

Original Research Article

Knowledge level of health workers on hand hygiene, aseptic techniques, isolation and quarantine services in selected health facilities in Kiambu County, Kenya

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ABSTRACT

Background: The objective of this article was to ascertain the knowledge level of health workers on hand hygiene, aseptic techniques, isolation and quarantine services in selected health facilities in Kiambu County.

Methods: A descriptive cross-sectional research design was adopted in Kiambu County and Thika Sub-County was purposively selected. Stratified random sampling was used to draw a sample size of 261 study respondents. Both descriptive and inferential statistics were used to analyze the data.

Results: Out of the 261 questionnaires administered, only 178 were accurately, appropriately filled and returned. Chi square was used to test the association between independent and dependent variables at 95% confidence interval. A p value of less than 0.05 ($p < 0.05$) was considered statistically significant. The general knowledge of health workers on IPC was satisfactory with 135 (75.8%) having good knowledge. Knowledge was established to have statistically significant association with nosocomial prevalence ($\chi^2 = 49.45$, $df = 2$, $p < 0.001$).

Conclusions: It was concluded that majority of health workers had good knowledge on hand hygiene and aseptic techniques but in the contrary this was not the case with isolation and quarantine services. This could have been attributed to the fact that there were almost no trainings carried out on isolation and quarantine services and furthermore not all health facilities had the infrastructure for isolation and quarantine required to enforce those services.

Keywords: Aseptic techniques, Hand hygiene, Health facilities, Isolation and quarantine services, Knowledge level, Nosocomial infections

INTRODUCTION

Nosocomial infections which are also known as hospital-acquired infections are ailments or diseases which are acquired in the precincts of health facilities either by patients, medical staff or any other persons. These are new infections acquired by patients while being treated in health clinics and are also described as occupational infections of which staffs working in health facilities

contract as they carry out their duties.¹ The nosocomial infections that are prevalent across the entire globe account for 10% and 7% of infections in developing and developed countries respectively. The most prevalent infections include surgical site infections, catheter-associated urinary tract infections, ventilator-associated pneumonia, and central line-associated bloodstream infections. Similar to other diseases, nosocomial pathogens include fungal parasites, bacteria and viruses.²

Though infectious diseases are a concern globally, developing countries account for 95% of the annual 15 million deaths.³ The most predominant infectious diseases include malaria, respiratory infections, tuberculosis and diarrheal diseases. The prevalence of these infectious diseases remains high with approximately 300 million cases of Malaria, 33 million cases of HIV/AIDS, 14 million cases of Tuberculosis and 5 million cases of Cholera reported globally.⁴ In Africa, infectious diseases account to 227 million years of health life lost and this reciprocates to annual productivity loss of over \$800 billion. Moreover, in developing countries problems of HAI's are much bigger compared to developed countries. It is exemplified that prevalence of the aforesaid infections stand at 15.5%, which is slightly above double the overall rate in Europe. In South Africa, there is no formal reporting scheme for HAIs in the public sector and the situation has been worsened by shortage of infection prevention and control practitioners, overcrowding, poor injection safety, poor waste and blood splatters disposal and contamination of parentally administered fluids, medication and supplements in majority of health facilities.⁵ In Kenya, clear guidelines are stipulated by the Ministry of Health with regard to infection prevention control (IPC). The guidelines have put a lot of emphasis on the need for all health care workers to not only understand, but also practice evidence-based IPC practices. The objective of the guidelines is to protect patients, healthcare workers and other persons against HAIs. The critical HAIs in the country include surgical-site infections (SSI), bloodstream infections (BSI), urinary tract infections (UTI) and pneumonias (including TB) that compromise the safety of the patients resulting in prolonged hospitalization, long term disabilities, increased antimicrobial resistance, high medical costs and ultimate death in some cases. This is in accordance to the National IPC guidelines for Health Care Services in Kenya.

Statement of the problem

Limited studies have been carried out with regards to nosocomial prevalence and IPC practices among health workers within Kiambu County. Moreover, the data health and information system in Kenya (DHIS) does not capture nor provide information on nosocomial prevalence among health workers. However, data from the Kenya National Bureau of Statistics (KNBS) indicate that infectious diseases are the leading cause of morbidity and mortality within the country and has contributed cumulatively more than 25% of deaths in Kenya.⁶ A retrospective study conducted in Kiambu County, revealed the vulnerability of health care workers to contracting nosocomial infections with 11 reported cases of Tuberculosis at Kiambu Level 5 Hospital.⁷ According to the health care waste management plan, waste segregation was found to be inadequate, with significant number of public health facilities (54%) having functional incinerators for safe waste disposal (HCWMP, 2016-2021).

Research objective

To ascertain the knowledge level of health workers on hand hygiene, aseptic techniques, isolation and quarantine services in selected health facilities in Kiambu County.

Research question

What is the knowledge level of health workers on hand hygiene, aseptic techniques, isolation and quarantine services in the selected health facilities in Kiambu County? According to the conceptual framework (Figure 1), knowledge level is the independent variable while prevalence of nosocomial infections is the dependent variable. The knowledge level of health workers on hand hygiene, aseptic techniques, and isolation and quarantine was examined in relation to prevalence of nosocomial infections.

Hand hygiene, aseptic techniques, isolation and quarantine, and prevalence of nosocomial infections: overview

Hand hygiene is any action of cleaning hands, rubbing them with an alcohol-made hand rub or washing one's hands with soap and water to avoid the growth of microorganisms on hands.⁸ Hand hygiene is an important issue concerning healthcare in the world. It is a cost-effective and practical way to reduce hospital acquired infections (HAIs) and spread of antimicrobial resistance in healthcare system. Health care associated infections are acquired by a patient while being treated at a healthcare facility and were not present at the time of admission. These include infections acquired in the hospital but appear after discharge and also occupational infections among the hospital staff.¹ Aseptic technique refers to the method which is used to prevent contamination from microorganisms with a primary goal of reaching asepsis. The technique entails employing the strictest rules and what is known about infection prevention with the object of reducing the risk of transmitting infections. It is further postulated that HAIs could stem from aseptic procedures which are not up to the laid down standards. Surgical aseptic procedures are used to keep the objects and areas sterile and free from all microorganisms.⁸ Isolation refers to the process of separating individuals who have contracted communicable diseases from the persons who have not contracted the aforesaid ailments. Isolation mostly occurs in hospital settings or in a special facility. Quarantine on the other hand refers to the restriction of movement of persons who are not ill but are likely to have been exposed to a contagious disease. Quarantine is mostly used at home and is applied at individual level or to a group of exposed persons. Isolation and quarantine are used concomitantly where the objective is to cut short the chain of infectious diseases' transmission in addition to creating the basis of cohorting at present times.⁹ Nosocomial infections also referred to as HAI's are ailments or diseases which are acquired in the precincts of health facilities either by patients, medical staff or any

other persons. These are new infections acquired by patients while being treated in health clinics and often noticed after discharge. They are also described as occupational infections where staff working in health facilities contract as they carry out their duties.¹

Empirical literature review

A cross-sectional study involving medical students studying in the Department of Surgery in Saudi Arabia was undertaken to investigate hand hygiene practices. The study evaluated the awareness and compliance of hand hygiene among undergraduate students during their clinical examination sessions. The study used questionnaires for data collection which were based on the World Health Organization's concept of "Five Moments for Hand Hygiene". It was revealed that 56% of the students were aware of the benefits of hand hygiene practices. The study also noted that compliance during clinical examination sessions was only 17% for both genders. It was therefore concluded that there was need to improve on hand hygiene practices among the students.¹⁰ Regionally, a study was carried out in Ghana to investigate the medical legal prerequisite for initiating quarantine and isolation practices in public health emergency management within hospitals. The purpose of the study was to review the legislative framework on governing the utilization of quarantine and isolation procedures in hospitals. The methodological approaches used involved a systematic review of laws and a desktop review of quarantine and isolation cases. The study found that there was lack of familiarity with quarantine and isolation measures among the medical staff.¹¹ Locally, a study sought to explore hand hygiene practices among healthcare workers in Ruiru Sub-County Hospital, Kenya. The objective of the study was to understand the hand hygiene practices in the country. The study involved use of questionnaires for data collection to determine the knowledge, structural and individual factors that affect hand hygiene, and whether healthcare workers comply with these practices or not. It was established that the overall rate of hand hygiene compliance among health care workers at the health facility was at 54.1%. The survey also acknowledged that the healthcare workers were knowledgeable and were well trained about hand hygiene. However, poor compliance with hand hygiene practices was established to have been occasioned mainly by lack of alcohol-based hand rub. This was followed by lack of time and the perception that the risk of acquiring infections was low.¹² Locally, an empirical study was carried out with the main objective being to examine the use of aseptic techniques among nurses involved in the management of burns patients at the Kenyatta National Hospital, Kenya. The study employed a cross sectional descriptive design for the study. The sample consisted of 59 nurses working in the burns' ward at the hospital. Descriptive statistics were used for data analysis. According to the results of the study, it was established that majority of the nurses (81%) had sufficient knowledge on aseptic techniques, however, only 14.6%

of the surveyed nurses maintained proper aseptic techniques throughout the procedure. The study concluded that nurses had a competency role to play in prevention of sepsis during burns' patient management.¹³ Locally, a study examined TB infections among HCWs in both Kiambu and Makindu District Hospitals.⁷ The study adopted a retrospective review of TB lab registers at both health facilities for the period from year 2010 to 2013. A total of 450 and 91 HCWs from the two hospitals respectively, were interviewed using structured questionnaires with the view of collecting both clinical and epidemiologic information. IPC practices were observed and duly recorded. The results of the study indicated that Kiambu Hospital had a relatively higher prevalence of nosocomial infections with (11) reported cases of TB compared to Makindu Hospital which had (5) reported cases of TB. The distribution of staffs who contracted TB were as follows: nurses (4) lab technicians (4), occupational therapists (2) clinical officers (2) pharmacist (1), telephone operator (1), driver (1), and casual labourer (1) respectively.

METHODS

A descriptive cross-sectional research design which is a type of observational research study design was adopted. A set of study constructs, that is, independent and dependent variables, guided this study. Knowledge level as pertains to hand hygiene, aseptic technique, and isolation and quarantine services was the independent variable while the dependent variable was the prevalence of nosocomial infections.

The research took place in Thika Sub County, which is one of the 12 sub-counties that constitute Kiambu County. The research study focused on sampled health workers offering services in both public and faith-based facilities within Thika Sub County. The study incorporated 745 health care workers as the accessible population. This number was a representative of the staff both in public and faith-based health facilities whose roles involve provision of curative, preventive, promotive, as well as medical waste management in Thika Sub-County. The study excluded HCWs unwilling to participate in the study, HCWs working within the selected health facilities but from other departments that do not provide curative, preventive, promotive and medical waste management services. In addition, the study exempted health care workers working in private health facilities.

Thika Sub-County was selected based on purposive sampling. All public and faith-based health facilities within the Sub-County were selected and 745 HCWs providing services in these health facilities comprised the accessible population. Given that the distribution of the 745 HCWs in the aforesaid selected facilities was heterogeneous, stratified random sampling technique was employed and this entailed dividing the population into groups that made up the strata comprising of homogenous

groups of health workers who shared similar attributes, characteristics and cadres. Out of the 745 HCWs, a sample of 261 was calculated using Yamane's formula.¹⁴

Semi-structured questionnaires, observation check lists and key informant interview guides were utilized as data collection tools. Pretest was carried out prior to the main research study and involved approximately 10% (27 respondents) of the unit of observation, across simple randomly selected health workers working both in public and faith-based health facilities within Githunguri Sub-County, Kiambu County.¹⁵ The study took place from November 2020 to June 2021. The results of the pretest were employed to test the validity and reliability of the research instruments particularly the questionnaire. The study examined the content validity of the data collection tools where university supervisors were engaged in assessing the content validity of the aforesaid research tools in order to ensure that they incorporate all essential data items under each study variable. Given that the key items captured by the questionnaire were on a Likert

scale, the Cronbach's alpha coefficient was used to test the instrument's reliability. The acceptable reliability threshold was alpha coefficient equal to or greater than 0.7. According to the findings, it is evident that all the study constructs returned alpha coefficients which was above the minimum acceptable threshold of 0.7. Data analysis was aided by the use of Statistical Package for Social Sciences (SPSS) Version 25. The analysis first used descriptive statistics followed by inferential statistics. The results of data analysis were presented in tables, graphs and charts.

RESULTS

Knowledge level on hand hygiene, aseptic techniques, isolation and quarantine services among health workers

The second objective aimed at determining the knowledge level on hand hygiene, aseptic techniques, isolation and quarantine services among health workers. The findings are presented in (Table 1).

Table 1: Health workers have received training on IPC.

Rating	Hand hygiene	Aseptic practices	Isolation and quarantine practices	Mean	%
Strongly agree	93	61	32	62	62
Agree	63	59	47	56.3	56.3
Neither agree/disagree	6	17	20	14.3	14.3
Disagree	13	30	46	29.7	29.7
Strongly disagree	3	11	33	15.7	15.7

Findings from the grouping above (Table 1) indicate that a mean of 62 respondents strongly agreed to having received training on infection prevention and control which translates to almost two thirds of the respondents who had acquired ample good level of knowledge on infection prevention and control. A rating score of (1-5) was established to ascertain the level of knowledge among the health workers. The rating was based on the 5 point Likert scale as illustrated in (Table 4).

Table 2: Scoring on knowledge.

Response	Scores	Knowledge level
Strongly disagree	1	Poor (16.9%)
Disagree	2	
Neither agree/disagree	3	Moderate (7.3%)
Agree	4	Good (75.8%)
Strongly Agree	5	

In this case (Table 2), the strongly disagreed and disagreed responses were classified as poor knowledge level, while neither agreed nor disagreed responses were classified as moderate knowledge and agreed or strongly agreed responses were classified as good knowledge. Besides, various observations were made using the observation check list with regard to knowledge of health workers on IPC. These observations are presented in

(Table 3). Findings from (Table 3) indicate that all the respondents who were assessed in the health facilities had the recommended appropriate skills in handwashing.

Table 3: Observation checklist findings.

Variable	Description	Category	%
Hand hygiene	Handwashing skills	Appropriate	100
		Inappropriate	0
	Timing of hand washing	After	9.1
		Before/After	90.9
	IEC materials/posters on hand hygiene	Available	60
		Unavailable	40
Aseptic techniques	IEC posters on waste segregation	Available	45.5
		Unavailable	54.5
	Skills on aseptic techniques	Appropriate	81.8
		Inappropriate	18.2
Isolation and quarantine	Decontamination formula highlighted	Yes	45.5
		No	54.5
	Knowledge on triaging	Adequate	81.8
		Inadequate	18.2

Washing of hands was mainly affected both before and after procedures among (90.9%) of the respondents observed. It was further observed that (60%) of the health

facilities had information education communication (IEC) materials and posters that contained information on hand hygiene and aseptic techniques.

Table 4: Chi-Square test of association.

Score of knowledge	Nosocomial prevalence		Total	χ^2	P value
	Yes	No			
Poor	13	17	30	49.448	<0.001
Moderate	5	8	13		
Good	3	132	135		

However, in almost all of the selected health facilities, there were no IEC materials or posters that contained information on isolation and quarantine services. It is also worth noting that most of the health workers (81.8%) observed, had appropriate skills while carrying out aseptic techniques. However, there was a gap noted in most procedural rooms among (54.5%) of the health facilities visited, whereby the formula for decontamination of unsterile equipment was not displayed. Needful to say that majority (81.8%) of the health workers had adequate knowledge on triaging of patients. Testing the null hypothesis involved assessing the relationship between the study variables. A Chi-square test of association was used. The findings are presented in (Table 4). Knowledge level with regards to infection prevention and control was statistically significantly associated with nosocomial prevalence ($p < 0.001$) hence rejection of null hypothesis which stated that, there was no significant association between knowledge with regard to IPC and the occurrence of nosocomial infections among health workers in selected health facilities in Kiambu County.

DISCUSSION

The article sought to determine the knowledge level on hand hygiene, aseptic techniques and isolation and quarantine services among health workers as well as putting into perspective the prevalence of nosocomial infections. In respect of knowledge level on hand hygiene, a majority of the study respondents (75.8%) had good knowledge level on IPC. However, the scores were high on hand hygiene and aseptic techniques only but low on isolation and quarantine at (44.4%). These findings are in agreement with results of a previous study which indicated that 56% of nurses in Saudi Arabia had knowledge on the importance of hand hygiene during examination sessions of patients.¹¹ Similarly, these findings also agree with another study that found 91.7% and 96.5% of Nigerian health care providers had sufficient knowledge on hand hygiene and observed hand hygiene practices respectively.¹⁷ It also closely agrees with another study which found that staffs working there were knowledgeable on hand hygiene and related skills.¹³ These findings also concur with results of a study carried out in Ghana and Tanzania respectively whereby medical staff lacked familiarity with quarantine and isolation measures.^{12,18} However, this study finding did not agree

with observations made by a past study conducted in Zambia which found that nurse aides had poor knowledge on IPC.¹⁹ Regarding nosocomial prevalence, it was observed that the occurrence of diseases contracted in health facilities was substantially linked to the knowledge level on issues pertinent to infection prevention and control. Therefore, the understanding of IPC was crucial in preventing the aforementioned infections. These results underpin the importance of practicing IPC in order to mitigate nosocomial infections. Yet, the results of a previous study indicated that, despite having sufficient knowledge on aseptic techniques (part of IPC), only few nurses (14.6%) maintained proper aseptic techniques.¹⁴

CONCLUSION

The study concluded that majority of health workers had good knowledge on hand hygiene and aseptic techniques but in the contrary, this was not the case with isolation and quarantine services. This finding could be attributed to the fact that there were almost no trainings carried out on isolation and quarantine services and furthermore not all health facilities had the infrastructure for isolation and quarantine required to enforce that service. Apparently, only a few staff had received training on isolation and quarantine and this was majorly carried at the onset of the Covid-19 pandemic. However, despite the trainings being conducted, there were no clear guidelines in respect of how isolation and quarantine services was supposed to be implemented within those health facilities that did not have amenities for isolation and quarantine services. This largely affected the implementation and sustenance of this crucial service.

Recommendations

It is recommended that the Ministry of Health in Kenya should regularly distribute information, education and communication materials that contain clear health messages on hand hygiene, aseptic techniques, isolation and quarantine services. Poster materials should be strategically pinned and erected on notice boards within the health facilities with an aim of relaying health messages on IPC. A reward system for best safe IPC practices should be instituted in every health facility as a measure of motivating staff to perform well in IPC thus minimize infection contraction among healthcare workers.

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