., [2]Adinortey M. B., [3]Nukunu F., [4]Ahwireng O. S., [5] Quaicoe S. N.

[1]Department of General Nursing, College of Community Health Nursing, Winneba, Ghana

[2]Department of Biochemistry, School of Biological Sciences, College of Agriculture and Natural Sciences, University of Cape Coast, Cape Coast, Ghana

[3]Nursing and Midwifery Training College, Cap Coast, Ghana

[4]Community Health Nursing Training School, Odumase Krobo, Ghana

[1]Department of General Nursing, College of Public Health Nursing, Winneba, Ghana

[*]Corresponding Author's Email: billytdonkor@gmail.com

Abstract

Purpose: Healthcare associated infections (HAIs) remain one of the most important public health problems in many countries and Ghana is no exception. HAIs affect hundreds of millions patients globally. HAIs are among the five leading causes of death worldwide next to cardiovascular diseases, neoplasms, respiratory tract diseases, and infectious diseases. The purpose of this study was to assess the level of knowledge, attitudes and practices of patients on prevention of healthcare associated infections in a healthcare facility in Central Region, Ghana.

Methodology: A cross sectional study design was used in this study. Both convenience and purposive sampling techniques were used in the study to administer the questionnaire to patients who were visiting the health facility for a period of four weeks. Descriptive statistical analysis was used to present data as frequencies and percentages. On the other hand, multivariable regression analysis was employed to examine the relationship between variables in the dataset. Data were presented with tables. Adjusted odds ratios (aORs) at 95% confidence intervals (CIs) were used to present the results.

Findings: The study showed that the overall level of knowledge of respondents on HAIs was high (54%). Most of the patients (61%) also had positive attitudes toward HAIs, and the practices of patients toward HAIs

prevention were also good (57%). Civil/public servant had higher odds of having good knowledge on HAIs than those who are self-employed [aOR=2.1, 95% CI=1.433.39]. Two times visitors also had higher odds of having good knowledge on HAIs than new patients [aOR=2.37, 95% CI 1.21–4.63].

Unique Contribution to Theory, Practice and Policy: Majority of patients had high knowledge on HAIs with positive attitude and good practices toward prevention of HAIs. Health education on HAIs is recommended for all patients visiting healthcare facilities to help prevent such infections among the patients and health care workers.

Keywords: *Knowledge, Attitudes, Practices, Healthcare Associated Infections, Ajumako District Hospital*

INTRODUCTION

Healthcare associated infections (HAIs) started in the later part of the 20th century where it was considered as a public health problem. The subject began to be publicized, discussed and planned, promoting the development of prevention and control actions in all healthcare facilities worldwide (Mello et al., 2009). HAIs are infections that patients get during admission. These infections usually manifest within 48 hours or more after hospital admission or 30 days after the person has been discharged (Ocran & Tagoe, 2014).

These infections are associated with prolonged hospital stay, extra financial burden, increased morbidity and mortality, and increased antimicrobial resistance (Zhou et al., 2014). HAIs are among the five leading causes of death worldwide next to cardiovascular diseases, neoplasms, respiratory tract diseases, and infectious diseases (Girot, Garanhani, Guariente, & Cruz, 2013).

The consequences of HAIs is mostly felt in countries that have poor resources have overburdened health care workers and a higher level of community acquired infection (Rothe, Schlaich, & Thompson, 2013). Despite the increasing antimicrobial resistance by most pathogenic microorganisms, only few new antimicrobial are being developed to fight these infections (Haque, Mainul, et al., 2020). HAIs affect hundreds of millions patients each year worldwide (WHO, 2016). Thus, out of 100 hospitalized patients at any given time, 7 of them in developed and 10 in developing countries acquire at least one healthcare associated infection (WHO, 2016).

A prevalence survey conducted in 2002 under the auspices of the WHO in 55 hospitals of 14 countries estimated that, averagely, 8.7% of patients in hospitals are infected by HAIs (WHO, 2002). Again, according to a study conducted by Zaidi, Javed, Naz, & Mumtaz, (2016), 97 out of 333 patients in Hyderabad Sindh, Pakistan acquired HAIs in the course of receiving health care. According to Ricks (2007), one-third of healthcare associated infections that resulted in 92% deaths could have been prevented.

A study by Tagoe, Baidoo, Dadzie, Tengey & Agede (2011) affirms that one third of HAIs are preventable and about 90% of deaths that resulted from these infections could be prevented by adhering strictly to infection prevention and control guidelines. In South Africa, it is estimated that about 1 in 7 patients assessing healthcare in hospitals stand at high risk of getting a HAI (Brink et al, 2006). A study conducted in Ghana also estimated that the incidence of HAIs is approximately 152 000 out of 20.7 million people (US Census Bureau, 2004).

According to Nedelcu et al. (2020), inadequate knowledge level can contribute to a potential barrier to the prevention of HAIs in medical practice. However, despite the overwhelming rate of HAIs, there is paucity of literature regarding patients' awareness on HAIs. Awareness of patients on HAIs enable them to actively engage in the infection control and prevention measures than those who do not receive any information (Park & Seale, 2017). The hands play very important role in prevention of the transmission of HAIs. This can be achieved through appropriate hand hygiene.

However, adhering to frequent hand washing is neglected in health care settings (Abduawahid, Mohammed, & Nife, 2020). Despite European and national recommendations of ensuring that patients have information on HAIs (Bo, Amprino, Dalmasso, & Zotti, 2017), there is little data available on patients receiving information from healthcare workers (HCWs) on HAIs in Ghana. According to Ottum et al. (2013). Little is known regarding patients' understanding and awareness of HAIs in many countries including Ghana. This study sought to assess the level of knowledge, attitudes and practices of patients on the prevention HAIs in a healthcare facility in the Central Region of Ghana.

LITERATURE REVIEW

Theoretical Framework

There are quite a number of theories or models that attempt to explain varieties of human behaviours by linking knowledge to attitudes and behaviour. The Health Belief Model (HBM) was adopted for the purpose of the current study.

The Health Belief Model was propounded by three United States social psychologists: Rosenstock, Hochbaum and Kegels in 1952. The model was later modified by Maiman in 1975. The HBM is a health specific social cognition model that was postulated to find out what was encouraging or discouraging people from participating in health related programs. Currently, the HBM has been adapted to explore a variety of health behaviours, and this including HAIs (Abraham, & Sheeran, 1994).

According to (Rosenstock, Strecher, & Becker, 1994), the model discusses the individual's actions to treat and prevent disease via consideration of four principal tenets:

1. The individual's perceived susceptibility to disease. It is the subjective perception of the risk the individual is at from a state or

condition. This explains that an individual will seek preventive health services if he/she believes his/her susceptibility to a disease condition.

2. The individual's perception of severity of illness. This is the subjective evaluation of the seriousness of the outcomes associated with disease condition. It is believed that if a person is unable to perceive illness as serious, it would be unlikely to seek treatment or prevent the disease.
3. The individual's rational perception of benefits versus costs. This is the subjectively understood positive benefits of taking a health action in this case taking having goo knowledge, attitude and practices towards HAIs to offset a perceived threat. This perception will be influenced not only by specific proximal factors (such as washing of hands with soap and water or avoiding handshake), but an individual's overall health motivation. An individual will not take action to prevent HAIs unless the prevention of HAIs is perceived as having greater benefits than costs (economic, time and social).
4. The individual's cues to action. The HBM considers individuals promptness to take consistent preventive actions with an intention. The absence of cues to action will reduce the likelihood of prevention.

Research Questions

1. Do patients have knowledgeable on prevention of healthcare associated infections?
2. What are the attitudes of patients toward prevention of healthcare associated infections?
3. How do patients prevent themselves from acquiring healthcare associated infections?
4. What relationships exist between the socio-demographic characteristics of patients of and their knowledge on HAIs?

METHODOLOGY

Study Setting and Population

A cross sectional study using institutional based method was conducted to assess knowledge, attitude, and practices of patients on HAIs at Ajumako District Hospital in the central region of Ghana in January, 2017. Ajumako is the capital of Ajumako Enyan Essiam District. The district is predominantly rural and covers an estimated land area of about 521.2 square kilometers and forms 5 percent of the total land area of Central Region. Ajumako share boundaries with the Assin districts (Assin North and Assin South) to the west,

South by Effutu district, to the north-west by Asikuma- OdobenBrakwa and Gomoa West district to the east. Ajumako is about 40 kilometers

North-east of the Cape Coast. According to Ghana's 2010 Population and Housing Census, Ajumako had a total population of about 5,399 people with female accounting for 53.6 percent. Ajumako District Hospital is a government health facility and the only hospital within the district. *Ethical clearance and Sampling Procedure.*

The proposal to conduct the study was approved by the Institutional Review Board (IRB) of University of Cape Coast (UCC). Ethical clearance was obtained from the IRB, U.C.C. An official permission was granted by the Ajumako District Hospital management team and also informed consent was sought from all study participants.

Both inpatients and outpatients who visited Ajumako District Hospital were used as the study population. Convenience and purposive sampling techniques were used to select respondents who were eighteen years of age and above for the study. Selection of participants was carried out for a period of four weeks to patients who visited the health facility.

To ensure accurate responses of participants on attitude and practices on HAIs during data collection, participants were given brief explanation of healthcare associated infections after answering questions on knowledge before proceeding to questions on attitude and practices. This was done to ensure that those who had little or no knowledge on HAIs get fair understanding so as to assess their real attitudes and practices on prevention of HAIs. In all, 345 patients were used for study.

Data Collection

Self-designed pretested structured questionnaire was used to collect data. The data collection instrument was pretested using 15 study participants (10 outpatients and 5 inpatients) at a different hospital, also in the central region of Ghana. The purpose was to assess effectiveness of instructions, effectiveness of data collection technique, the clarity of questions and time required to complete the questionnaire. Participants for the pilot study were asked to give their comments on the questionnaire applicability and validity after which related adjustments were made before using for the study. Five (5) Research assistants were trained to assist in data collection. Data was collected from the following areas within the hospital: out-patient department, casualty unit, male, female and maternity wards. The questionnaire was designed in

four sections. Section A comprises demographic characteristics of respondents. Section B dealt with knowledge of patients on HAIs. Sections C and D dealt with attitude and practices of respondents on prevention of HAIs respectively.

Seven knowledge questions were developed to assess respondents' knowledge on HAIs. Knowledge questions asked included the following: Have you ever heard of HAIs? Do you know that catheter-associated urinary tract infection is a type of HAIs? Do you think surgical site infection is a type of HAIs? Can venous catheter associated infection be a type of HAIs? Do you know that pneumonia is a type of HAIs? Have you ever been educated on HAIs in the course of receiving health care? Can any patient develop HAI in the course of receiving healthcare?

Data Management and Analysis

Each completed questionnaire was checked for accuracy and consistency in relation to responses to the items on the data collection instrument. The questionnaire was also checked for comprehensiveness of the responses. After editing, a template was developed and used to create a data analysis matrix on the computer, as well as code responses to the items on the instrument.

After coding, the data was then entered into the computer analysis matrix developed with the computer software, Statistical Package for the Social Services (SPSS) version 22. The data was cleaned and check for errors and consistency in responses. The first, second and third research questions were analysed using descriptive statistics of frequencies and percentages whilst the fourth research question on the association between the socio-demographic characteristics of respondents and knowledge on HAIs was analysed using multivariable regression analysis.

Firstly, a descriptive analysis of frequencies and percentages was performed for all the seven items under this research question. Finally, a composite of all the items was created and the knowledge of respondents on HAIs was grouped into 'high' and 'low'. Respondents with high knowledge were those with a minimum of four 'Yes' for all the items and respondents who had 0-3 'Yes' were classified as having 'low' knowledge. Participants attitude were also assessed using nine questions. Respondents with positive attitudes were those with 5-9 'Yes' for all the nine items and respondents who had 0-4 'Yes' were classified as having 'negative' attitudes towards healthcare associated infections. Practices of respondents toward prevention of healthcare associated infections was also assessed by five research questions. Their responses were

grouped into 'Good' and 'Poor'. Respondents with good practices were those with 3-5 'Yes' for all the five items and respondents who had 0-2 'Yes' were classified as having 'Poor' practices on healthcare associated infections.

FINDINGS

Background Information of the Respondents

According to Table 1, a total of 345 participants were involved in the study. A little above than half (183 (53.0%)) of the respondents were females. Majority, 43% (148) of the respondents were aged 18-30. With regards to the type of patient, most (290 (84.1)) were outpatients. With occupation, majority (73.8% (255)) were self-employed. Finally, about one – third (35.7% (123)) of the respondents had visited hospital two times for the past one year.

Table 1: Socio-Demographic Characteristics of Respondents

Variables		Frequency	Percentage
Gender	Male	162	47.0
	Female	183	53.0
Age	18- 30	148	42.9
	31- 40	80	23.2
	41- 50	78	22.6
	51- 60	39	11.3
Type of patient	Outpatient	290	84.1
	Inpatient	55	15.9
Occupation	Self employed	255	73.8
	Civil/public servants	29	8.4
	Students	61	17.8
Number of visits	First time	106	30.7
	Two times	123	35.7
	Three times	58	16.8
	Four and above	58	16.8

Source: Field Survey (2017)

Knowledge of Respondents about HAIs

From the study, about half (50.1% (173)) of the respondents had heard of HAIs. Again, majority (58.8% (203)) of the respondents knew that catheter-

associated urinary tract infection is a type of HAIs. The results also show that majority (58.8% (203)) of the respondents thought surgical site infection is a type of HAIs. Furthermore, 60.6% (n = 209) of the respondents knew that venous catheter associated infection can be a type of HAIs but the remaining did not. Moreover, 41.2% (n = 142) of the respondents knew that pneumonia is a type of HAIs. Furthermore, more respondents, 58.8% (n = 203) had never been educated on HAIs in the course of receiving health care. Finally, 58.8% (n = 203) of the respondents knew that any patient can develop HAI in the course of receiving healthcare. Furthermore, the showed that a little more than half of the respondents (188) representing 54% had high knowledge on HAIs.

Attitude of Respondents towards Prevention of HAIs

Majority of the respondents (58.3% (201)) indicated that they will not report to a healthcare facility with a disease they suspect they had in the course of seeking healthcare. Again, 58.8% (n = 203) of the respondents were of the view that they will seek healthcare at a different health different facility if they are told that they have contracted HAI in the course of seeking healthcare. Moreover, only a few number of respondents (n = 109) representing 31.6 were of the view that HAIs cannot be transmitted from one patient to another patient. The study also showed that, most (60.6% (209)) of the respondents indicated that HAIs can be transmitted from a healthcare worker to a patient.

Again, greater percentage (81.4%) of the respondents thought that HAIs can kill patients if they are not treated. It was also believed by 69.9% (n = 241) of the respondents knew that HCW protect patients from acquiring. Again, majority of the respondents (89.3% (308)) believed that HAIs can be prevented. The study also demonstrated that majority (211) of the respondents representing 61% had positive attitude towards HAIs.

Practices of Respondents toward Prevention of HAIs

The study shows that most (69.9% (241)) of the respondents avoid hand shaking in the hospital in order to prevent HAIs. Again, more than half (55.4% (191)) of the respondents do regular hand washing with soap and water to prevent HAIs. Furthermore, 91.3% (n = 315) were with the view that using different chairs in the hospital would not prevent HAIs. Also, 54.8% (n = 189) of the respondents clean their hands within and after leaving the healthcare facility. Finally, 65.8% (n = 227) of the respondents use hand gel to clean their hands within the hospital. The study also indicates that majority (57.0% (195)) of the respondents had good practices toward HAIs prevention.

Factors Associated with Knowledge towards Prevention of HAIs

Table 5 shows the multivariable analysis of factors associated with knowledge on healthcare associated infections. Results show that civil/public servants and patients who visited health facility two times were factors associated with knowledge on healthcare associated infections. This is indicated by higher odds on good knowledge on HAIs among civil/public [aOR=2.1, 95% CI 1.43–3.39], and students [aOR=1.46, 95% CI 0.6 0–3.58] compared to those who are self-employed.

Again, results on the multivariable analysis revealed that in terms of number of visits, those who visited two times [aOR=2.37, 95% CI 1.21–4.63], three times [aOR=0.55, 95% CI 0.24–1.30], and four times [aOR=1.23, 95% CI 0.54–2.81] were more likely to have good knowledge on HAIs compared to those who were New patients.

Discussion

The study was conducted to assess knowledge, attitude, and practices of patients regarding HAIS at Ajumako District Hospital in central region of Ghana. From the study, 54% of patients were knowledgeable about HAIs. Findings from the study indicate that patients who visit Ajumako District Hospital have high knowledge on HAIs. Findings of the study are contrary to the findings of Gudnadottir et al., (2013) who found in their study that patients have limited knowledge about HAIs and their consequences.

Again, the finding of the study is contrary to what has been reported by Madeo, Shields and Owen (2008), that patients have poor or little knowledge on HAIs. However, the data in the current study support the findings obtained by Ocran, and Tagoe (2014) who conducted a study in Central Regional hospital in Ghana, where it was identified that patients have some level of knowledge (53.8%) regarding HAIs. Bo, Amprino, Dalmasso and Zotti, (2017) attributed the low knowledge to the fact that healthcare workers do not have enough time to educate patients on HAIs. This was confirmed by Merle et al., (2007), who reported that only a few number of healthcare workers give information on HAIs to patients.

Table 2: Knowledge of Patients on HAIs

	Yes		No		Total	
	n	**%**	**n**	**%**	**n**	**%**
Have you ever heard of HAIs?	173	50.1	172	49.9	345	100
Do you know that catheter-associated urinary tract infection is a type of HAIs?	203	58.8	142	41.2	345	100
Do you think surgical site infection is a type of HAIs?	203	58.8	142	41.2	345	100
Can venous catheter associated infection be a type of HAIs?	209	60.6	136	39.4	345	100
Do you know that pneumonia is a type of HAIs?	142	41/2	203	58.8	345	100
Have you ever been educated on HAIs in the course of receiving healthcare?	142	41.2	203	58.8	345	100
Can any patient develop HAIs in the course of receiving healthcare?	203	58.8	142	41.2	345	100

Source: Field Survey (2017)

Findings on the attitudes of patients towards HAIs in this study support what has been reported by Ocran and Tagoe (2014), where some patients had the belief that been knowledgeable on HAIs could contribute to reduction of HAIs. The reason for the positive attitudes of patients towards HAIs could be attributed to their knowledge on HAIs. With high knowledge on HAIs, patients are more likely to understand some of the issues surrounding HAIs and will see things in a positive manner compared to if they had low knowledge on HAIs.

In line with this, a patient with high knowledge on HAIs is more likely to seek healthcare at a different health facility if they are told that they have contracted HAI in the course of seeking healthcare. Furthermore, patients who know that HAIs can be transmitted from one patient to another patient, transmitted from a healthcare worker to a patient, and thinks that HAIs can kill patients if they are not treated are also likely to seek healthcare at different facility.

Table 3: Patients' Attitudes toward HAIs

Statements	Yes	%	No	%	Total	%
Will you report to the same healthcare facility with a disease you suspect you had in the course of seeking healthcare?	144	41.7	201	58.3	345	100
Will you seek healthcare at a different health facility if you are told that you have contracted HAI in the course of seeking healthcare?	203	58.8	142	41.2	345	100
Do you think HAIs can be transmitted from one patient to another patient?	236	68.4	109	31.6	345	100
Do you think HAIs can be transmitted from a healthcare worker to a patient?	209	60.6	136	39.4	345	100
Do you think HAIs can kill you if not treated?	281	81.4	64	18.6	345	100
Do you believe that misuse of antibiotics can cause HAIs?	162	47.0	183	53.0	345	100
Do you think the hospital environment is free from infection?	178	51.6	167	48.4	345	100
Do you believe that HCW protect you from acquiring HAIs?	241	69.9	104	30.1	345	100
Do you believe that HAIs can be prevented?	308	89.3	37	10.7	345	100

Source: Field Survey (2017)

Findings from the study indicated that patients have good practices on prevention of healthcare associated infections. Data collected from this research work indicates that they do this by avoiding hand shaking in the hospital in order to prevent HAIs, regular hand washing with soap and water to prevent HAIs, cleaning their hands within and after leaving the hospital and using hand gel to clean their hands within the hospital. This observation contradicts what has been reported by Zaidi, Javed, Naz, & Mumtaz (2016), who found that patients had average practice of preventing these infections and also an account by Sarani et al., (2016), of a poor practice in the prevention of HAIs.

The main reason accounted for the high practices of patients on prevention of healthcare associated infections as found in this study could be attributed to high knowledge and positive attitudes of patients towards HAIs. The various measures used by patients to prevent HAIs is in line with WHO (2016) guidelines, which spelt out infection prevention and control measures, such as

effective hand hygiene and the proper application of basic universal precautions during invasive procedures as some measures to prevent HAIs.

Such effective infection prevention practices in outpatient settings according to Garrett (2015) are very important for the reduction of the risk of transmitting infections, improving patient safety and patient outcomes, and also reducing costs associated with health care delivery. With such good practices towards preventing HAIs, the consequences of HAIs will be reduced among patients. The consequence of this is an improved health status and general improvement in health care delivery within the hospital.

Table 4: Practices on Prevention of Healthcare Associated Infections

Statements	Yes	%	No	%	Total	%
Do you avoid hand shaking in the hospital in order to prevent HAIs?	241	69.9	104	30.1	345	100
Do you do regular hand washing with soap and water to prevent HAIs?	191	55.4	154	44.6	345	100
Do you use different chairs in the hospital in order to prevent HAIs?	30	8.7	315	91.3	345	100
Do you clean your hands within and after leaving the hospital?	189	54.8	156	45.2	345	100
Do you use hand gel to clean your hands within the hospital?	227	65.8	118	34.2	345	100

Source: Field Survey (2017)

Findings from the study indicated a statistically significant association between gender, age, highest level of education, occupation and number of visits and knowledge of patients on HAIs. The relationships between the socio-demographic characteristics of patients and their knowledge on HAIs corroborate the findings of Suchitra and Devi (2007), who found a positive impact of education on knowledge with regards to HAIs.

Similarly, the findings of the current study are in line with the findings obtained by Bajracharya, Maharjan and Shrestha (2014), who found in their study that age, duration of hospitalization and educational level were associated with knowledge on surgical site infections.

Another data that supports the findings of the current study, is reported by Sarani et al. (2016), who indicated that there was a significant association

between gender and knowledge on HAIs. The reason for the association between gender, age, occupation and number of visits and knowledge of patients on HAIs could be associated to the importance of these characteristics in healthcare delivery. In this study, we found higher odds of knowledge on HAIs among Civil/public servant [aOR=2.1, 95% CI 1.43–3.39] compared to the self-employed. Finally, in this study, there were higher odds of among those who visited two times [aOR=2.37, 95% CI 1.21– 4.63] as compared to those who were New patients (Table 5).

Table 5: Multivariable Logistic Regression Output for Factors Associated With Knowledge on HAIs

			95% CI	
Variables	**Adjusted Odds Ratio**	**P-value**	**Lower CI**	**Upper CI**
Gender				
Male	Ref			
Female	0.74	0.273	0.44	1.26
Age				
18-25	Ref			
26 - 30	0.75	0.543	0.29	1.92
31 - 35	0.72	0.466	0.30	1.75
36 - 40	0.29	0.085	0.07	1.18
41 - 45	1.36	0.57	0.47	3.92
46 - 50	1.52	0.476	0.48	4.82
51 - 55	1.88	0.398	0.43	8.20
56 - 60	0.44	0.208	0.12	1.59
Type of patient				
Output	Ref			
Inpatient	0.80	0.534	0.40	1.61
Occupation				
Self employed	Ref			
Civil/public servant	2.11	0.027	1.43	3.39
Student	1.46	0.406	0.60	3.58
Number of visits				
New patient	Ref			
Two times	2.37	0.012	1.21	4.63
Three times	0.55	0.173	0.24	1.30
Four and above	1.23	0.622	0.54	2.81

Source: Field Survey (2017)

CONCLUSION AND RECOMMENDATIONS

Conclusion

It could be concluded based on the findings of the study, that majority of patients had high knowledge on HAIs, as most of the respondents (58.8%) stated that they have been educated on HAIs in the course of receiving health care. The study also demonstrated that majority of responding patients had positive attitudes toward HAIs prevention. The current study also shows that most of patients had knowledge of good practices toward HAIs prevention. Descriptive statistical analysis was used to present data as frequencies and percentages. Multivariable regression analysis was employed to examine the relationship between variables in the dataset. Variables (Gender, Age, type of patient, Occupation, and Number of visits) were examined with knowledge on HAIs. The study concluded that civil/public servant had higher odds of having good knowledge on HAIs than the self-employed [AOR=2.1; 95%CI=1.43-3.39]. Patients who had visited the facility twice also had higher odds of having good knowledge on HAIs than new patients [AOR=2.37; 95%CI=1.21-4.63].

Recommendation

1. There is the need for healthcare institutions to effectively incorporate in their activities, infection prevention and control programs to prevent or minimize the incidence of HAIs.
2. Heads of healthcare facilities should develop protocols that tailored towards delivering information on HAIs to all patients by all healthcare workers. Health care workers need to be knowledgeable about prevention of HAIs so that they can adopt best practices to prevent these infections.
3. Health education is considered to be an essential element that can influence behaviour of patient to enhance and increase good practices of preventing HAIs. Improvement in the knowledge, attitude and practices on HAIs need to be done for all patients visiting healthcare facilities. For this reason, health educational programs should be intensified to target all patients on the availability and usage of facilities for prevention of HAIs.
4. The government must strengthen its monitoring and evaluation activities on the implementation of infection prevention and control policy.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Emerging Issues and Controversies

Limited Patient Awareness: Many patients may have limited knowledge about HAIs, including their causes, transmission, and prevention. Improving patient awareness and education is an ongoing challenge.

Patient Stigma and Blame: Patients who contract HAIs may experience stigma or blame from healthcare providers or fellow patients. Controversies may arise regarding the responsibility for HAIs and their impact on patient-provider relationships.

Communication Gaps: Effective communication between healthcare providers and patients is essential for preventing HAIs. Issues related to language barriers, cultural sensitivity, and patient understanding of infection prevention measures can be contentious.

Infection Control Practices: Patients' adherence to infection control practices, such as hand hygiene and cough etiquette, can vary. Controversies may revolve around the enforcement of infection control measures and patient compliance.

Access to Resources: Patients' ability to follow infection prevention practices may be affected by their access to resources, including clean water and sanitation facilities. Disparities in access can lead to debates about equity in healthcare.

Patient Engagement in Infection Control: Engaging patients in infection control efforts, such as reporting symptoms and concerns, can be challenging. Controversies may arise regarding the role of patients in identifying and preventing HAIs.

Healthcare Worker Practices: Patients may have concerns about healthcare workers' compliance with infection control protocols, including hand hygiene and the use of personal protective equipment. Controversies may involve issues of trust and accountability.

Data Privacy: Collecting patient data on knowledge, attitude, and practices related to HAIs requires attention to data privacy and ethics. Controversies may emerge if patients' privacy rights are not respected during research or data collection.

Cultural Beliefs and Practices: Cultural beliefs and practices can influence patients' attitudes and behaviors related to HAIs. Controversies may pertain to balancing cultural sensitivities with evidence-based infection prevention measures.

Patient Feedback and Quality Improvement: Incorporating patient feedback into quality improvement initiatives for infection control can be a contentious issue. Patients' perspectives may differ from those of healthcare providers, leading to debates about the best strategies for improvement.

REFERENCES

Abduawahid, M. K., & Mahmood, N. R. (2020). Awareness, Knowledge and Attitude of Hand Hygiene Practices among Healthcare workers in Kirkuk Pediatric Hospital. *Middle East Journal of Family Medicine*, *18*(2).

Abraham, C., & Sheeran, P. (1994). Modelling and modifying young heterosexuals' HIVpreventive behaviour; a review of theories, findings and educational implications. *Patient Education and Counseling*, *23*(3), 173-186.

Bajracharya, S. L., Maharjan, S., & Shrestha, S. (2014). Knowledge of Surgical Site Infection among Post-operative Patients in Kathmandu University Teaching Hospital Dhulikhel, Nepal. *International Journal of Nursing Research and Practice,* 1(2), 14-17.

Bo, M., Amprino, V., Dalmasso, P., & Zotti, C. M. (2017). Delivery of written and verbal information on healthcare-associated infections to patients: opinions and attitudes of a sample of healthcare workers. *BMC health services research*, *17*(1), 1-7.

Brink, A., Feldman, C., Duse, A., Gopalan, D., Grolman, D., Mer, M. & Richards, G. (2006). Guideline for the management of nosocomial infections in South Africa. *Southern African Journal of Epidemiology and Infection*, *21*(4), 152-160.

D. Ricks (2007). Germ Warfare". *Ms. Magazine*, 43–5.

de Oliveira Giroti, S. K., Garanhani, M. L., Garanhani, M. L., de Menezes Guariente, M. H. D., & de Almeida Cruz, E. D. (2013). Teaching of health care-related infections within an integrated Nursing Curriculum. *Creative Education*, *4*(12), 83.

Evaluation of the Nurses' Level of Knowledge Regarding Hand Hygiene and HealthcareAssociated Infections: A Survey. *Applied Medical Informatics 42*(2), 53-61.

Garrett Jr, J. H. (2015). A review of the CDC recommendations for prevention of HAIs in outpatient settings. *AORN journal*, *101*(5), 519-528.

Gudnadottir, U., Fritz, J., Zerbel, S., Bernardo, A., Sethi, A. K., & Safdar, N. (2013). Reducing health care-associated infections: patients want to be engaged and learn about infection prevention. *American journal of infection control*, *41*(11), 955-958.

Haque, M., McKimm, J., Sartelli, M., Dhingra, S., Labricciosa, F. M., Islam, S., & Charan, J. (2020). Strategies to prevent healthcare-associated infections: a narrative overview. *Risk management and healthcare policy*, *13*, 1765.

Madeo, M., Shields, L., & Owen, E. (2008). A pilot study to investigate patients reported knowledge, awareness, and beliefs on health care–associated infection. *American journal of infection control*, *36*(1), 63-69.

Mello, M. J. G. D., Albuquerque, M. D. F. P. M. D., Lacerda, H. R., Souza, W. V. D., Correia, J. B., & Britto, M. C. A. D. (2009). Risk factors for healthcare-associated infection in pediatric intensive care units: a systematic review. *Cadernos de saude publica*, *25*, 373391.

Merle, V., Tavolacci, M. P., Moreau, A., Dubreuil, N., Dollois, B., Gray, C. & Czernichow, P. (2007). What factors influence healthcare professionals' opinion and attitude regarding information for patients about hospital infection?. *Journal of Hospital Infection*, *66*(3), 269-274.

Nedelcu, V., Mariana, Z. A. Z. U., Mazilu, D. C., Vernic, C., & GRINŢESCU, I. M. (2020).

Ocran, I., & Tagoe, D. N. A. (2014). Knowledge and attitude of healthcare workers and patients on healthcare associated infections in a regional hospital in Ghana. *Asian Pacific Journal of Tropical Disease*, *4*(2), 135-139.

Ottum, A., Sethi, A. K., Jacobs, E., Zerbel, S., Gaines, M. E., & Safdar, N. (2013). Engaging patients in the prevention of health care-associated infections: a survey of patients' awareness, knowledge, and perceptions regarding the risks and consequences of infection with methicillin-resistant Staphylococcus aureus and Clostridium difficile. *American journal of infection control*, *41*(4), 322-326.

Park, J., & Seale, H. (2017). Examining the online approaches used by hospitals in Sydney, Australia to inform patients about healthcare associated infections and infection prevention strategies. *BMC infectious diseases*, *17*(1), 1-7. population/international/data/idb/informationGateway.php

Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1994). *The health belief model and HIV risk behavior change*. New York, NY: Plenum Press.

Rothe, C., Schlaich, C., & Thompson, S. (2013). Healthcare-associated infections in subSaharan Africa. *Journal of HospitalInfection*, *85*(4), 257-267.

Sarani, H., Balouchi, A., Masinaeinezhad, N., & Ebrahimitabs, E. (2016). Knowledge, attitude and practice of nurses about standard precautions for hospital-acquired infection in teaching hospitals affiliated to Zabol University of Medical Sciences (2014). *Global journal of health science*, *8*(3), 193.

Suchitra, J. B., & Devi, N. L. (2007). Impact of education on knowledge, attitudes and practices among various categories of health care workers on nosocomial infections. *Indian journal of medical microbiology*, *25*(3), 181.

Tagoe, D. N. A., Baidoo, S. E., Dadzie, I., Tengey, D., & Agede, C. (2011). Potential sources of transmission of hospital acquired infections in the volta regional hospital in Ghana. *Ghana medical journal*, *45*(1).

US Census Bureau (2004). International Data Base. Washington, DC. US Census Bureau. Available: http://www.census.gov/

World Health Organization (2016). *Fact Sheet on health care-associated infections.* Geneva, Switzerland. Available: http://www.who.int/gpsc/country_work/gpsc_ccisc_fact_sheet_en.pdf

World Health Organization (2002). *Prevention of hospital-acquired infections: a practical guide.* Geneva, Switzerland. Availableat:http://apps.who.int/medicinedocs/documents/s16355e/s16355e.pdf

Zaidi, N., Javed, N., Naz, S., & Mumtaz, A. (2016). Gaps in knowledge and practices about health care associated infections among health care workers at a tertiary care hospital. *Journal of Islamabad Medical & Dental College (JIMDC)*, *5*(2), 84-87.

Zhou, Y., Zhang, D., Chen, Y., Zhou, S., Pan, S., Huang, Y., & Ba-Thein, W. (2014). Healthcare-associated infections and Shanghai clinicians: A multicenter cross-sectional study. *PloS one*, *9*(8), e105838.

Ascertain the Relationship between Undergraduate Nursing Students' Age, Gender and Their Level of Assertive Behaviour

[1*]Ajumoke O. O., [2]Gbaranor K.B., [3]Mube W. A., [4]Austin-Asomeji I., [4]Bademosi A., [2]Okpara E. P., [2]Reuben E., [4]Ohaka J. C. [2]Oriji I. E, [5]Famba Famba D., [4]Bruce I.

[1]Department of Nursing Sciences, College of Medical Sciences, Rivers State University, Port Harcourt, Nigeria

[2]Department of Human Physiology, College of Medical Sciences, Rivers State University, Port Harcourt, Nigeria

[3]Department of Obstetrics and Gynaecology, University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria

[4]Department of Community Medicine, College of Medical Sciences, Rivers State University Teaching Hospital, Port Harcourt, Nigeria

[5]Department of Family Medicine, College of Medical Sciences, Rivers State University Teaching Hospital, Port Harcourt, Nigeria

[*]Corresponding Author's Email: Barinua.gbaranor@ust.edu.ng

Abstract

Purpose: The aim of the study is to ascertain the relationship between undergraduate nursing students' age and their level of assertive behaviour. Assertiveness is communicating and expressing your thoughts, feelings, and opinions in a way that makes your views and needs clearly understood by others, without putting down their thoughts, feelings, or opinions. Assertiveness is the ability to express our thoughts and feelings openly in an Honest, Appropriate, Respectful and Direct way.

Methodology: The participants were students of 2nd - 5th levels at the Department of Nursing, University of Port Harcourt with a total of 205 participants. The study was a cross sectional descriptive survey design with an adapted structured questionnaire using Rathus Assertiveness schedule instrument with a four point Likert scale of strongly Agree, Agree, Disagree and Strongly Disagree. All statistical analysis was performed using statistical package for social Science (SPSS).

Findings: The findings revealed an increased in assertiveness level with students in the 5lh and 4th levels of study being more assertive than the lower levels of study. Age and gender of students did not have any influence on their

assertive behaviour. Chi-square Test of independence was the inferential statistics used to test the hypotheses on whether significant relationships existed between student nurses' level of assertiveness and their age, gender and year of study with the level of significant 0-05.

Unique Contribution to Theory, Practice and Policy: The study recommended that all Nurses should be exposed to assertiveness training so that they can mentor/coach students and it also recommended that assertive behaviour should be included in the curriculum of nursing programme.

Keywords: *Ascertain, Relationship, Undergraduate, Nursing, Students*

INTRODUCTION

Assertiveness is communicating and expressing your thoughts, feelings, and opinions in a way that makes your views and needs clearly understood by others, without putting down their thoughts, feelings, or opinions. Assertiveness is the ability to express our thoughts and feelings openly in an Honest, Appropriate, Respectful and Direct way. It can be hard to do, but it gets easier with practice. In assertive communication both individuals are considered to be equally important (www.mirecc.va.gov/cihvisn2). According to McCabe and Timmins (2003) assertiveness is necessary for effective nurse/patient communication and it is suggested that its development may also aid the confidence of the profession as it develops. Assertiveness differs from aggressiveness, which involves inappropriate expression of thoughts. Emotions, and beliefs in a way that violates the rights of others (Lawton and Stewart, 2005).

Nurses play a vital communication role in the healthcare System, and advocacy and empowerment are central to this. In this perspective, Ibrahim (2015) suggested that to empower their patients, nurses need to be assertive. The concept of empowerment in nursing education according to Ibrahim (2015) is an interpersonal process in which educators provide the tools and an environment conducive to increasing autonomous decision making in students. Hence it is compulsory for nurses and midwives and undergraduate nurses who will provide individuals, families and society in the field of health and education in the future, be individual with high self-esteem and assertiveness in order to be able to establish communication more comfortably in society and to be able to use their professional knowledge and skills more effectively (Karagozolu *et al*, 2008).

Few researchers have investigated demographic factors such as age, gender, experience, and nursing education on assertiveness. Unal (2002) examined assertiveness in 79 nursing students and found that age and sex were not related assertiveness.

METHODOLOGY

It was a cross-sectional study involving students from 2nd - 5th year in the department of nursing science. A structured questionnaire using Rathus Assertiveness schedule instrument with a four-point Likert scale of strongly Agree, Agree, Disagree and Strongly Disagree was used to collect data. Assertiveness instrument developed by Rathus Assertiveness Schedule (RAS) (1973) was used.

FINDINGS

Table 1: Relationship between the Student Nurses' Age and their Level of Assertiveness

		Student Nurse' Assertive (n=84)	Assertiveness Unassertive (n=121)	Total	Chi-Square	df	P-value
Age	<20	16(36.4)	28(63.6)	**44**	3.781	2	.151
	21>25	59(45.7)	70(54.3)	**129**			
		9(28.1)	23(71.9)	**32**			

Result on the relationship between students' nurses' age and their level of assertiveness. Their age had no significant relationship with their level of assertiveness (p= .151). No age group was significantly associate d with higher level of assertiveness than others. The level of assertiveness for the different age groups were this distributed: 20 years and below (36.4%), 21-25 years (45.7%) and above 25 years (28.1%). Hence, student nurses' level of assertiveness was not related on their age (Table 1).

Table 2: Relationship between the Student Nurses' Gender and their Level of Assertiveness

		Student Nurse' Assertive (n=84)	Assertiveness Unassertive (n=121)	Total	Chi-Square	df	P-value
Sex	Female	76(41.3)	180(58.7)	**184**	.080	1	777
	Male	8(38.1)	13(61.9)	**21**			

Result on the relationship between student nurses' gender and their level of assertiveness. Their gender had no significant relationship with their level of assertiveness (p = .777). The female students (41.3%) were not significantly associated with high Assertiveness than their male counterpart (38 1%). Hence, student nurses' level of Assertiveness was not gender related (Table 2).

Table 3: Relationship between the Student Nurses' Years of Study and their Level of Assertiveness

		Student Nurse' Assertive (n=84)	Assertiveness Unassertive (n=121)	Total	Chi-Square	df	P-value
Age	2nd	23(41.8)	32(58.2)	**55**	12.045	3	.007
	3rd	17(25.4)	50(74.6)	**67**			
	4th	8(47.1)	9(52.9)	**17**			
	5th	36(54.5)	30(45.5)	**66**			

Result on the relationship between student nurses' year of study and their level of assertiveness. Their year of study had a significant relationship with their level of assertiveness (p = .007). Students with high years of study (that is. 5th and 4lh students) were associated with higher level of assertiveness; while the 3rd year were the least assertive. The level of assertiveness for the different years of study were thus distributed: 5th year (54.5%), '|t'1 year (47.1%), 2nd year (41.8%) and 3rd year (25.4%). Hence, student nurses' level of assertiveness significantly depended on their ears of study, with students in 4th and 5111 years being more assertive than others (Table 3).

Discussion

The findings of this study revealed that student nurses' level of assertiveness was not related to their age. This is in line with the findings of the study by Unal (2002), who examined at assertiveness in 79 nursing students and found that age and sex were not related to at assertiveness. In same vein, McCabe and Timmins (2005) in a study of 27 nurses found that regardless of gender, age and amount of education, nurses without any assertiveness training were less assertive than those who had assertiveness training. Amicone (2015) in their study also found that only a very weak positive correlation (r = .113) existed between age and assertiveness scores which was not even significant (p= .116).

The fact that age and assertiveness had no relationship can be attributed to the fact that the students understudy were almost within the same age group; hence a high tendency to have the same level of exposure. The demographic characteristics revealed that 21.5% of the students were aged 17-20 years; 62.9% were aged 21-25 years; 13.2% were aged 26-30 years while 2.4% were aged 31-33 years; implying that approximately 15% of the students were above 25 years while 85% were between 25 years and below. Relationship between

age and assertiveness in this study can also be explained on the basis that assertiveness is a behavioural characteristic.

The findings of this study revealed no significant relationship between nursing students' level of assertiveness and their gender. This agrees with the findings of Unal (2002), and McCabe and Timmins (2005) as stated earlier. It is also in agreement with the work of Arigbabu *et al*, 2010) who carried out a study on gender, marital status and religious affiliation as factors of assertiveness among Nigerian education majors. The result obtained showed no significant difference in assertiveness between gender groups.

The age-assertiveness non-relationship is suggestive to gender and assertiveness also being unrelated. As stated earlier, being within the same age group already predicts a lot about their exposure level, which may be perceived to contribute to assertiveness irrespective of gender. The gender-assertiveness non-relationship can also be explained based on assertiveness as a behavioural characteristic as stated earlier; that is, a male or female can be assertive or unassertive because that has become the person's behaviour either inborn or learnt.

A similar study by Amicone (2015) found that assertive scores for males were higher than females and there was a significant difference (p= .033). This finding may be as a result of the uniqueness of the population as regards their race, employment status, place of employment and the government and human right laws of the place of study. The study noted less than half of the sophomore students and more than half of the senior students were employed; of which above 70% in each group were employed in health facility.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The assertiveness of the participants was not age-related neither was it gender-based. Assertiveness was however dependent on their year of study, the students in senor (5th and 4th year) level being more assertive than those in the lower level (2nd and 3rd year).

Recommendations

1. All Nurses should be exposed to assertiveness training so that they can mentor/coach students.
2. Assertive behaviour should be included in the curriculum of nursing programme.

Declarations

Funding

Self-funding

Conflict of Interest

No conflict of interest.

Ethical Approval

It was approved by the ethical committee of University of Port Harcourt, Nigeria

Emerging Issues and Controversies

Gender Stereotypes: The impact of gender stereotypes on assertive behavior may be a subject of controversy. Nursing students may face societal expectations regarding their assertiveness based on their gender, which could affect their behavior and self-perception.

Cultural Differences: Cultural norms and values can influence assertiveness, and these differences may lead to controversies related to the measurement and interpretation of assertiveness levels among nursing students from diverse cultural backgrounds.

Age and Experience: Age can be a proxy for experience in the nursing field. Controversies may arise over whether age alone is an accurate indicator of assertiveness or if it should be considered in conjunction with years of nursing education and practice.

Nursing Curriculum: The nursing curriculum may not explicitly teach assertiveness skills. Controversies may center on whether assertiveness training should be integrated into the curriculum and how it should be assessed.

Role of Gender in Nursing: Nursing as a profession has historically been associated with women, which may affect the expectations for assertiveness among male nursing students. This could lead to discussions about gender dynamics within the nursing profession.

Ethical Considerations: The use of gender and age as variables in research can raise ethical concerns related to privacy and potential discrimination. Ensuring the ethical treatment of participants in studies examining assertive behavior is essential.

Intersectionality: Considering the intersection of multiple identity factors (e.g., gender, age, race, and ethnicity) can provide a more nuanced understanding of assertiveness among nursing students. Controversies may arise regarding how to account for intersectionality in research and practice.

Self-Perception vs. Objective Assessment: Nursing students' self-perception of assertiveness may differ from objective assessments. Controversies may revolve around the validity of self-reported assertiveness measures compared to external evaluations.

Gender and Leadership Roles: Nursing leadership roles may require different levels and types of assertiveness. Controversies may relate to how gender and

assertiveness impact opportunities for leadership within the nursing profession.

Implicit Bias: The presence of implicit bias in nursing education and practice may influence how assertiveness is perceived and assessed. Controversies may arise regarding strategies to mitigate bias in education and clinical settings.

Impact on Patient Care: The relationship between nursing students' assertiveness and the quality of patient care may be debated. Research may examine whether assertive behavior positively or negatively affects patient outcomes.

Addressing these emerging issues and controversies requires a multi-faceted approach that involves research, education, and practice. Nursing programs can consider integrating assertiveness training into their curriculum, emphasizing the importance of gender-neutral and culturally sensitive education, and promoting inclusivity and diversity within the nursing profession. Additionally, ongoing research can help to refine our understanding of the complex relationship between age, gender, and assertiveness among nursing students.

REFERENCES

Amicone, K. F. (2015) Assertiveness in Nursing Students, Honours research projects, University of Akron.

Arigbabu, A. A., Oladipo, S. E. & Owolabi-Gabriel, M. A. (2010) Gender, marital status and religious affiliation as factors of assertiveness among Nigerian education majors, International Journal of Psychology and Counselling, 3 (2), 20-23.

Ibrahim, S. A. (2015). Factors affecting assertiveness among student nurses. Nurse Education Today, 3 1(4), 356-360.

Karagozolu, Kahve, E., Koc, O., Adamiolu, O., (2008). Self- esteem and assertiveness of final year Turkish university students. Nurse Education Today 28, 641 —649.

Lawton, S., Stewart, F., (2005). Assertiveness: making yourself heard in distnct nursing. British Journal of Community Nursing 10 (6), 281 283.

McCabe C., & Timmins, F. (2005) Nurses' and midwives' assertive behavior in the workplace. Journal of Advanced Nursing, 51(1), 38-45.

Unal, S. (2002). Evaluation the effect of self-awareness and communication techniques on nurses' assertiveness and self-esteem. Contemporary Nurse, 43(1), 90-98.

Educational Intervention to Improve Adherence to Methicillin-Resistant Staphylococcus Aureus Control Practice among Nurses at Two Hospitals in Egypt

[1*]Wafaa Mahmoud Elboraey Elsayed, [2] Amany Mohamed Shebl, [3] Heba Abd El Kader Ali, [4]Eman Sobhy Omran
[1]Doctorate Degree in Surgical-Medical Nursing, Faculty of Nursing, Benha University, Egypt
[2]Professor of Surgical-Medical Nursing, Faculty of Nursing, Mansoura University
[3]Professor of Surgical-Medical Nursing, Faculty of Nursing, Benha University
[4]Lecturer of Surgical-Medical Nursing, Faculty of Nursing, Benha University
[*]Corresponding Author's Email: wafaaboraey171@gmail.com

Abstract

Purpose: The aim of this study was to evaluate the effectiveness of an educational intervention to improve adherence to Methicillin-Resistant Staphylococcus Aureus control practice among nurses at two Hospitals in Egypt. Methicillin-resistant Staphylococcus aureus (MRSA) is a major pathogen and the most common multidrug-resistant bacterium which is responsible for nosocomial infections, with elevated morbidity and mortality rate. Nurses need a comprehensive intervention to improve adherence to MRSA control practice in order to decrease the rate of its spread.

Methodology: Pre /post-quasi-experimental design was used in this study. This study was carried out at two hospitals in Egypt (Mansoura Chest Disease and Benha University Hospital). A convenient sample of 80 nurses. Tool I- Nurses' Structured Interview Questionnaire in Arabic language. Tool II - Observational Checklist for MRSA and Infection Control Practice. Descriptive statistics such as frequencies, means, and standard deviations were used to summarize the data. Chi-square and r (correlation) were used to correlate between the studied variables.

Findings: Before the application of educational intervention 32.5% of nurses have poor practice levels and the percentage decreased to 7.5%, 14.5 immediately and 2 months post-educational intervention respectively.

Unique Contribution to Theory, Practice and Policy: The educational intervention was effective in improving adherence to Methicillin-Resistant Staphylococcus Aureus control practice among nurses at the two hospitals as there is a statistically significant difference between all phases of the study regarding nurses' practice. Emphasizing the importance of following the latest updated evidence-based approaches to infection control in continuing training programs, and infection prevention with national guidelines (standard precautions) should be provided.

Keywords: *Adherence, Educational Intervention, Methicillin-Resistant Staphylococcus Aureus, Nurses, Practice.*

INTRODUCTION

Healthcare-associated infections (HAIs) are a major problem for the safety of patients and healthcare workers as well and healthcare systems and organizations should consider their prevention as a top priority (Al-Omari et al., 2020). Antibiotics are crucial to medical care as they have a significant role in treating infections thus ensuring the success of surgeries. Antimicrobial resistance makes antibiotics lose their efficacy so many resources of health care and treating illness would be affected which threatens human lives in the worst-case scenario (World Health Organization, 2021).

One of the Antimicrobial drug resistance bacterium is Methicillin-resistant Staphylococcus aureus (MRSA) (Ruotsalainen, 2021). MRSA is still known as one of the most important nosocomial organisms. These isolates are usually resistant to all currently available β-lactam antibiotics penicillins, cephalosporins, and carbapenems (Asaad, 2021).

Currently, 20–40% of all hospital-acquired pneumonia and ventilator-associated pneumonia are caused by MRSA (Dahal & Schwan, 2018). The rate of MRSA colonisation in Iran shows 32.8% (95% CI: 26.0-40.4), in Egypt 58.8% Staphylococcus aureus was MRSA, in Ethiopia 44% was MRSA, in China 4.7% of Staphylococcus aureus was MRSA, in Ireland 8.9% and in Europe and the United States the lowest, 1.8% are reported (Emaneini, Jabalameli, Rahdar, Leeuwen & Beigverdi, 2017).

In a study done in Egypt, the prevalence of MRSA in HCWs was 14.8% (Haggag, Aboelnour& Al-Kaffas, 2019). MRSA prevalence causes a heavy economic burden not only on hospitals but also patients too. The length of a hospital stay for an MRSA infection is roughly twice as long as for any other type of stay—10 days versus 4.6 days, respectively. MRSA infections result in higher morbidity and mortality (Kilpatrick et al., 2020).

Colonization of MRSA is commonly in the nose, perineum, and throat**.** The colonization has developed into an MRSA infection as MRSA lead to clinical disease. This would involve, for example, skin and soft tissues, bones or joints, intravenous or implanted devices. Treatment of these infection needs expensive and potentially toxic antibiotics (Prabhoo et al., 2019).

MRSA can survive in the environment for a very long time and is easily transmitted through a variety of methods. The most significant method for patient MRSA infection in healthcare facilities continues to be the staff-to-patient transmission. MRSA prevalence can be decreased by the use of

infection prevention and control (IPC) techniques and restrictions on the use of antibiotics (Coia et al., 2021).

Infection prevention and control measure is at the top of the principles of nursing practice, infections prevention requires continuous adherence and compliance with a number of good practices including maintaining of a clean environment, invasive devices and aseptic techniques management**.** Hospitals, outpatient surgical centers, and other healthcare facilities must effectively prevent and manage infections as a necessity of both patient safety and business viability (Nguemeleu et al., 2020).

Nurses need to be aware regarding the essential roles and the consequences of nonadherence to MRSA transmission prevention practices such as hand washing or hand hygiene for infection prevention (Ahmed, Khalil & Abo Seada, 2021) so, educational intervention is always needed to enhance nurses' practice regarding MRSA

Significance of the Study

Two studies were conducted in Egypt and revealed that Staphylococcus aureus isolates are the major pathogens responsible for wound and surgical site infections at Minia University Hospital and is consider a potential threat for patients in Egypt (Ahmed, Gad, Abdalla, Hasaneen & Abdelwahab, 2014) also, transmission of MRSA among patients is linked mainly to health care personnel. 13.5% of HCPs at Hospital in Fayoum had nasal MRSA colonisation (Hefzy et al., 2016).

Compliance with infection prevention and control measures has critical implications for HCWs' safety, patient protection, and the care environment (Alhumaid et al., 2021). Therefore, educational intervention is needed for health care workers specially nurses to improve adherence and compliance with infection control practices.

Aim of the Study

The study aimed to evaluate the effectiveness of an educational intervention to improve adherence to Methicillin-Resistant Staphylococcus Aureus control practice among nurses at two hospitals in Egypt

Research Hypothesis

H_{01}: Nurses' adherence to Methicillin Resistant Staphylococcus Aureus control practice will improve after the application of the educational intervention.

METHODOLOGY

Technical Design

Study design: A pre- and post-test design; prior to and at the completion of the educational intervention.

Setting: This study was conducted at two hospitals in Egypt; Mansoura Chest Disease Hospital and chest department at Benha University Hospital.

Figure 1: Egypt Map Illustrate the Location of Mansoura and Benha in Egypt

Source:https://www.istockphoto.com/vector/egypt-map-with-flag-gm861872198-142801541

Subjects

A convenience sample of 80 nurses working at Chest Hospital at Mansoura and chest department at Benha University Hospital.

Tools of Data Collection

Tool (I): Nurses' Structured Interview Questionnaire

This part involved nurses' demographic characteristics as (age, gender, and educational level, hospital name, years of experience, and previous MRSA training courses. Tool was found to be reliable (r = 0.9167).

Tool (II): Observational Checklist for MRSA and Infection Control Practice:

This tool was adapted from (WHO, 2016) to evaluate nurses' adherence to MRSA control guidelines. The observation checklist was completed during patient care activities and the participants were not aware of being observed. The observation checklist had infection control practices distributed under different domains namely universal precautions (hand washing, gloving, gowning, goggles, and personal hygiene), linens, sharps, and spills precaution. Disposal of waste safely, avoiding overcrowding patients, avoiding unnecessary patient transfers between wards, and isolating patients with a known or suspected infection. The reliability was found by Cronbach's Alpha test Kuder Richardson (KR-20) which evaluates tools' internal consistency and it found to be (r = 0.9485).

Each step that was completed according to the observational checklist for MRSA and infection control practice received a score of one, whereas steps that were skipped or completed incorrectly received a score of zero. The practice score system was put into the following categories: Less than 50% for poor practice, and 50–75% for fair practice while more than 75% considered a good practice (Mohamed, Ahmed & Tawfik, 2020).

Pilot Study

Prior to conducting the study, a pilot study was done on 8 nurses as representatives for 10% of the total sample. Nurses who participated in the pilot study were not included in the study sample. Pilot study results were used to examine the proposed methods for statistical and data analysis. Study tools were accomplished without any difficulty, adding support to instrument validity.

Data Collection Procedure

Once permission was obtained to conduct the study, a schedule for data collecting was established which done over six-months started from July to December 2020. The researcher arrived the hospital from 8.30 a.m. to 1 p.m.

The researcher introduced herself to the participants and start to explain the study's aim.

A pre-intervention observation checklist was conducted to determine the nurse's practice. The time needed for completing the checklist ranged from 20 to 30 minutes. Based on the pre-intervention observation data and the relevant literature about MRSA and infection control prevention practice, the educational program and session's content were developed. The researcher translated the gap between ideal and actual practice, identified needs, requirements and deficiencies into the educational intervention aim and objectives and then an illustrative colored Arabic booklet was developed and distributed to all participants.

The educational intervention included 8 sessions deived on two main parts theorical and practical part. Each session last about 30-45 minutes according to nurses' responses and active participation, as well as the time available and the content of each session.

Session 1:

The main objective of this session was to improve the nurses' knowledge about hospital acquired infection, MRSA infection, methods of transmission of MRSA infection.

Session 2:

The main objective of this session was to discuss how to prevent MRSA and list therapeutic aspects for MRSA infection.

Session 3:

The main objective of this session was to describe and draw six steps in the chain of infection. Compare and contrast methods of preventing infection by breaking the chain of infection.

Session 4:

The main objective of this session was to discuss the factors that place an individual at increased risk for infection, especially health care workers. Describe precautions that must be taken when there is concern about contact, droplet, or airborne disease transmission, linens precautions, and sharps precautions

Session 5:

The main objective of this session was to identify the purpose of hand washing, rubbing and how to demonstrate hand washing and hand rubbing demonstrate donning and removing of gloves.

Session 6:

The main objective of this session was to demonstrate donning and removing of gowning.

Session 7:

The main objective of this session was to demonstrate donning and removing of mask and googles.

Session 8:

The main objective of this session was to demonstrate how to clean spills of blood and other body fluids.

All 80 nurses were divided into 13 groups, 4 to 7 nurses for the group according to nurses's workload. The whole intervention was implemented in 360 minutes (180 minutes) as the theoretical part and the same for the practical component. Each group received 4 sessions in two weeks.

The researcher utilized a variety of approaches of learning in carrying out the program. These included interactive lectures with group discussions, brainstorming to exchange ideas between the participants and the researcher, demonstration and re-demonstration.

Various media were used, including power-point presentations, posters, pictures, illustrated booklet to enhance the process of learning.

After the application of the educational intervention, each participant was evaluated using the observation questionnaire. Comparison between nurses' practice was done before, immediately, and 2 months after the application of the educational intervention to evaluate nurses' ability to apply and adhere to infection control practice to prevent MRSA infection and the degree of effectiveness of health education intervention.

Ethical Considerations

Consent form was obtained from all study subjects after clarifying that participation in this study was voluntary also, anonymity and confidentiality

were assured through coding of all data, and all the information gathered about the nurses' practices was protected and it doesn't affect their annual appraisal.

Statistical Analysis

After completion of data collection, data were coded, organized, categorized, computerized, and analyzed using the statistical package for social sciences software (SPSS) version 25.0. Armonk, NY: IBM Corp. Descriptive statistics such as frequencies, means, and standard deviations were used to summarize the data. Chi-square and r (correlation) were used to correlate between the studied variables. P values that were less than 0.05 & 0,001 were considered statistically significance and highly significant respectively. The given graphs were constructed using Microsoft Excel software.

FINDINGS

Table 1: Frequency Distribution of Nurses Regarding their Demographic Data

Item	No (80)	Percentage
Age		
≤20	3	3.8%
21≥30	34	42.5%
31≥40	42	52.5%
41≥50	1	1.3%
Educational level		
Diploma degree	24	30.0%
Bachelors degree	42	52.5%
Post-graduate degree	14	17.5%
Name of hospital nurse is working in		
Mansoura	54	67.5%
Benha	26	32.5%
Previous attending training course for MRSA prevention		
No	70	87.5%
Yes	10	12.5%

Table 1 illustrates that (52.5%) of nurses were aged between (31-40) years, concerning their educational level, more than half of nurses 52.5% had a Bachelor's degree, 67.5% of participants works at Mansoura hospital while 32.5% works at Benha hospital. 87.5% of nurses had not received previous MRSA training courses.

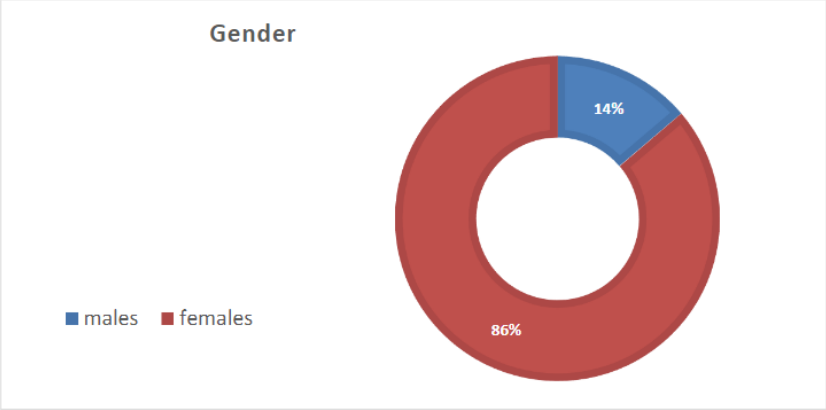

Figure 2: Frequency Distribution of Nurses Regarding their Gender

Figure 2 illustrates that the majority of the study sample (86.3%) were females.

Figure 3: Frequency Distribution of Nurses Regarding their Work Experience

Figure 3 shows that more than half of nurses had from five to ten years of experience.

Table 2: Comparison between the Studied Nurses' Practices Regarding Universal Precautions (Maintain Hand Washing, Disposable Gloves, Aprons, Goggles and Face Shield) (N= 80)

Variables	Pre-Educational intervention				Post Educational intervention				Post-2-months of Educational intervention			
	Done		Not Done		Done		Not Done		Done		Not Done	
	No.	%	No.	%	No.	%	No	%	No	%	No	%
1. Maintain hand washing												
a) Before and after each patient contact	38	47.5	42	52.5	54	67.5	26	32.5	53	69.7	23	30.3
b) After handling blood and body fluids and items contaminated with it.	54	67.5	26	32.5	64	80.0	16	20.0	61	80.3	15	19.7
c) Prior to the aseptic technique.	51	63.8	29	36.3	65	81.3	15	18.8	61	80.3	15	19.7
d) After removing protective clothing/gloves	52	65.0	28	35.0	64	80.0	16	20.0	62	81.6	14	18.4
e) Before handling invasive devices	42	52.6	38	47.5	55	68.8	25	31.3	53	69.7	23	30.3
f) Following bed making	49	61.3	31	38.8	58	72.5	22	27.5	54	71.1	22	28.9
g) Proper drying of hands	27	33.8	53	66.3	45	56.3	35	43.8	43	56.6	33	43.4
Mean ± SD	**3.91 ± 1.255**				**5.06 ± 1.461**				**5.09 ± 1.480**			
2. Use disposable gloves when handling blood and body fluids.	51	63.8	29	36.3	63	78.8	17	21.3	61	80.3	15	19.7
Mean ± SD	**0.64 ± 0.484**				**0.79 ± 0.412**				**0.80 ± 0.401**			
3. Use disposable aprons for direct patient care, bed making, and aseptic techniques.	52	65.0	28	35.0	49	61.3	31	38.8	47	61.8	29	38.2
Mean ± SD	**0.35 ± 0.480**				**0.61 ± 0.490**				**0.62 ± 0.489**			
4. Use goggles and a face shield when applying procedures and contact with a patient with an infection.	40	50.0	40	50.0	51	63.8	29	36.3	47	61.8	29	38.2

It can be seen in Table 2 that in the pre-educational intervention period more than half of studied nurses maintained hand washing after handling blood and body fluids and items contaminated with it, prior to the aseptic technique, after removing protective clothing/gloves, before handling invasive devices, and also the following bed making 67.5% 63.8%, 65.0%, 52.6%, 61.3% respectively then the percent elevated to more than 70% immediately after educational intervention

Also, only 33.8 % of nurses dried their hands properly pre-educational intervention and the percentage elevated to 56.3 %, 56.6% immediately and two months post the educational intervention respectively. Furthermore, more than half 56.3% of these nurses applied all the steps of hand washing in the

immediate post educational intervention and in the post two-month phase. With highest mean ± SD was found in the post-2-months period (5.09 ± 1.480).

Additionally, it's found that 63.8% of nurses used disposable gloves when handling blood and body fluids in the pre-educational intervention period. 78.8% did it in the immediate-post educational intervention period, and 80.3% in the post-2-months period. Regarding using disposable aprons for direct patient care, bed making, and aseptic techniques, 65% of nurses did it in the pre-educational intervention period. 61.3% did it in the immediate-post educational intervention period, and 61.8% did it in the post-2-months period. Also, 50% of nurses used goggles and face shields in the pre-educational intervention period. 63.8% used it in the immediate-post educational intervention period, and 61.8% did it during the post-2-months period.

Table 2: Cont. Comparison between the Studied Nurses' Practices Regarding Universal Precautions (Personal Hygiene) (n= 80)

Variables	Pre-Educational intervention				Post Educational intervention				Post-2-months of the Educational intervention			
	Done		Not Done		Done		Not Done		Done		Not Done	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
5. Personal Hygiene												
a) Practice social hand washing appropriate to the situation.	18	22.5	62	72.5	37	46.3	43	53.8	36	47.4	40	52.6
b) Wear unit uniform clean and tidy.	40	50.0	40	50.0	55	68.8	25	31.3	51	67.1	25	32.9
c) Remove jewelry while at work.	41	51.3	39	48.8	52	65.0	28	35.0	48	63.2	28	36.8
d) Keep fingernails short and clean.	64	80.0	16	20.0	67	83.8	13	16.3	63	82.9	13	17.1
e) Change unit uniform when soiled with blood or body fluids.	42	52.5	38	47.5	53	66.3	27	33.8	51	67.1	25	32.9
f) Cover nose and mouth when coughing and sneezing.	39	48.8	41	51.3	54	67.5	26	32.5	53	69.7	23	30.3
g) Avoid exposure to an individual with a communicable disease without standard precaution.	35	43.8	45	56.3	41	51.3	39	48.8	36	47.4	40	52.6
Mean ± SD	**3.49 ± 0.981**				**4.49 ± 1.432**				**4.45 ± 1.455**			

It can be found in Table 2 con., that only 22.5% of the studied nurses practiced social hand washing appropriate to the situation at the pre-educational intervention period but in the immediate and two months post educational intervention 46.3%, 47.4% did it respectively. Half 50% of nurses wore unit uniform clean and tidy in the pre-educational intervention period compared with 68.8% in the immediate post and about two third 67.1% in the post-2-months period.

Regarding covering nose and mouth when coughing and sneezing, 51.3% of them didn't do it in the pre-educational intervention period, but more than two

third 67.5% did it in the immediate-post and the 2 months post educational intervention. Lastly, 56.3% and 52.6% of nurses didn't a void exposure to an individual with a communicable disease without standard precaution either in the pre-educational intervention or in the post-2-months period respectively, but only 51.3% of them avoided it in the immediate post educational intervention.

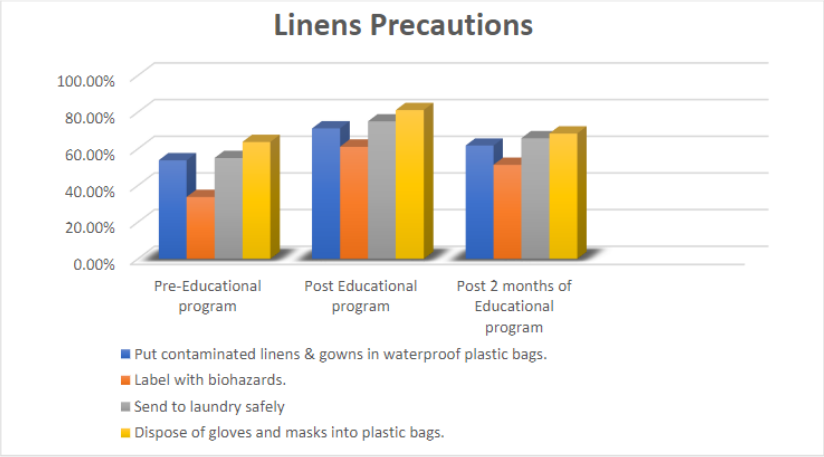

Figure 4: Comparison between Participant' Practice Pre, Immediate and Post 2 Months of the Educational Intervention as Regards Linens Precautions

It's found in this figure that 53.8% of nurses put the contaminated linens in the waterproof plastic bags in the pre-educational intervention period, 71.2% in the immediate post period, and 61.8% put them in the 2 months post-educational intervention. Regarding labeling with biohazards, 66.2% didn't do that pre-educational intervention, but 61.2% and 51.3% did that in both the immediate post and 2 months post-educational intervention.

Additionally, 55%, 75%, and 65.8% of nurses sent the contaminated linens to laundry safely in the three phases respectively. More than 63.8% of the studied nurses disposed gloves and masks into plastic bags in the pre-educational intervention period compared to 81.2%, 68.4 in the immediate post and 2 months post-educational intervention respectively. The highest mean was found in the immediate post educational intervention (2.89 ± 1.031).

Table 3: Comparison between Participant' Practice Pre, Immediate, and Post 2-Months of Educational Intervention as Regards Sharps Precautions

6. Sharps Precautions:												
Variables	**Pre-Educational intervention**				**Post Educational intervention**				**Post-2-months of the educational intervention**			
	Done		**Not Done**		**Done**		**Not Done**		**Done**		**Not Done**	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1. Needles are not recapped by hand.	58	72.5	22	27.5	68	85.0	12	15.0	56	73.7	20	26.3
2. Needles not be bent or broken before disposable.	74	92.5	6	8.5	78	97.5	2	2.5	68	89.5	8	10.5
3. Leave sharps devices carefully in a special container.	58	72.5	22	27.5	63	78.8	17	21.3	52	68.4	24	31.6
Mean ± SD	**2.38 ± 0.718**				**2.61 ± 0.606**				**2.32 ± 0.912**			

Table 3 shows that in the pre-educational intervention 27.5% of nurses recapped the needles by hand compared to 15% in the post educational intervention, and 26.3% in the post 2 months. Also, 8.5% of these nurses bent or broke the needles before disposing in the preeducational intervention compared to 2.5% in the immediate post and 10.5% in the post 2 months. Additionally, 72.5% of them left sharp devices carefully in a special container compared to 78.8% in the immediate-post educational intervention and 68.4% in the post-2months period. The highest mean was found in the immediate post educational intervention (2.61 ± 0.606).

Table 4: Comparison between Participant' Practice Pre, Immediate, and Post 2-Months of Educational Intervention Concerning Precautions Related to Cleaning Spills of Blood and other Body Fluids

Variables	Pre-Educational intervention				Post Educational intervention				Post-2-months of the Educational intervention			
	Done		Not Done		Done		Not Done		Done		Not Done	
	No.	%	No.	%	No	%	No	%	No	%	No	%
7. Precautions related to cleaning spills of blood and other body fluids												
1. Decontaminate surface with O.5% sodium hydrochloride (or suitable disinfection.	55	68.8	25	31.2	69	86.3	11	13.8	58	76.2	18	23.7
2. Clean the surface with soap and water.	34	42.5	46	57.5	53	66.3	27	33.8	46	60.5	30	39.5
3. Rinse with clean water.	47	58.8	33	41.2	59	73.8	21	26.3	53	69.7	23	30.3
4. Dispose of excreta and waste disposal into the toilet.	58	72.5	22	27.5	68	85.0	12	15.0	60	78.9	16	21.1
Mean ± SD	**2.43 ± 0.911**				**3.11 ± 0.811**				**2.86 ± 0.989**			

Table 4 illustrates that 68.8% of nurses decontaminated surface with O.5% sodium hydrochloride in the pre-educational intervention period compared to 86.3% in the immediate-post and 76.2% in the post 2 months. Also, 57.5% of these nurses didn't clean the surface with soap and water, but 66.3% of them cleaned it in the immediate-post and 60.5% did it in the post-2-months period.

Additionally, 58.8% of these nurses rinsed with clean water in the pre-educational intervention period, and 73.8% in the immediate-post and 69.7% in the post-2-months did that. Concerning dispose of excreta and waste disposal into the toilet, 72.5% of them did it in the pre-educational intervention period compared to 85% in the immediate-post and 78.9% in the post-2-months period.

Table 5: Comparison between Participant Nurses' Practice Pre, Immediate, and Post 2months concerning Dispose of Waste Safely, Avoid Overcrowding Patients, Avoid Unnecessary Patient Transfers between Wards, and Isolate Patients with a Known or Suspected Infection

Variables	Pre-Educational intervention				Post Educational intervention				Post-2-months of the Educational intervention			
	Done		Not Done		Done		Not Done		Done		Not Done	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
5. Dispose of waste safely.	43	53.8	37	46.2	57	71.3	23	28.8	53	69.7	23	30.3
Mean ± SD	**0.54 ± 0.502**				**0.71 ± 0.455**				**0.70 ± 0.462**			
6. Avoid overcrowding patients	43	53.8	37	46.2	63	78.8	17	21.3	57	75.0	19	25.0
Mean ± SD	**0.54 ± 0.502**				**0.79 ± 0.412**				**0.75 ± 0.436**			
7. Avoid unnecessary patient transfers between wards.	47	58.8	33	41.2	61	76.3	19	23.8	57	75.0	19	25.0
Mean ± SD	**0.59 ± 0.495**				**0.76 ± 0.428**				**0.75 ± 0.436**			
8. Isolating patients with a known or suspected infection.	46	57.5	34	42.5	60	75.0	20	25.0	58	76.3	18	23.7
Mean ± SD	**0.58 ± 0.497**				**0.75 ± 0.436**				**0.76 ± 0.428**			

It's illustrated that 53.8% of nurses disposed wastes safely in the pre-educational intervention period compared to 71.3% in the immediate-post and 69.7% in the 2 months post-educational intervention. Also, 53.8% of nurses avoided overcrowding patients in the pre-educational intervention period compared to 78.8% in the immediate-post and 75.0% in the 2 months post-educational intervention. 58.8% of these nurses avoided the unnecessary patient transfers between wards in the pre-educational intervention period compared to 76.3% in the immediate-post and 75.0% in the 2 months post-educational intervention.

Additionally, 57.5% of them isolated patients with a known or suspected infection in the preeducational intervention period compared to 75.0% in the immediate-post and 76.3% in the 2 months post-educational intervention.

Table 6: Comparison between Total Nurses Practice Grades Along the Three Periods (N = 80)

Score of Total Practice										P^1	P^2	P^3
Frequency & percentage	Pre-intervention			Immediately post-intervention			Post-2-months of intervention					
	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	t =- 8.616	t =-5.725	t =3.426
No.	2	52	26	29	45	6	22	43	11	P =0.00**	P =0.00**	P =0.01**
%	2.5	65	32.5	36.3	56.3	7.5	28.9	56.6	14.5			
Mean ± SD	17.99 ± 3.743			23.21 ± 3.980			22.18 ± 4.465					

P^1 = Pre-intervention and immediately post-educational intervention.

p^2= Pre-intervention and post 2 months of intervention.

p^3= Immediately post- intervention and post 2 months of intervention.

*= Significant differences at $p<0.05$

It is illustrated in Table 6 that statistically significant differences were present between all phases of the study regarding nurses' practice, and the highest mean was in the immediate-post intervention phase (23.21 ± 3.980).

Discussion

It is important to note that antibiotic resistance is an ever-worsening issue that creates challenges for practice nurses when caring for patients with infections. Antibiotic-resistant infections are associated with a higher mortality rate than infections caused by the same organism that is not resistant to multiple antibiotics and prolonged hospital lengths of stay impose a considerable burden on health care system networks worldwide (Fabian, 2019).

Staphylococcus aureus, especially MRSA), is one of the antibiotic-resistant infections. Approximately 30% of the world's human population is persistent carriers of S. aureus (Mulcahy & McLoughlin, 2016). The carriage rate is even higher in healthcare workers and clinical students (Lloyd-Price, Abu-Ali & Huttenhower, 2016).

Moreover, it was evident that the nurse's role is focused on the prevention and control efforts of different infection types. The nursing profession is the major section of healthcare in the world, they are always on the front lines of providing health care (Palacios-Ceña et al, 2021). Therefore, they must demonstrate practices towards achieving the goal of prevention of HAIs, especially MRSA infection. Our study aimed to evaluate the effectiveness of an educational intervention to improve adherence to Methicillin-Resistant Staphylococcus Aureus control practice among nurses at two hospitals in Egypt**.**

Part I: Nurses' Demographic Characteristics

In relation to current study findings of nurses demographic it was noticed that the large number of nurses aged between 31 to 40 years old, and female gender was the dominant in our study, this can be clarified as younger nurses are needed to directly deliver care to the patients as followed by job descriptions and traditional working styles and after years of work and experience, they would be involved more in management duties.

These findings are consistent with previous studies done by Khalil and AbdelFattah Hassan, (2019) whom reported that the larger number of their participants were in the age group of 31 to 40 years old and the majority of them were female. Khalifa, and Farghally, (2020) also reported that female nurses represented the whole percentage of their study sample. On the other hand, study done in Egypt by Ahmed et al., (2021) revealed that nearly half of nurses aged between 26 to 29. Also, Abukhader, and Abukhader, (2020) stated that the majority of nurses in their study were male.

In relation to working experience, more than half of nurses have experience of five to ten years and this may be due to increased number of nurses with age between 30 to 40. This finding is in agreement with a study by (Moqbel, Shebl & Soliman, 2015) which found that more than half of the nurses had 5-10 years and not in line with Suss (2017) study about nurse knowledge, attitude, and compliance related to MRSA and revealed that 86.96% of the studied sample was five years of experience or less.

Concerning nurses' attendance of previous courses related to MRSA prevention, the current findings revealed that the majority of nurses had no previous training courses related to MRSA. This could be due to the shortage of nurses and increase in workload so the number of nurses who had a chance to attend training was few. It is known that the training courses play a significant role in training nurses on how to follow infection control guidelines thus enhancing nurses' practice. So, nurses should be provided with recurrent training courses

Our findings are supported by another study conducted by (Ahmed et al., 2021) that searched critical care nurses' knowledge regarding Methicillin-Resistant Staphylococcus Aureus at Mansoura University Child Hospital and found that the majority of nurses had no previous training courses**.** On the other side**,** a study by Suss (2017) found that more than half of nurses received courses regarding MRSA.

Part II: Nurses Practice Regarding MRSA Prevention Guidelines

A statistically significant difference was found among all phases of the study regarding nurses' practice, and the highest mean was in the immediate post intervention phase. This could be due to the enrichment of their practice by the educational intervention, and it is noteworthy that the findings of the present study supported the study hypothesis, which indicated that nurses' adherence to Methicillin Resistant Staphylococcus Aureus control practice will be improved after the application of the educational intervention.

A Palestinian study by Sikora, and Zahra, (2021) about knowledge, attitudes, and adherence to MRSA transmission prevention among health care workers reported poor adherence concerning performance in all aspects of MRSA infection control precautions among studied subjects. They concluded that education of nurses regarding hand hygiene, cleaning and disinfecting medical equipment, environmental contamination prevention, and isolation precautions should start with staff who are directly in contact with the patients, beginning with nurses, physicians, medical technicians, and environmental service staff.

Our findings are consistent with Aby, (2015) who demonstrated that the majority of their nurses had unsatisfactory levels of practice in the pre infection control training program, however, the majority of them in the post program had satisfactory levels and continued in the follow-up had a high level of practice.

Specifically, regarding the standard precautions; concerning hand washing, more than half of nurses applied all the steps of hand washing in the immediately post-educational intervention and the post two months period with the highest mean post-2-months. This could be referred to the knowledge provided about the importance of complete adherence to hand washing practices for their safety and protection from infections. To our knowledge, the WHO, (2022) stated that hospital-acquired infections may be transmitted through contaminated hands. Practicing hand hygiene using alcohol-based hand rub or soap and water reduces harmful organisms.

A study by Zeigheimat et al., (2016) indicated that a significant difference was found between the scores of both groups after intervention in terms of practice regarding hand washing and safe injection practice. Additionally, the systematic review by Waramlah, and Huda, (2019) stressed that education alone can enhance standard precautions (SP) knowledge whereas adding education to infection control support could improve practice and compliance slightly. Conversely, education in addition to using checklists, and financial and technical support will probably enhance compliance with SP.

Moreover, the same result was in line with Khalil and Abdel-Fattah Hassan, (2019) who revealed that there was an improvement in nurses' knowledge and attitude responses regarding MRSA infection control and prevention after receiving an educational intervention.

The present study states that the appropriate use of PPE increased after implementation of the educational intervention indicating that periodic

observation of infection practices of nurses assists them in understanding the compliance level and improving the practices.

This is in line with (Mello, Latha, Alva & Barnini Banarjee, 2019) who conducted a cross-sectional descriptive survey and stated that appropriate use of PPE was found in only 43.25% of HCP and highlighted the importance of using educational intervention to improve nurses compliance. The researchers explained this by saying that while these practices are carried out regularly in their units, there are some factors that could limit their effectiveness, such as work overload, a lack of knowledge of the proper steps, or a lack of time to carry out the procedure properly, such as hand washing. So, these findings could give a reflection about the need for nurses to refresh and update their skills.

Our study showed an improvement regarding personal hygiene including social hand washing, wearing the unit uniform clean and tidy and changing it when becoming dirty, removing jewelry while at work, and keeping fingernails short and clean, covering the nose and mouth when coughing and sneezing after application of the intervention.

This is in harmony with Moqbel et al., (2015) who found an improvement in compliance with the practice of personal hygiene immediately and 3 months after application of the educational intervention. Additionally an Egyptian study by Mohamed, Mohamed, and ELmetwaly, (2021) found statistically significant differences before and immediately after applying their educational intervention and post three months of their intervention regarding all practice items concerning universal precaution.

The present study revealed that the minority of nurses had adequate practice levels prior to intervention implementation as regards handling of soiled linens and this percentage improved to include most of them after the intervention and in follow-up phase. This result is on the same line with (EL-Shafey, El-Dakhakhny & Mohammed, 2019) who found that less than half of nurses had an unsatisfactory level of practice related to the handling of soiled linens and practice level improved after the implementation of the educational intervention. Then decreased slightly 2 months after the intervention. This could be reflected to the absence of close supervision, or nurses' neglect, therefore, linens were collected in bags and sent to the laundry.

Regarding precautions related to cleaning blood and other body fluids spills including cleaning the surface with soap and water, rinsing with clean water, disposing of excreta and waste disposal into the toilet, the highest mean (3.11

± 0.811) was found after the educational intervention and this goes with the result of Moqbel et al., (2015) which revealed that the highest mean was found after three months from the educational. This highlight that educational intervention implementation is very effective in enhancing nurses' adherence to infection control practice regarding spills of blood and other body fluids precautions (Alhumaid et al., 2021).

CONCLUSION AND RECOMMENDATIONS

Conclusion

There was a statistically significant difference between all phases of the study regarding nurses' practice, and the highest mean was found in the immediate post intervention phase (23.21 ± 3.980). This means that the educational intervention was effective in improving adherence to Methicillin-Resistant Staphylococcus Aureus control practice among Nurses at both hospitals.

Recommendations

- Further studies should be conducted to assess the reasons behind the lack of commitment to MRSA control precautions practice and try to find specific causes and solutions for compliance.
- Emphasizing the importance of following the latest updated evidence-based approaches of infection control in continuing education and training programs, and infection prevention with national guidelines (standard precautions) should be provided.
- Enhancing Infection Control Committee tasks to be really implemented.
- Further studies with a larger number of health care providers and different geographical area are needed to confirm these findings.

Acknowledgment

The authors would like to express their sincere gratitude to all nurses participating in the current study for their cooperation throughout the study period.

Emerging Issues and Controversies

Resource Allocation: The allocation of resources for comprehensive educational interventions may be limited in healthcare systems with competing priorities. Controversies may arise regarding budget allocation for infection control education compared to other healthcare needs.

Sustainability: Ensuring the sustainability of educational interventions over time can be challenging. Controversies may revolve around the long-term commitment to training and education programs.

Cultural Sensitivity: Cultural beliefs and practices can influence healthcare behaviors, including adherence to infection control measures. Controversies may pertain to the balance between cultural sensitivity and the promotion of evidence-based practices.

Language Barriers: Language barriers can affect the effectiveness of educational interventions, particularly in multilingual healthcare settings. Controversies may arise concerning the language of instruction and communication.

Health Literacy: The health literacy levels of nurses can vary, affecting their ability to understand and apply infection control practices. Controversies may involve tailoring educational materials to different literacy levels.

Access to Continuing Education: The availability of ongoing education and professional development opportunities for nurses may be limited. Controversies may relate to equitable access to educational resources.

Assessment and Accountability: The assessment of nurses' adherence to MRSA control practices and accountability for non-compliance can be contentious. Balancing the need for accountability with a supportive learning environment is essential.

Infection Control Guidelines: Evolving infection control guidelines and recommendations may lead to controversies over which guidelines to prioritize in educational interventions and practice.

Multidisciplinary Collaboration: Effective MRSA control often requires collaboration among healthcare professionals, including nurses, physicians, and infection control teams. Controversies may arise over the roles and responsibilities of different healthcare providers.

Patient-Centered Care: Balancing infection control practices with patient-centered care can be challenging. Controversies may relate to how nurses prioritize the safety of patients while maintaining a caring and empathetic approach.

Stigmatization: Healthcare workers who are carriers of MRSA may face stigmatization, which can discourage adherence to control practices. Controversies may pertain to addressing stigma within the healthcare setting.

Data Collection and Reporting: Collecting and reporting MRSA infection data may lead to controversies, particularly if data disclosure affects the reputation of healthcare facilities or healthcare workers.

Addressing these issues and controversies requires a comprehensive approach that includes evidence-based education, cultural sensitivity training, continuous professional development, and strong leadership support. Strategies should be adaptable to the local context and healthcare system while emphasizing the importance of patient safety and infection control best practices. Collaborative efforts among healthcare stakeholders, policymakers, and educational institutions are crucial for the successful implementation of educational interventions in Egypt and other healthcare settings.

REFERENCES

Abukhader, I., & Abukhader, K. (2020). Effect of Medication Safety Education Program on Intensive Care Nurses' Knowledge regarding Medication Errors. *Journal of Biosciences and Medicines*, *8*(6), 135-147.

Aby, A. R. (2015). A Study to Assess the Effectiveness of Structured Teaching Programme Regarding Knowledge on Nosocomial Infections in Newborns Among the Staff Nurses Working in Labour and Paediatric Units of Selected Hospitals In Tumkur District. *International Journal of Healthcare Sciences*, *3*(1), 110-119.

Ahmed, E. A. E. A., Khalil, N., & Abo Seada, A. (2021). Critical Care Nurses' Knowledge Regarding Methicillin-Resistant Staphylococcus Aureus at Mansoura University Child Hospital. *Mansoura Nursing Journal*, *8*(3), 231-240.

Ahmed, E. F., Gad, G. F., Abdalla, A. M., Hasaneen, A. M., & Abdelwahab, S. F. (2014). Prevalence of methicillin resistant Staphylococcus aureus among Egyptian patients after surgical interventions. *Surgical infections*, *15*(4), 404-411. https://doi.org/10.1089/sur.2013.212

Alhumaid, S., Al Mutair, A., Al Alawi, Z., Alsuliman, M., Ahmed, G. Y., Rabaan, A. A., & Al-Omari, A. (2021). Knowledge of infection prevention and control among healthcare workers and factors influencing compliance: a systematic review. *Antimicrobial Resistance & Infection Control*, *10*(1), 1-32.

Al-Omari, A., Al Mutair, A., Alhumaid, S., Salih, S., Alanazi, A., Albarsan, H., & Al Subaie, M. (2020). The impact of antimicrobial stewardship program implementation at four tertiary private hospitals: results of a five-years pre-post analysis. *Antimicrobial Resistance & Infection Control*, *9*(1), 1-9. https://doi.org/10.1186/s13756-020-00751-4

Asaad, A. M. (2021). Continuous medical education activities; Answers to Case No. 5: Infection control for MRSA transmission. *Microbes and Infectious Diseases*, *2*(3), 597-604. DOI: 10.21608/mid.2021.184415

Coia, J. E., Wilson, J. A., Bak, A., Marsden, G. L., Shimonovich, M., Loveday, H. P., & Wilson, A. P. R. (2021). Joint Healthcare Infection Society (HIS) and Infection Prevention Society (IPS) guidelines for the prevention and control of meticillin-resistant Staphylococcus aureus (MRSA) in healthcare facilities. *Journal of Hospital Infection*, *118*,S1-S39. DOI:https://doi.org/10.1016/j.jhin.2021.09.022

Dahal, M., & Schwan, W. R. (2018). Management of methicillin-resistant Staphylococcus aureus mediated ventilator-associated pneumonia. *Current trends in microbiology*, *12*, 95.

EL-Shafey, S. A. E. B., El-Dakhakhny, A. M., & Mohammed, B. M. (2019). Effect of an Educational Training Program for Nurses about Infection Control Precautions in Their Practice in the Pediatric Critical Care. *Afro-Egyptian Journal of Infectious and Endemic Diseases*, *9*(1), 20-30.

Emaneini, M., Jabalameli, F., Rahdar, H., Leeuwen, W. B. V., & Beigverdi, R. (2017). Nasal carriage rate of methicillin resistant Staphylococcus aureus among Iranian healthcare workers: a systematic review and meta-analysis. *Revista da Sociedade Brasileira de Medicina Tropical*, *50*, 590-597.

Fabian, E. C. (2019). Nurse Practitioner Attitudes, Perceptions and Knowledge about Antimicrobial Stewardship.

Haggag, M. G., Aboelnour, A. E., & Al-Kaffas, M. (2019). MRSA screening and spa gene detection in isolates from healthcare workers at ophthalmology hospital in Egypt. *Bulletin of the National ResearchCentre*, *43*(1), 1-7. https://doi.org/10.1186/s42269-019-0253-0

Hefzy, E. M., Hassan, G. M., & Abd El Reheem, F. (2016). Detection of Panton-Valentine leukocidin-positive methicillin-resistant Staphylococcus aureus nasal carriage among Egyptian health care workers. *Surgical infections*, *17*(3), 369-375. https://doi.org/10.1089/sur.2015.192

Khalifa, S. M. A., & Farghally, S. M. (2020). Nurses' Perception of Safety Culture, Medication Errors Occurrence and Reporting. *IOSR Journal of Nursing and Health Science (IOSR-JNHS)*, 8 (3), 08-15.

Khalil, N. S. & Abdel-Fattah Hassan, A.D.(2019). Effectiveness of structured teaching programme regarding prevention and control of methicillin-resistant Staphylococcus aureus on nurses' knowledge and attitude in Egypt. Research Article - *Clinical Practice (2019) Volume 16, Issue 2*

Kilpatrick, M., Hutchinson, A., Manias, E., & Bouchoucha, S. L. (2020). Paediatric nurses', children's and parents' adherence to infection prevention and control and knowledge of antimicrobial stewardship: a systematic review. *American Journal of Infection Control*.

Lloyd-Price, J., Abu-Ali, G., & Huttenhower, C. (2016). The healthy human microbiome. *Genome medicine*, *8*(1), 1-11.

Mello, D. D., Latha, T., Alva, J., & Barnini Banarjee, V. K. (2019). Methicillin Resistant Staphylococcus Aureus (MRSA) Infection: Knowledge, Preventive Practices and Colonisation among Healthcare Professionals of Surgical Units. *Indian Journal of Public Health*, *10*(12), 587.

Mohamed, E. I. E., Mohamed, E. M. H., & ELmetwaly, A. A. M. (2021). Effect of educational Guidelines Intervention regarding COVID-19 on nurses knowledge and precautionary practices in gastrointestinal endoscopes. *Egyptian Journal of Health Care, 12*(4), 318-331

Mohamed, N. I., Ahmed, S. M., & Tawfik, A. H. (2020). Assessment of pediatric nurses' performance regarding intravenous Therapy. *Minia Scientific Nursing Journal*, *8*(1), 3-14.

Moqbel, A. A., Shebl, A. M., & Soliman, H. M. (2015). Effectiveness of planned health education program on nurses' knowledge and practice for preventing infection in gastrointestinal endoscopy units at major hospitals in Yemen. *Journal of Nursing and Health Science,(IOSR-JNHS) e-ISSN*, 2320-1959.

Mulcahy, M. E., & McLoughlin, R. M. (2016). Host–bacterial crosstalk determines Staphylococcus aureus nasal colonization. *Trends in microbiology*, *24*(11), 872886.

Nguemeleu, E. T., Beogo, I., Sia, D., Kilpatrick, K., Séguin, C., Baillot, A., & Boivin, S. (2020). Economic analysis of healthcare-associated infection prevention and control interventions in medical and surgical units: systematic review using a discounting approach. *Journal of Hospital Infection*, *106*(1), 134-154.

Palacios-Ceña, D., Fernández-de-Las-Peñas, C., Palacios-Ceña, M., de-la-LlaveRincón, A. I., & Florencio, L. L. (2021). Working on the frontlines of the COVID19 pandemic: A qualitative study of physical therapists' experience in Spain. *Physical Therapy*, *101*(4), pzab025.

Prabhoo, R., Chaddha, R., Iyer, R., Mehra, A., Ahdal, J., & Jain, R. (2019*).* Overview of methicillin resistant Staphylococcus aureus mediated bone and joint infections in India. *Orthopedic reviews*, *11*(2).

Ruotsalainen, I. (2021). Preventing the spread of MRSA in home care. Available athttps://www.theseus.fi/bitstream/handle/10024/509959/Preventing%20the%20spread%20of%20MRSA%20in%20home%20care.pdf?sequence=2

Sikora, A., & Zahra, F. (2021). Nosocomial infections. In *StatPearls [Internet]*. StatPearls Publishing.

Suss. (2017). Nurse Knowledge, Attitude, and Compliance Related to Methicillin Resistant Staphylococcus aureus. Retrieved from http://aquila.usm.edu/honors_thes es.

Waramlah, R., & Huda, B. Z. (2019). The Interventions to Improve Standard Precautions (Sp) Knowledge And Practice Among Healthcare Workers (Hcws): A Systematic Review. *International Journal of Public Health and Clinical Sciences*, *6*(3), 53-66.

World health Organization (2022). https://www.who.int/campaigns/world-hand-hygieneday

World Health Organization. (2016). Improving infection prevention and control at the health facility: interim practical manual supporting implementation of the WHO Guidelines on Core Components of Infection Prevention and Control Programmes (No. WHO/HIS/SDS/2018.10). World Health Organization.

World Health Organization. 2021. about AMR. Retrieved on 6 November 2021. Available at https://www.euro.who.int/en/health-topics/disease-prevention/antimicrobialresistance/about-amr .

Zeigheimat, F., Ebadi, A., Rahmati - najarkolaei, F., & Ghadamgahi, F. (2016). An investigation into the effect of health belief model- based education on healthcare behaviors of nursing staff in controlling nosocomial infections. Journal of Education and Health Promotion, 5(23), 1–8. https://doi.org/10.4103/22779531.184549.

Institutional Factors Affecting Uptake Blended Learning among Students in Kenya Medical Training College

[1*]Mr. George Tibi, [2]Mrs. Bonareri Regina, [3]Mr. Winstone Churchil Okumu, [4]Mrs. Kainde Musyoka, [5]Ms. Candy Carol Anyango & [6]Mr. Ben Mutiria
Kenya Medical Training College

Abstract

Purpose: The objective was to determine the institutional factors affecting uptake blended learning among students in Kenya Medical Training College

Methodology: A cross-sectional descriptive study was done. In the KMTC campuses the average student population is thirty thousand (30,000). The research used simple random sampling in the selected campuses. The sample size was 384. Primary data was collected using questionnaires and Quantitative data was analyzed using descriptive statistics whereas qualitative data was analyzed using content analysis. Qualitative data was transformed into themes and analyzed with the helped of SPSS version 25. Collected data was edited, sorted, cleaned and coded for data analysis.

Findings: The study found that at 5% significance level, there is no association between student's awareness of the existence of WIFI within the campus to aid in e-learning and attending virtual classes, χ^2 *(1, N= 396) = 1.720, p = 0.190.* At 5% level of significance, there is no association between the stability of the campus WIFI network and the percentage of attending virtual classes, χ^2 *(1, N= 230) = 18.408, p = .104*

Unique Contribution to Theory, Practice and Policy: The study recommends that the institutions should providing information communication and technological support to students on E learning platform. The study also recommends the government to support the transition to blended learning of Kenya Medical Training College through funding.

Keywords: *Institutional Factors, Blended Learning, Students, Kenya Medical Training College.*

INTRODUCTION

Blended learning is an approach to education that combines online educational materials and opportunities for teacher/ student interaction, with the traditional face–to-face classroom methods (Seaman *et al.,* 2018). Blended learning was introduced in the United States in late 1960s. It advanced rapidly and in 1970s Television (TV)-Based Technology to Support Live Training was commonly used in most of the trainings. During this time blended learning started with companies that began using video networks to train their employees. The instructor no longer had to be physically on-site in order to train staff members. In blended learning, learners are able to communicate with their peers, watch the lecturers and even address any questions or concerns by sending them messages (Ginder *et al.,* 2019).

Globally blended education is one of the fastest growing segments of higher education and the demand continues to rise (Seaman, Allen, & Seaman, 2018; Ginder *et al.,* 2019). Despite growing importance and demand for blended method of study, there is very little data on the scale and scope of blended learning (Seaman, Allen & Seaman 2018). In the United States of America Department of Education, there were more than 3.1 million students enrolled in fully online education as at 2017 and this represented only 15% of all students enrolled in United States. Colleges and universities (Ginder *et al.,* 2019).

In sub-Saharan Africa, Ghana is rated as one of the best countries for blended learning though its online education is still in its infancy (Togoe, 2012.) In Ghana 5 out of every 10 students have internet and most universities have 24-hour access to the internet. Though people have access to the internet, the online education in Ghanaian universities is still not fully embraced and most students prefer traditional systems to e-education (Togoe, 2012).

Statistics shown by UNESCO in indicate that e-learning was improving in Ghana, though for the whole of Sub Saharan Africa the program was a huge challenge because of lack of infrastructure facilities such as computers and network in most universities to adopt the blended programs successfully (Togoe, 2012).

In Kenya, blended learning method of study was started in 2005 and is still in use at Jomo Kenyatta University of Agriculture and Technology (Tarus *et.al* 2015). Most institutions of higher learning in Kenya after the closure of all learning institutions in March 2020 have resorted to the blended learning. There are a number of surveys that have been carried out in both developed

and developing countries and existing literature has identified several critical success factors in implementing blended learning programs and also a number of studies have pointed out different challenges and issues in implementing blended learning. Blended learning has many benefits to include widening access so as to reach many learners in a flexible manner, improving the effectiveness of learning and teaching via technology, reducing public spending in education and training and increasing the quality of research among others (Arkorful *et al.,* 2014).

However, despite the numerous blended learning benefits, promises and opportunities for e-learning initiatives in institutions of higher learning in Kenya are faced by a number of challenges that leave stake holders dissatisfied when they fail to meet their expectations (Wright, 2016). A study by Nyerere *et al.,* (2012) on the delivery of open distance and e-learning in Kenya revealed that most of the learners 90.8% were dissatisfied with the delivery of e-learning and 85.6% of the e-tutors indicated that they were demotivated in executing their e-learning responsibilities. The drawbacks in turn have led to a slow uptake of the blended learning in institutions of higher learning in Kenya (Nyerere, 2016).

Following the global pandemic of COVID-19, on March 15, 2020, the Kenyan government abruptly closed all schools and colleges nationwide in response to the COVID-19. This measure disrupted nearly 17 million learners countrywide. Universities and institutions of higher learning have adopted e-learning in the former face to face approach as a new strategy to teaching and learning.

Blended learning provides flexibility in learning for both students and teachers. Integration of the virtual and physical landscapes enables both instructors and students to become learners, but this is most effective when there is institutional support through the provision of professional learning and the opportunity for redesigning courses for the most appropriate blend (Bliuc, 2007).

In most organizations, management often agrees that blended learning is the correct direction for training initiatives, but it fails to understand that this is a complex process that needs thought beyond an individual programme. Challenges within the organizations include; overcoming the idea that blended learning is not as effective as traditional classroom training; redefining the role of the facilitator; managing and monitoring participant progress (Hofmann, 2011).

For e-learning is to be successfully adopted in a school, teachers and head teachers should be involved in the decision making processes (Cox, 2010). Leadership and support from senior management are identified as critical factors for successful implementation (Birch & Burnett, 2009; Browne *et al.*, 2010).

Gunawardena (2005) points out that for e-learning to succeed in the developing world, it needs to build on another important pillar: the existence of infrastructure, along with connectivity. Developing countries like Kenya still face a lot of challenges while implementing e-learning which requires advanced level of technological infrastructure and heavy investment of resources especially at the initial stages. Most of the Kenyan public colleges rely on government exchequer for funding which has been dwindling in the recent years.

According to Zake (2009), poverty is one of the most important barriers, especially due to the fact that ICT is important and therefore relatively more expensive in Africa than in developed countries. Therefore, most of the Kenyan institutions of higher learning have opted for blended learning as a starting point since it's a cheaper option in terms of implementation and requirements.

Despite the existence of a considerable body of research demonstrating the value of blended approaches to tele-collaboration (Dooly, 2008; O'Dowd, 2007), a preliminary research study carried out by O'Dowd (2010) revealed that the activity remains relatively peripheral in nature and has yet to be taken up by a significant number of university educators. With this in mind, in 2011 the INTENT (Integrating Tele-Collaborative Networks in Higher Education) project group carried out a large scale quantitative and qualitative study on tele-collaborative activity in European higher education which involved a survey of over 300 university lecturers and students and the collection of seven case studies of representative tele collaborative exchanges which involve universities in many European and non-European contexts. The study set out to explore what types of tele collaborative practices were being undertaken by European university educators. The principal results are outlined in detail in Guth *et al*., (2012).

According to Chambers *et al.*, (2006), factors necessary to achieve normalization of Computer Assisted Language Learning (CALL) activities were identified to be certain criteria which are dependent on the institutions involved and others which relate to the educators themselves. Factors which

depend on institutional policy include the integration of CALL facilities into 'normal' teaching space, the provision of additional time to teachers for preparation and planning of CALL activities and a conducive attitude on the part of management to the integration of new technologies.

It also involves ensuring the integration of CALL activities into the syllabus and the provision of both technical support and pedagogical training for teachers in their technological activities. The factors related to educators included teachers feeling sufficiently confident to use the new technologies, having a realistic understanding of both the strengths and limitations of the technological practice in question, and the willingness of experienced practitioners to engage in training and collaboration with novice colleagues.

According to Kashorda and Waema (2014) in their E-readiness Survey of Kenyan Universities (2013) Report, the networked PCs available per 100 student's ratio was 3.8 in Kenyan universities, which was considered quite low. The e-readiness survey also indicated that 16,174 student lab computers were available for 423,664 students at the 30 universities and only 17% of students accessed computers from their campuses.

On the other hand, 53% of students owned over 200,000 laptop computers in the 30 universities. It was therefore recommended in the report that universities should invest in student computer labs to serve the students who are unable to purchase laptop computers or those who may not wish to carry their laptop computers to university campuses. The e-readiness survey further revealed that universities in 2013 achieved Internet bandwidth of 4.0 Mb/s per 1,000 students compared to only 0.431Mb/s per 1,000 students in 2008. In Kenya, institutions emphasized the provision of infrastructure, investment in human capital required to operate those ICTs has almost been ignored (Kenya ICT Authority, 2014).

Additionally, there is a challenge of discrepancies in computers owned by the school. The findings have shown that the number of computers in schools varies widely from one school to another. Statistically, 17.9% of schools (10) had less than 5 computers. 46.4% of schools had 20 or less schools while 62.5% had l30 or fewer computers, which lead to a big student computer ratio and school still do not afford enough funds to purchase computers. Some of the schools (25.9%) have to outsource maintenance services while 3.7% use CFSK supports. Majority of schools (58.9%) examined lack Internet connectivity (Oloo, 2009).

Problem Statement

World Health Organization recognized the spread of COVID-19 as a pandemic on 11 March 2020 as Italy, Iran, South Korea, and Japan reported rapidly increasing numbers of the COVID-19 cases. (WHO, 2020) Following the global spread of the virus in many countries in the world Kenya included, there was then an immediate and sudden suspension of schools, colleges, universities and other government institutions as a strategy to contain the pandemic. Most institutions of higher learning in Kenya including KMTC have resorted to the blended learning. However, the implementation challenges faced by these universities have continued to impact negatively on the effective utilization of the blended learning (Tarus *et al.,* 2015). Therefore, this research seeks to determine the challenges of blended learning among students in Kenya Medical Training College

METHODOLOGY

The specific objectives are to find out individual challenges, find out social economic challenges and institutional challenges. A cross-sectional descriptive study will be done. In the KMTC campuses the average student population is thirty thousand (30,000). The research will use simple random sampling in the selected campuses. The sample size will be 384. Primary data will be collected using questionnaires and Quantitative data will be analyzed using descriptive statistics whereas qualitative data will be analyzed using content analysis. Qualitative data will be transformed into themes and analyzed with the helped of SPSS version 25. Collected data will be edited, sorted, cleaned and coded for data analysis.

FINDINGS

Institutional Challenges Availability of Wifi

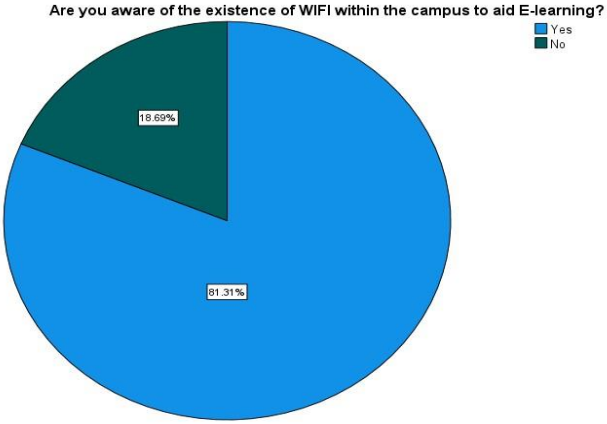

Figure 1: Are You Aware of the Existence of Wifi Within The Campus to Aid E-Learning?

From the figure above, it is evident that 81.3% of the students are aware of the existence of the WIFI while 18.7% are not.

WIFI Usage

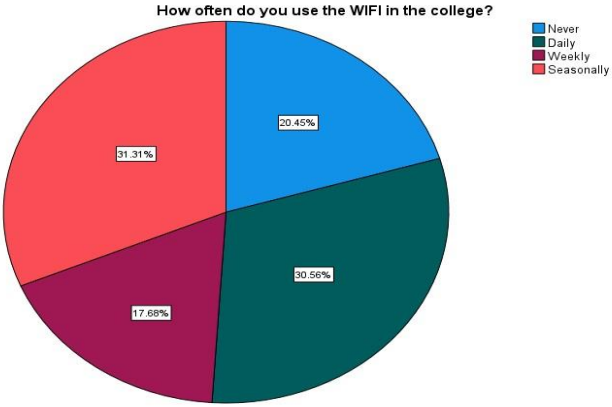

Figure 2: How Often Do You Use the Wifi in the College?

31.3% of the students use the college WIFI seasonally, 30.6% daily, 17.7% weekly while 20.5% have never used the college WIFI. The pie chart of the frequency of usage of college WIFI is presented above.

Stability of WIFI

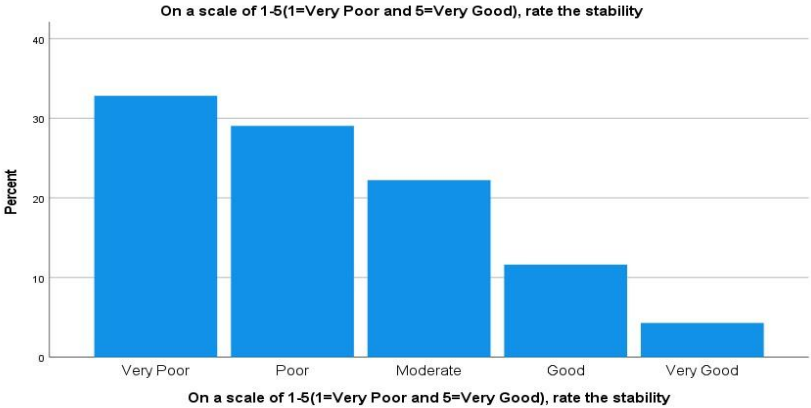

Figure 3: Network Stability

Clearly, most of the students (32.8%) indicated that the stability of the network is very poor, 29% reports that the stability of poor, 22.2% indicated that the stability is moderate. However, only 11.6% and 4.3% reported that the stability is good and very good respectively

Support on E-Learning

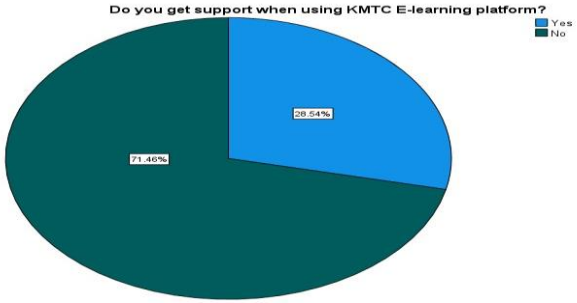

Figure 4: Do You Get Support When Using KMTC E-Learning Platform?

Among the surveyed students, 71.5% reported that they do not get any support when using the elearning platform of the college while 28.5% get support when using the platform.

Examinations on E-Learning Platform

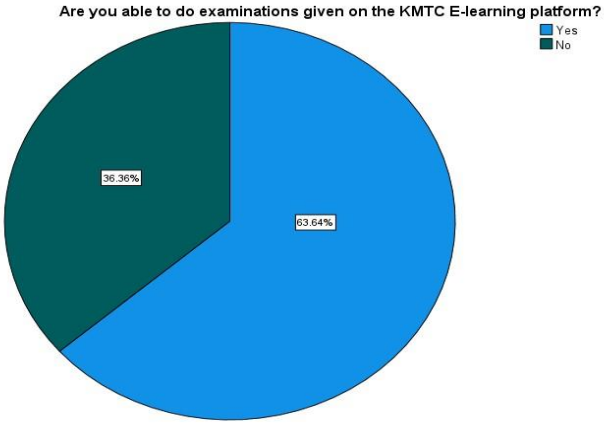

Figure 5: Are You Able to Do Examinations Given on the KMTC Elearning Platform?

63.6% of the surveyed students indicated that they are able to do examinations given on the college's e-learning platform while 36.4% said they are not.

At 5% significance level, there is no association between student's awareness of the existence of WIFI within the campus to aid in e-learning and attending virtual classes, $\chi 2$ (1, N= 396) = 1.720, p = 0.190. At 5% level of significance, there is no association between the stability of the campus WIFI network and the percentage of attending virtual classes, $\chi 2$ (1, N= 230) = 18.408, p = .104

CONCLUSION AND RECOMMENDATIONS

Conclusions

The study concluded that Institutional support is a challenge when it comes to achievement of blended learning. The study also concluded that students used the college WIFI seasonally, there was stability of the network is very poor and that they do not get any support when using the elearning platform of the college.

Recommendations

The study recommends that the institutions should providing information communication and technological support to students on E learning platform. The study also recommends the government to support the transition to blended learning of Kenya Medical Training College through funding.

Emerging Issues and Controversies

Technological Infrastructure: The availability and reliability of technology infrastructure, including internet access and computer resources, can be a significant barrier to blended learning adoption. Controversies may arise over investments in technology and concerns about equity in access.

Digital Divide: The digital divide, which includes disparities in digital literacy and access to technology, can affect students' ability to engage in blended learning. Controversies may relate to addressing these disparities and ensuring inclusivity.

Faculty Preparedness: Faculty members' readiness and capacity to design, deliver, and support blended learning can be a contentious issue. Faculty development and training programs may be needed to address these concerns.

Course Design and Quality: The design and quality of blended learning courses can vary. Controversies may arise over the adequacy of course materials, assessments, and instructional strategies.

Assessment and Evaluation: Issues related to the assessment of student learning in blended environments, including concerns about cheating and academic integrity, may be debated.

Student Engagement: Ensuring active student engagement in blended learning can be challenging. Controversies may involve strategies for promoting interaction, collaboration, and motivation.

Data Privacy and Security: Protecting students' data and ensuring privacy and security in online learning environments is essential. Controversies may pertain to data breaches and compliance with data protection regulations.

Cost of Technology: The cost of technology and internet connectivity can be a barrier to students. Controversies may relate to who should bear these costs, whether it's the institution, students, or the government.

Access to Healthcare Facilities: Given KMTC's focus on healthcare education, access to clinical and laboratory facilities for practical training can be an issue, particularly when blended learning is emphasized. Controversies may involve the balance between online and hands-on training.

Regulatory and Accreditation Issues: Blended learning programs may need to meet specific regulatory and accreditation standards. Controversies may arise

regarding compliance and whether blended learning can meet these requirements.

Student Support Services: Providing adequate student support services, including technical support and academic advising, in a blended learning environment can be challenging. Controversies may relate to the adequacy of support services.

Pedagogical Approaches: Controversies may revolve around the choice of pedagogical approaches in blended learning, including debates over the best balance between online and face-to-face components.

Student Feedback and Adaptation: Gathering and acting upon student feedback on blended learning experiences is important for improvement. Controversies may involve the responsiveness of institutions to student input.

REFERENCES

Bliuc, A. G. (2007). Research focus and methodological choices in studies into. In Internet and Higher Education, 10, 31-244. E-Learning resources. (2012). Retrieved July 31, 2012 from http://www.grayharriman.com/blended_learning.htm

Cox M.J. (2010). The changing nature of researching information technology in education. In Researching IT in education: Theory, practice and future directions (Eds. A. McDougall, J. Murnane, A. Jones & N. Reynolds), pp. 11–24. Routledge: Taylor and Francis Group, Abingdon, England.

Hofmann, J. (2011). Soapbox: Top 10 challenges of blended learning. Retrieved July 31, 2012 fromhttp://www.trainingmag.com/article/soapbox-top-10-challenges-blendedlearning

Kashorda, M., & Waema, T. (2014). E-Readiness survey of Kenyan Universities (2013) report. Nairobi: Kenya Education Network.

Oloo, L. M. (2009). Baseline survey report for ICT in secondary schools in selected parts of Kenya Maseno.

Touray, A., Salminen, A. and Mursu, A. (2013). ICT barriers and critical success factors in developing countries. The Electronic Journal on Information Systems in Developing Countries, 56(7), 1-17

Vázquez-Cano, E.; León Urrutia, M.; Parra-González, M.E.; López Meneses, E. Analysis of Interpersonal Competences in the Use of ICT in the Spanish University Context. Sustainability 2020, 12, 476. [CrossRef]

Zake, J. (2009), Challenges to e-learning in developing communities of Africa. Available at: http://digitallearning.in (Accessed on August 28, 2013).

The Relationship between Perceived Social Support and Medication Adherence among Adult Type 2 Diabetes Mellitus Patients Attending the Diabetes Clinic in a Tertiary Health Institution in South- South Nigeria

Okwuosa J.C.[1], Nwajei A.l.[1], Owolabi A.O.[1], Ibuaku J.C.[1], Owolabi M.O.[1] &Aniekwensi EC.[2]
[1]Department of Family Medicine, Federal Medical Centre Asaba
[*]Corresponding Author's Email: okwuosajoseph23@gmail.com

Abstract

Purpose: Medication adherence can be defined as the extent to which a patient's behaviour corresponds to the medication dosing regimen including time, dosing, and interval of medication intake. In chronic conditions with long-term therapies like hypertension, diabetes, depression, etc., adherence is important in achieving target outcomes but is often low. It has long been recognized that support from family, friends and significant others do play a role in helping diabetics adhere to their medication which might lead to optimal glycaemic control. This study set out to find out what influence perceived social support has, as regards medication adherence among adult type 2 diabetic Nigerians assessing care in Federal Medical Centre, Asaba, Nigeria.

Methodology: The study was conducted on 244 participants who attended the diabetic clinic of the Federal Medical Centre, Asaba from September to November 2018. Data was collected by means of an interviewer-administered questionnaire comprising of 3 sections. Section A was for sociodemographic characteristics, section B was the 8-item Morisky Medication Adherence Scale for information on medication adherence and section C was the modified Multidimensional Scale of Perceived Social Support to collect information on perceived social support.

Findings: All the recruited 244 participants completed the study giving a response rate of 100%. The age range of the respondents was 18 to 87 years with a mean age of 51.9 ± 6.1 years. Females accounted for a higher percentage of respondents [60.2%] compared to their male counterparts [39.8%]. Good total perceived social support was significantly associated with high medication adherence [p=0.0001]. A good total perceived social support (OR = 3.27; 95% CI = 2.25 - 4.71; P = 0.0001) has 3.27 times the odds for high medication adherence than a poor total perceived social support.

Unique Contribution to Theory, Practice and Policy: The study shows that high medication adherence is significantly associated with good perceived social support. It is important that healthcare providers caring for patients with type 2 diabetes involve families, friends, or significant others in their management so as to improve their medication adherence. Routine evaluation of perceived social support is also recommended for type 2 diabetes patients with poor medication adherence.

Keywords: *Perceived Social Support, Medication Adherence, Type 2 Diabetes Mellitus.*

INTRODUCTION

In spite of the advancements of medical sciences in the management of diabetes mellitus over the years, management of diabetes mellitus remains a very big burden to people living with the disease, their families, the health care system and the society in general. A wide variety of pharmacological classes of drugs are now available for the treatment of type 2 diabetes mellitus but the adherence to oral hypoglycemic agents for patients with diabetes still remains sub-optimal.[1]

Medication adherence can be defined as the extent to which a patient's behavior corresponds with the prescribed medication dosing regimen including timing, dosing and interval of medication intake.[2,3] Adherence is a multifactorial phenomenon that can be influenced by various factors. These factors can be divided into five different dimensions: social and economic-related factors, therapy-related factors, disease-related factors, patient- related factors and health care system related factors.[2,3] Some factors can have an influence on intentional non- adherence (conscious decision not to take the medication e.g. because of high cost) while others can have an influence on non-intentional non-adherence (e.g. forgetfulness because of mental comorbidity).[2,3] In chronic conditions with long-term therapies, adherence is important to achieve target outcomes but is often low.[4]

Social support is a network for family, friends, neighbors and community members that are available in times of need to give physical, psychological and financial help. Perceived social support can be defined as a perception that one is accepted, cared for and provided with assistance from certain individuals. Support can come from many sources such as family, friends, and significant others.[5] Positive social support from family has been linked with improved patient behavior, adherence to medications and lifestyle recommendations.[6]

The study set out to assess how perceived social support influences medication adherence among adult type2 diabetes mellitus Nigerians accessing care in the Diabetic Clinic of Federal Medical Centre, Asaba, with the hope that the findings would motivate clinicians to enquire about social support in routine outpatient consultation encounter with adult type2 diabetes mellitus patients.

METHODOLOGY

Setting

The study was carried out in the diabetic outpatient clinic of Federal Medical Centre, Asaba which is run by Consultant Endocrinologist with a team of Resident Doctors once weekly, every Thursday from 9:00 am to 4:00 pm.

Study Population

This comprised of all adult type 2 diabetes mellitus patients that have been diagnosed and on treatment for a minimum of six months. The study was carried out over a period of three months [September to– November, 2018].

Data obtained from the Department of Health Information Management records of the hospital showed that the clinic attends to an average of 65 patients in a week comprising of about 5 new patients and 60 old patients. In one month, that is 60 patients x 4 = 240 patients, while in 3 months, it will be 240 patients x 3 = 720 patients.

The sample size was determined using the Leslie Kish formulation for population > 10,000.[7]

$n = \underline{z^2\ pq}$

Where

d2

~~Z~~ =the standard normal deviation usually set at 1.96 which corresponds to 95% confidence interval.

P =the proportion of the target population estimated to have a particular characteristic. In a study done in Ibadan by Adisa et al, the percentage of medication adherence among adult type 2 diabetes mellitus patients was 60 percent.[8]

Hence P=0.60 q = 1.0 – p = (1.0-0.60) = 0.40

d = the degree of accuracy desired usually set at p 0.05

From the calculation

n = 368.79

When studying population < 10,000, the formula

$$nf = \frac{n}{1 + \frac{n}{N}} = \frac{369}{1 + \frac{369}{720}} = \frac{369}{1 + 0.512} = 244$$

Where nf is the desired sample size.

Hence the sample size in this study was 244.

Inclusion Criteria

Registered diabetes mellitus patients from the ages of 18 years and above who gave informed consent and had been on treatment with oral antidiabetic medications for at least six months and who lived with families, friends or relatives so that information on social support can be obtained.

Exclusion Criteria

Critically ill patients as these patients require urgent medical attention. Also, patients with major psychiatric problems because they may not be able to answer questions and pregnant women because the study was not on gestational diabetes mellitus.

Tools for Data Collection

Data was collected using the data collection form which was sub divided in different sections.

Section A: This was a pre-tested interviewer administrated questionnaire containing information on socio-demographic characteristics of the participants. The information that was collected included age, gender, marital status, ethnic group, religion, educational status and occupation.

Section B: This was the 8 - item Morisky Medication Adherence Scale [MMAS-8][9] which was used to collect information on medication adherence. The MMAS-8 has a score range of 0-8. In this study scores were categorized into 3 levels of adherence. Score of 8 was categorized as high adherence; scores of 6-7 as medium adherence, and scores of 0-5 as low adherence. The sensitivity and specificity of 8-item MMAS are 93% and 53% respectively. The validity value via Cronbach's alpha is 0.88. MMAS-8 has the advantages of being brief, inexpensive, and applicable in various settings.[10]

Section C: This was the modified Multidimensional Scale of Perceived Social Support [MSPSS] devised in 1988 by Zimet et al.[11] This was used to collect information on perceived social support. MSPSS is a 12-item questionnaire that objectively measures perceived social support using 3 subscales namely Family subscale; Friends subscale and significant others subscale. The total

modified MSPSS contains 12 questions scored 1-5. The minimum score is 12, while the maximum is 60 and the average is 36. For the purpose of this study, total score below 36 was regarded as poor perceived social support, while scores of 36 and above were regarded as good perceived social support. The MSPSS provides 4 scores: family (FA), friends (FR), significant others (SO) and the total. The higher the score the more the perceived social support level. The MSPSS has been used in various studies in Nigeria.[12]

Study Protocol

Adult patients seen during the study period were selected through a process of systematic random sampling which involved picking the first patient from an initial ballot and then every third patient from the first (sampling fraction 244/720 = 1:3) that registered to see the physician and who met the selection criteria.

Data Analysis

Data was analyzed using the Statistical Package of Social Sciences [SPSS] version 20. The data was summarized as percentages and frequency tables depicting the pattern of medication adherence, while Spearman's ranked correlation and ANOVA were used to determine the relationship between perceived social support and medication adherence. A p-value of ≤ 0.05 was considered statistically significant.

Ethical Consideration

Ethical approval for the study was obtained from the Ethical Committee of Federal Medical Centre, Asaba. Each participant signed a written voluntary informed consent after the rationale and procedure of the study were explained to them.

FINDINGS

Socio-Demographic Characteristics

All the recruited 244 participants completed the study giving a response rate of 100 $^0/_0$. The age range of the respondents was 18 to 87 years with a mean age of 51.9+ 6.1 years. As seen in (Table 1) below, majority of the respondents [45.5%] were above 54years of age, while the 18-30 age group constituted the least number of respondents (11.5$^0/_0$). The female gender accounted for a higher percentage of respondents (60.2$^0/_0$) compared to their male counterparts (39.8$^0/_0$).

One hundred and fifty-three respondents (62.7%) were married while only six (2.5%) representing the least number were co-habiting. The respondents that had primary and secondary education were highest in number (31.6%) as opposed to those with no formal education (15.5%). The majority of the respondents (79.9%) practiced Christianity while 11.1% of the respondents practiced Islam. Those practicing other religions constituted the least (9.0%)

Sixty-one respondents (25.0%) were civil servants, while 143 respondents (58.6%) were self- employed. The Igbo ethnic group accounted for 40.2% of the respondents while the Itsekiri ethnic group being the lowest number accounted for only 7.8%.

Table 1: Socio-Demographic Characteristics of Respondents Percentage Distribution of Respondents by Socio-Demographic Characteristics Socio-Demographic Characteristic

Socio-demographic characteristic	Frequency (%)
Age (years)	
18- 30	28 (11.5)
31- 42	34 (13.9)
43- 54	71 (29.1)
>54	111 (45.5)
Gender	
Male	97 (39.8)
Female	147 (60.2)
Marital status	
Single	42 (17.2)
Married	153 (62.7)
Separated	13 (5.3)
Widowed	14 (5.7)
Divorced	16 (6.6)
Cohabitating	6 (2.5)
Educational status	
Nil formal	38 (15.5)
Primary	77 (31.6)
Secondary	77 (31.6)
Tertiary	52 (21.3)
Religion	
Christianity	195 (79.9)
Islam	27 (11.1)
Others	22 (9.0)
Occupation	
Civil service	61 (25.0)
Self-employed (Business & artisans)	143 (58.6)
Unemployed	40 (16.4)
Ethnicity	
Ijaw	77 (31.6)
Igbo	98 (40.2)
Itsekiri	19 (7.8)
Urhobo	50 (20.4)

Distribution of Medication Adherence in the Respondents

Table 2 below shows the distribution of medication adherence in the respondents. One hundred and seventy-nine respondents (73.4%) had a high adherence score. Eleven respondents (4.5%) had a medium adherence score while 54 (22.1%) respondents had a low adherence score.

Table 2: Medication Adherence in the Respondents by the Morisky Medication Adherence Scale (MMAS-8)

Total score (MMA8)	Adherence	N (%)
0-5	Low	54(22.1)
6-7	Medium	11(4.5)
8	High	179(73.4)

The Perceived Social Support of the Respondents

Table 3 below shows the perceived social support of the respondents. One hundred and forty-two respondents (58.2%) had good family social support while 102 respondents (41.8%) had poor family social support. Eighty-nine respondents (36.5%) had good friends' social support while 155 respondents (63.5%) had poor friends' social support. One hundred and fifty-three respondents (62.7%) had good significant others support while 91 respondents (37.3%) had poor significant others support. Total perceived social support: 155 respondents (63.5%) had good total perceived social support while 89 respondents (36.5%) had a poor total perceived social support. There was a statistically significant difference in the mean scores of all the components of the perceived social support of the respondents.

Table 3: Perceived Social Support of the Respondents

Perceived Social Support	N (%)	Mean score ±SD	F-Stat	P-Value
Family social support				
Good	142(58.2)	14.95±0.88	1.68	0.001*
Poor	102(41.8)	11.33±0.81		
Friends social support	89(36.5)			
	155(63.5)			
Good		13.62±1.55	2.71	0.001*
Poor		11.19±1.27		
Significant other support	153(62.7)	14.91±0.20	1.93	0.001*
Good	91(37.3)	10.71± 0.36		
Poor				
Total				
Good	155(63.5)	37.77±1.13	3.72	0.0001*
Poor	89(36.5)	31.80±1.55		

*significant at $p<0.05$;

The Relationship between Total Perceived Social Support and Medication Adherence in the Respondents

From Table 4 below, the relationship between the total perceived social support and medication adherence in the respondents is statistically significant by Spearman's ranked correlations and ANOVA. Hence, the higher the medication adherence, the higher the perceived social support of the respondents. As the medication adherence value moves from low - to medium - to high, the mean value of total perceived social support increases from 36 – to- 37 – to- 39 and this is statistically significant by Spearman's ranked correlation with a p-value of 0.0001.

Table 4: Relationship between Total Perceived Social Support and Medication Adherence by Non-Parametric Correlation

Medication adherence	Perceived social support	P	F-stat	p-value
High	39.01±2.07	0.298	2.25	0.0001*
Medium	37.79±1.63			
Low	36.93±1.45			

*significant at p<0.05

The Odds for High Medication Adherence in the Respondents

Table 5 below shows the odds for high medication adherence in the respondents. A good total perceived social support (OR = 3.27; 95% CI = 2.25-4.71; P = 0.0001) has 3.27 times the odds for high medication adherence than a poor total perceived social support.

Table 5: Linear Regression Depicting the Odds Ratio for High Medication Adherence with Perceived Social Support

Perceived Social Support	Number(N)	Standard Error (S.E)	OR (95%CI)	p-value
Good	121	0.17	3.27(2.25 – 4.71)	0.0001*
Poor**	58		1.00	

****Reference category

Discussion

The mean age of the respondents in this study was 51.9 ± 6.1 years. This is in keeping with the findings from the study of Ufuoma et al.[13] carried out among persons with type 2 diabetes mellitus in Warri metropolis, Delta State in which they found a mean age of 54.8 ± 11. 9 years. Biru in the work on glycaemic control and its determinants among ambulatory patients with type 2 diabetes at Mizan Tepi University, Ethiopia, also found similar mean age of 52.68 ± 11.17.[14]

The finding in this study differs from the work of Iloh et al.[15] who had average age of 36.8 ± 5.4 years. The difference between this study and that of Iloh et al may be due to the study location. Iloh's study was done in a primary care (Family Medicine) clinic which is the point of entry for newly diagnosed type

2 diabetics while the present study was done in the Endocrinology clinic which serves as referral clinic where most often long standing poorly controlled and complicated cases are seen. The unprecedented aging in the world's population is a major contributor to the diabetic epidemic and older adults represent one of the fastest growing segments of the diabetic population[16]

A significant proportion of respondents in this study lie between the age ranges of 43 to 54 years (29.1%) while 54 years and above (45.5%) contributed the highest age bracket. This finding is similar to the study by Nduati et al. in Mathari National Teaching Hospital, Nairobi, Kenya who found the predominant age group to lie between 41 to 55 years (45.6%) and 56 to 70 years (40.%).[17] This finding shows that chronic non-communicable diseases such as type 2 diabetes mellitus are more common among middle age and elderly people. This may be attributed to sedentary lifestyle among these group of patients and the increased adoption of western lifestyle in our society all contributing to the rising incidence of chronic diseases in these age groups.

Female gender accounted for a higher percentage of the respondents (60.2%) in this study. This is similar to the study by Onodugo et al.[18] who found female gender accounting for 62.2% of the type 2 diabetic study participants in Enugu metropolis. In a community based cross-sectional study conducted by Anthony et al.[19] in rural communities of Abuja to determine the prevalence and awareness of diabetes mellitus, 66.9% of the diabetics were found to be females. The female preponderance in the study by Anthony et al. was attributed to the fact that more females than males were at home during the study period.

The female preponderance in this study can be attributed to the following possible explanations, one being an increase in the prevalence of type 2 diabetes mellitus among females and secondly, it can also be an indication of poor health seeking habit in males thus they may not present to hospital for screening and follow-up. Women have been known to have better health seeking behaviour for chronic diseases than men.[20]

Of the 244 participants in the study, 62.7% were married. This is similar to other studies, which showed a higher prevalence of diabetes among married participants.[21] This can be explained by the increase in the prevalence of type 2 diabetes with age, the younger age usually comprises of mainly single (unmarried) participants.

Most of the respondents in this study were literate, with primary and secondary education accounting for 31.6% each and tertiary education accounting for

21.3%. This may be due to the fact that this study was conducted in an urban setting where the inhabitants were predominantly civil servants who require a certain level of education in order to be employed and business persons who also require a certain level of education to perform effectively.

The relationship between total perceived social support and medication adherence in the respondents was statistically significant. The higher the perceived social support the higher the medication adherence. This is in keeping with the findings of other studies.[22,23] The implication of this finding to the clinicians is that the absence of social support for patients with diabetes could be a major risk factor for medication non-adherence and could be a surrogate marker of patients who generally are less likely to adhere to medication.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study showed that perceived social support is significantly related to medication adherence in adult type 2 diabetic patients. It is, therefore, not enough to prescribe oral hypoglycemic medications during clinical consultations with patients with type 2 diabetes mellitus. Efforts should be made to persistently include the evaluation of social support as a component of care package for patients with diabetes mellitus. Family members and friends may have obligations to provide a wide variety of support to ensure that oral anti-diabetic medications are purchased and taken as at when due and as prescribed. Social support is, therefore, one of the important factors for reducing the risk of medication non-adherence.

Limitations

This study was a cross-sectional descriptive study where the relationship between the dependent and the independent variables cannot be established with certainty. The study relied on self-reported measures of medication adherence and social support which are subjective and are subject to recall bias and as such may limit the methodological quality of this research.

Recommendation

It is important that healthcare providers caring for patients with type 2 diabetes involve families, friends, or significant others in their management so as to improve their medication adherence. Routine evaluation of perceived social

support is also recommended for type 2 diabetes patients with poor medication adherence.

Authors Contributions

Okwuosa JC: Conceptualization, data collection, and manuscript writing

Nwajei AI: Conceptualization and manuscript writing

Owolabi AO: Data analysis

Ibuaku JC: Data collection and supervision of manuscript writing

Owolabi MO: Supervision of manuscript writing

Aniekwensi EC: Supervision of manuscript writing

Conflict of Interest

The authors hereby declare that there is no conflict of interest in writing this manuscript.

Emerging Issues and Controversies

Cultural and Contextual Variations: Diabetes care and patient behavior can be influenced by cultural factors, and Nigeria's cultural diversity presents unique challenges. Emerging research might focus on how different cultural contexts within South-South Nigeria affect perceived social support and medication adherence. This includes understanding the role of traditional healing practices and beliefs in managing diabetes alongside Western medicine.

Digital Health Interventions: The integration of digital health interventions, such as mobile apps and telemedicine, into diabetes care has been growing globally. Researchers may investigate how these technologies impact perceived social support and medication adherence among patients in South-South Nigeria. This is especially relevant considering the increasing penetration of smartphones and internet access in the region.

Healthcare Access and Infrastructure: Nigeria faces challenges related to healthcare access and infrastructure, which can affect both perceived social support and medication adherence. Emerging research might explore how limited access to healthcare facilities, medications, and healthcare professionals influences patients' ability to adhere to their medication regimens and seek social support.

Stigma and Mental Health: Stigma related to diabetes can be a barrier to seeking social support and adhering to medication regimens. Emerging research may delve into the stigma associated with diabetes in the South-South region and its impact on patients' willingness to disclose their condition, seek social support, and adhere to prescribed treatments. Additionally, the relationship between mental health and diabetes management could be explored further, as mental health issues can affect medication adherence.

Healthcare Policy and Resources: Changes in healthcare policy and resource allocation at the national and regional levels can impact diabetes care. Researchers might investigate how policy decisions and resource allocation affect the availability of medications, healthcare services, and support systems for diabetes patients in South-South Nigeria.

Patient Education and Empowerment: Empowering patients with knowledge about their condition and self-care practices is crucial. Emerging research could focus on the effectiveness of patient education programs, especially those tailored to the unique needs of South-South Nigeria's population, in improving medication adherence and perceived social support.

Longitudinal Studies: While many studies have examined cross-sectional associations between perceived social support and medication adherence, emerging research might prioritize longitudinal studies to better understand the dynamic nature of this relationship over time.

Intersectionality and Vulnerable Populations: Investigating how social support and medication adherence vary among different subpopulations, such as gender, socioeconomic status, and age, is essential for developing targeted interventions and policies that address the specific needs of vulnerable groups within the Type 2 diabetes patient population.

REFERENCES

1. Nasir TW, Mulugeta TA, Sadikalmandi H. Medication adherence in diabetes mellitus and self-mangement practicesamong type 2 diabetics in Ethiopia. NAMJ Med Sci 2011; 9: 418423
2. Gast A, Mathes T. Medication adherence influencing factors – an (updated) overview of systemic reviews. Sys Rev 8, 112 (2019). https:// doi.org /10.1186/s13643-019-1014-8
3. Cramer JA, Roy A, Burrell A, Fair child CJ, Fuldeore MJ, Ollendorf DA, et al. Medication compliance and persistency, terminology and definitions. Value Health, 2008;11 (1): 44-7
4. Sabate E. Adherence to long term therapies: evidence for action. Available from URL: http://apps,who. int/iris/bitstream/handle/10665/42682. Assessed 12/05/2022.
5. Folasire OF, Akinyemi O, Owoaje E. Perceived social support among HIV+ve and HIVve people in Ibadan, Nigeria. World Journal of AIDS 2014; 4:15-26.
6. Lee AA, Piette J, Heisler M, Janevic MR, Langa KM, Rosland AM. Family members experiences supporting adults with chronic illness. A national survey. Families, Systems and Health. 2017; 35 (4) 463-473
7. Araoye MO. Research methodology with statistics for Health and Social Sciences. Ilorin, Nigeria: Nathedex Publishers. 2003: p115-129
8. Adisa R, Fakeye TO, Fasanmade A. Medication adherence among ambulatory patients with T2DM in a tertiary health care setting in Southwestern Nigeria. Pharmacy practice (Internet) 2011 Apr-Jun; 9(2): 72-81. www.Pharmacy practice .org (ISSN: 1886-3655) 72.
9. Morisky DE, Ang A, Krousel-Wood M, Ward HJ. Predictive Validity of medication adherence measure in an outpatient setting. Journal of Clinical Hypertension 2008;10(5): 348-354
10. Abhinav G, Mansi O. Self-reported Morisky Eight Item Medication Scale is a Reliable and Valid Measure of Compliance to Statins in Hyperlipidaemic Patients in India. Indian Heart Journal 72(4):2020 doi:10.1016/j.ihj.2020.06.016
11. Zimet GD, Dahlem NW, Zimet SG, Farley GK. The Multidimensional Scale of Perceived Social Support. Journal of Personality Assessment 1988;52: 30-41

12. Ilori T, Ladipo MM, Ogunbode AM, Obimakinde AM. Knee osteoarthritis and perceived social support amongst patients in a family medicine clinic. South African Family Practice 2016: http://dx.doi.org/10.1080/20786190.2016.1198086.
13. Ufuoma C, Godwin YD, Kester AD, Ngoji JC. Determinants of glycaemic control among persons with Type 2 DM in Niger Delta. Sahel Med J 2016;19: 190-195
14. Biru TT. Glycaemic control and its determinants among Ambulatory patients with Type 2 diabetes. J Diabetes 2017;8: 757.doi.10.4172/2155-6156.
15. Iloh GUP, Ofoedu JN, Njoku PU, Amadi AN, Godswill- Uko EU. Blood glucose control and medication adherence among adult type 2 diabetes mellitus Nigerians attending a primary care clinic in under-sourced environment of Eastern Nigeria. N. Am J Med Sci 2012;4(7): 310-315
16. Kalyani RR, Golden SH, Cefalu WT. Diabetes Mellitus and Aging: Unique Considerations and Goals of Care. Diabetes Care 2017;40(4):440-443
17. Nduati AJ, Simon K, Eva N, Lawrence M. Factors associated with glycaemic control among Type 2 DM patients attending Mathari National Teaching Hospital, Nairobi, Kenya. J Endocrinol Diab 2016; 3(6); 1-11
18. Onodugo OD, Ezeala- Adikaibe BA, Anyim OB, Onodugo P, Anyim IN, Mbadiwe NC, et al. Glycaemic control among medical outpatients in Enugu. A cross sectional survey.
19. Journal of Diabetes Mellitus 2019;9: 50-61
20. Anthony OK, Bevis OD, Uchechi IM. Prevalence and awareness of diabetes mellitus in rural communities of Abuja, Nigeria. Texila International Journal of Public Health 2019;7(2): 1-11
21. Thompson AE, Anisimowicz Y, Miedoma B, Hogg W, Wodchis WP, Aubrey Bassler K. The influence of gender and other patient characteristics on healthcare seeking behaviour: a QUALICOPC study. BMC, Family Practic 2016, Mar 31; 17(1):38
22. Ogbera AO, Ekpebegh C. Diabetes mellitus in Nigeria: the past, present and future. World J Diabetes 2014; 5: 905-911
23. Hamidreza KT, Farah M, Mohsen KN, Mohsen H, Gholamhossein M. Impact of family support improvement behaviour on anti-diabetic medication adherence and cognition in Type 2 diabetic patients. J Diabetes Metab Disord 2014; 13: 113

24. Arulmozhi S, Mahalakshmy J. Self-care and medication adherence among type 2 diabetes in puducherry, Southern India. A hospital-based study. J Clin Diag Res 2014; 8 (4): 1-3