

Use of Integrated Security Management System in Crime Prevention a Case of Public Referral Hospitals in Nairobi City County, Kenya

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Abstract: Security in health care facilities and their environment is of absolute necessity. The patients, staff and visitors have a legal right to protection against any criminal activity. Many hospitals have installed an Integrated Security Management System (ISMS) where physical, electronic and procedural security measures are synchronized to mitigate the levels of crime. This study assessed the use of ISMS in mitigating crime in public hospitals specifically, in Nairobi County by establishing the components of ISMS used in public hospitals and the capacity the security officers working in public hospitals in Nairobi County. The study further assessed the extent of implementation of ISMS in public hospitals in Nairobi County and examined the challenges that hospitals faced in the implementation of ISMS in the wake of ever changing security threats. The study was guided by the integrated system theory of information security management. Cross-sectional survey design was used in the study. Both non-probability and probability sampling procedures was used to obtain a sample of 196 participants. The data was gathered using research tools; questionnaire and semi structured interview focused. Data analysis was through descriptive statistics for quantitative data while qualitative data was thematically analyzed. From the assessment conducted by the researcher, the researcher found out that: the hospitals had not installed basic physical security measures like perimeter fence to covers the entire premises, the gate house lacked critical areas like vehicle and personnel search and badge issue areas, the barriers installed were not strong enough to resist vehicle ramming, the doors and windows were installed in the hospital though they were not integrated with intruder detective systems and biometric systems, the security officers were not adequate to be deployed in all critical areas in the hospital. Electronic security gadgets like CCTV cameras, biometric system, patients tagging and intruder detection systems used in the hospital were not adequate and those installed lacked critical security specifications like detection, transmission of data and storage. Therefore there is need to equip the hospitals with adequate ISMS components with the required operational specifications, train the security officers on how to integrate the components of ISMS in order to mitigate the level of crime in the hospitals.

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INTRODUCTION

1.1 Background of the study

Global security threats have been evolving over time. They have transformed from conventional warfare to the unconventional warfare (transnational crime) in the form of terrorism, drug trafficking, smuggling of migrants, cyber-attacks and money laundering. The modern day crime uses both technology and physical approach to their selected targets which has a great impact to all organizations including hospitals where there has been an increased incidence of criminal activities. The history of security management has been to manage facilities and control access, as well as maintain confidential information of the client. Physical security alone would always and is often breached by both the client and the service provider and thus the need to have a harmonious single system for both physical, human and information security. As such, there was always a need to balance the risks, hazards and the vulnerabilities of the facilities in order to establish the need for an integrated security management system in any facility According to ¹³, security management involves the essential elements of physical security, personnel security, and information security all of which together will protect assets in the form of tangible and intangible assets. Physical security refers to multiple layers of security designed to deny unauthorized access to a facility in order to safeguard assets.

Personnel security involves the safety and protection of all persons associated with the organization as well as those who visit the organization. The protection of staff, patients and visitors is a very important security function in a hospital and information security, often called InfoSec, is the protection of the data of the organization from creation, processing, storage, retrieval, transmission, dissemination and disposal¹³. Confidential information in hospitals like medical records, prescription, medical appointments are at risk of cybercrime. For instance, medical records and appointments in major hospitals in North America, Europe and part of Asia were hacked by what was referred to as Wanna cry virus from 12th to 19th May 17¹. It is further stated that more than 19000 appointments were cancelled and over 200 000 computers were locked out from their users with a red letter demanding for Bitcoin a form of decentralized digital currency. Hospitals are considered to be Critical National Infrastructure (CNI) worldwide because of the unique role they play in the society. It has high value assets like patients, staff, visitors, sensitive medical organized crime, fire and life safety issues, water, emergency services and public health. Any impact to a hospital as a result of transnational crime like terrorism, cyber-attack or loss of medical equipment can lead of consequential losses like loss of lives and reputation. Therefore a national security concerns especially the referral hospitals.

Healthcare security has become top priority and is imperative when addressing issues of theft, and safety at healthcare facilities are important for both quality healthcare and public safety. Hospitals should be a safe place for those in physical or emotional need, the sick and those relatives and friends visiting the sick. It is essential that healthcare security staff not only consider facility security and safety, but also take an interest in broader public safety.

Hospitals are characterized by high pressure, stressful situation and therefore prone to crime as a result of psychological and physical conditions of the patients, visitors and staff. With the ever-changing technology and increase of transnational crimes, hospital have increasingly become a target to criminal activity because of the high population, the nature of low level of security functions put in place, the value of assets in hospitals in terms of medical equipment and drugs.

Different security areas tend to be designed separately, but must work together as an integrated as a whole. These broad areas are: Intruder Alarm Systems (IDS), Automatic Access Control Systems (AACS), Closed Circuit Television (CCTV), Perimeter Intruder Detection Systems (PIDS) security lighting, alarm signaling, walls, control room, procedures, security officers , Health and Safety measures, emergency preparedness, legislation and human resources including assessment of operating staff and response forces.

According to the ⁶, an Integrated Security Management System (ISMS) is a security system that brings together the management of all the aspects of organizational security into one by the use of internet networks running within the organization's Local Area Network (LAN) or Wide Area Network (WAN) or wireless. An ISM is used by organizations to improve its security, reduce cost and provide return on investment.

ISMS therefore is categorized into three main components; first, the physical component that includes security officers, perimeter fence, barriers, gates, turnstiles, walls and windows. The physical security component plays a very important role in acting as a platform for the second component, which is electronic security component. Electronic security component comprises of Sensors, CCTV cameras, intruder alarm systems, electronic visitors management systems, biometric system, fire systems, building management systems (BMS) among others. The third component is the security procedures that guide the operations of ISMS like the policy documents, security manuals and instructions among others.

The shift in security operations from the man at the gate to ISMS has made security guards and security officers globally seek learning through classroom instructions, e learning and seminars. The officers are expected to know how to monitor CCTV footages, analyze pictures, sounds and video footages, use biometric system and respond to an alarm system.

To manage the operations of ISMS, organizations developed policies, instructions and manuals that ensure safety and smooth integration of the systems without breaking the law. For instance Castle knock Lawn Tennis Club (CLTC) policy on CCTV and data management for example protects privacy, emphasis on sensitization of the staff on CCTV cameras deployment, display of signage, monitoring areas and storage procedures.

ISMS have been adopted to address safety and security by several institutions and organizations across the world including hospitals. Hospitals have increasingly become targets to criminal activity because of their high populations, the nature of low-level security functions put in place, the value of assets in hospitals in terms of medical equipment and drugs as well as the perception that hospitals have people who are already vulnerable.

According to the ¹⁰, workplace violence continue to plague the US hospitals in that there has been an increased work place violence that accounts for 89% of the assault crimes in the period 2012-2016. Other crimes reported by the survey to be on the rise included murder, rape, robbery, vandalism and vehicle theft. This necessitated the adoption of the Integrated Security Management System (ISMS) in the hospitals.

In Kenya today, the use of the ISMS has been adopted by several organizations both in the private and public realm. Public hospitals have adopted this system following waves of attack on patients, the staff, loss of

documents and patient files that have marred the public hospitals in the recent past. According to ¹⁴, patients have been attacked or have been the subject of medical negligence that has caused families anguish and pain in most of public hospitals in Kenya.

It is against this background that led to the implementation of the ISMS in public hospitals in Kenya. However, several years after its inception, ISMS has experienced challenges in its implementation and operation as well as management in several hospitals in Nairobi County. This study assessed the operations of ISMS in public hospitals within Nairobi County with the view to identify gaps in the system and make appropriate policy recommendations.

1.2 Statement of the problem

Integrated Security Management System comprising physical, electronic and procedural security measures installed in a hospital is aimed at reducing the rates of crime in a public hospital by creating an effect of deterrence, detection and denying criminal activities as well as reducing the response time to crime. However, despite public hospitals engaging ISMS to help address the security problems, crime in public hospitals and other health care facilities has been on the rise. In the year 2018 alone there has been many cases of crimes reported in KNH prompting the government of Kenya to constitute a special parliamentary committee to investigate the reports of sexual assaults and theft of babies ⁸ This study therefore assessed why there has been an increase of crime despite hospitals engaging ISMS. This was done by assessing the components of ISMS used in the hospitals, the capacity of the security guards manning the hospitals in line with ISMS, the extent of implementation of ISMS and the challenges that ISMS is facing in the hospitals in the wake of ever changing security threats and gave recommendations that will help reduce the crime rates in public hospitals. The study will also widen the scope of knowledge of the training of the security guards.

1.3 Objectives of the study

The objective of this study was to establish the components of ISMS used to address insecurity in public referral hospitals in Nairobi County.

1.4 Significance of the study

Hospital Security in health care facility and its environment is fundamental. The patients, staff and visitors have a right to protection against any criminal activity. It is also everyone's interest that crime should not be committed particularly against the most vulnerable people in the society such as the elderly and the sick.

Hospital environment have in the recent past witnessed criminal activities against the sick, staff and visitors that has made healthcare facilities insecure. ISMS has played its role in private hospitals in Kenya by reducing crime rates but little has been achieved in public hospitals in Kenya despite the use of ISMS.

This study therefore assessed ISMS implementation in the Hospitals in order to identify security gaps in implementation of ISMS and give recommendations that will assist the hospital implement ISMS in order to reduce criminal activities in the hospitals ALARP. This will make all public hospital a safe and secure place to seek and offer medical services. The recommendations will also widen the scope of knowledge to security officers on the operational functions of ISMS.

METHODOLOGY

2.1 Area of study

Nairobi County is the capital and largest city of Kenya. It has the largest population of 4, 397,073 from the data obtained in the 2019 census. Nairobi county has four public referral hospitals out of the total five in Kenya therefore the highest number of public referral hospital in Kenya and the leading county in the number of crime rates of 7, 123 in the year 2018 according to National police 2018 crime report. The study focused on public referral hospitals in Nairobi City County because they serve a huge population and are considerably affordable to most people in the region.

2.2 Research design

The study adopted the cross-sectional survey design to collect data from public hospitals in Nairobi County. The researcher collected data by examining closely the components of ISMS in four public hospitals by selecting four categories of respondents to give information on ISMS in a hospital. The researcher adopted the design because it was possible to collect data at one point in time ¹⁵. In this case, it was possible to collect data from public hospitals in Nairobi County within a short period of time.

2.3 Population and Sampling design

Nairobi County was purposively selected because of its heterogeneity; it contains nearly all ethnic identities in Kenya as well as the existence of majority of the hospitals that serve over 4 million people. More so, most of the public hospitals in Nairobi County embraced ISMS but the crime rate is still on the rise.

The study population were the security officers who were the primary respondents and gave information on the three components of ISMS, administrative staff were critical respondents who gave information on budgetary allocation in support of ISMS and creating a suitable environment for the implementation of ISMS, police officers were equipped with reported criminal incidences and respond procedures in line with ISMS, visitors information subjected to ISMS was critical to measure the whole process of detection and response to criminal activity, medical practitioners information on ISMS awareness and implementation was important to the study and the patients within the hospitals in Nairobi County information on access control, security procedures and response time to criminal activity assisted the researcher assess the implementation of ISMS in public hospitals.

This study adopted both probability (stratified random sampling) and non-probability (purposive sampling) technique where purposive sampling was used to select respondents from the security officers, administrative staff members, visitors and the police officers. The researcher believed that they were the key respondents within these categories that gave adequate and accurate data on the implementation of ISMS in the hospitals. The sample size selected is 384 respondents from the Hospitals in Nairobi County

2.4 Data collection

Stratified sampling procedure was used to collect data from inpatients, and the medical practitioners in the hospital. Inpatients were stratified into wards to form stratus. The stratus was then selected using purposive sampling technique where the wards were selected based on sex (male and female). The researcher then selected the samples from the combined admission register and use simple random sampling using a random number generator to select the respondents of the study.

The researcher used enumerators to collect data from the respondents in the two public hospitals in Nairobi County. The researcher trained the enumerators on how to collect data and ethical considerations before issuing them with the questioners.

This study used questionnaires and semi structured interview focused as the research instruments. Questionnaires were the primary method of data collection for this study. The questionnaire included some open ended questions that tapped on the ISMS information of the respondents. The questionnaire was administered to the administrative staff. Visitors, medical practitioners and inpatients within then public health sector while the semi structured interview schedule was administered to security guards and police officers. The public hospital security officers were considered as key respondents and who answered the interview schedule. This is because, the interview was able to reveal rich and thick descriptions of the variables under the study and they were the people charged with the primary task of implementing ISM. According to ⁵ specialized interviewing can be incorporated into any research project as a supplementary source of information. The semi structured interviews was therefore conducted to supplement the data that was gotten from the issuing of the questionnaires. In general, the semi structured interviews was generated both standardized quantifiable data and more in depth qualitative data that greatly enriched the study.

2.5 Data analysis

The researcher collected data from the field on a daily basis from the enumerators, recorded data that required translation was typed manually using MS word and quantitative data was analyzed by use of Statistical Package for Social Sciences (SPSS) Qualitative data was analyzed thematically.

Quantitative data was analyzed through descriptive statics, this made it possible to organize, summarize, and convey distribution of key variables. The descriptive statistics used was percentages, frequency distributions, and contingency tables. The data was presented using a combination of statistical technique and graphical techniques.

All the qualitative data in the form of, notes, and text documents were organized and coded. The researcher got the ideas of other respondents in order to categorize various respondents for particular questions and identify ideas that are common. The common ideas was analyzed and assessed thematically. The data was presented using a combination of statistical technique and graphical techniques.

DATA ANALYSIS AND DISCUSSIONS

3.1 General and Demographic Information

3.1.1 Demographic characteristics of participants

In this section, the sex, level of education, and designation of the study participants are presented and discussed. The sample from both Kenyatta National Hospital and Mathari National Teaching and Referral Hospital was

195. Kenyatta National Hospital contributed 51.3 per cent of the study participants while the remaining 48.7 per cent was from Mathari National Teaching and Referral Hospital.

From a sample of 195, 56.9 per cent were male while 43.1 per cent were female. It was also observed that there were more male than female participants from both Kenyatta National Hospital and Mathari National Teaching and Referral Hospital. Out of a sample of 99 from Kenyatta hospital, 61.5 per cent were male while 38.5 per cent were female. On the other hand, 51.6 per cent of the 96 participants from Mathari National Teaching and Referral Hospital were male and 47.4 female. This can partially be attributed to having security guards as study participants. Previous studies have shown that the sector still attracts a high number of males than females. For example, a study by ² on the role of private security in community policing in Kenya had 87 per cent male participants in the sample compare to only 13 per cent of females.

Table 3.1: Distribution of respondents by age

Age (Grouped)	Frequency	Percent	Valid Percent
<= 20	7	3.6	3.9
21 - 30	57	29.2	31.8
31 - 40	44	22.6	24.6
41 - 50	51	26.2	28.5
51 - 60	20	10.3	11.2
Total	179	91.8	100
No response	16	8.2	
Total	195	100	

From the results in table 3.1, out of the sampled participants, 16 (8.2%) did not answer the question on age. Thus, the percentage distribution was computed a considering only the 179 respondents who answered the question. The mean age of the participants was 36.79 with 31.8 per cent aged between 21 – 30 years. The second largest category of participants by age was those between 41 – 50 at 28.5 per cent, while those aged 31 – 40 were 24.6 per cent of the total. Majority of employees working in the hospitals are at their young adulthood and their strength to work is at their peak.

The distribution of study participants was also done by level of education. The frequency and per cent distribution are presented in table 3.2.

Table 3.2: Distribution of respondents by level of education

Level of Education	Frequency	Percent	Valid Percent
Primary incomplete	3	1.5	1.5
Primary	10	5.1	5.2
Secondary	41	21	21.1
College and university	140	71.8	72.2
Total	194	99.5	100
No response	1	0.5	
Total	195	100	

The results show that there were more participants with college and university level of education (71.8%) than the other categories. Participants with secondary school level of education were the second highest category (21%) while those with primary level of education and primary incomplete were 5.1 per cent and 1.5 per cent respectively. A comparison of level of education for participants from Kenyatta National Hospital and Mathari National Teaching and Referral Hospital is presented in figure 3.1.

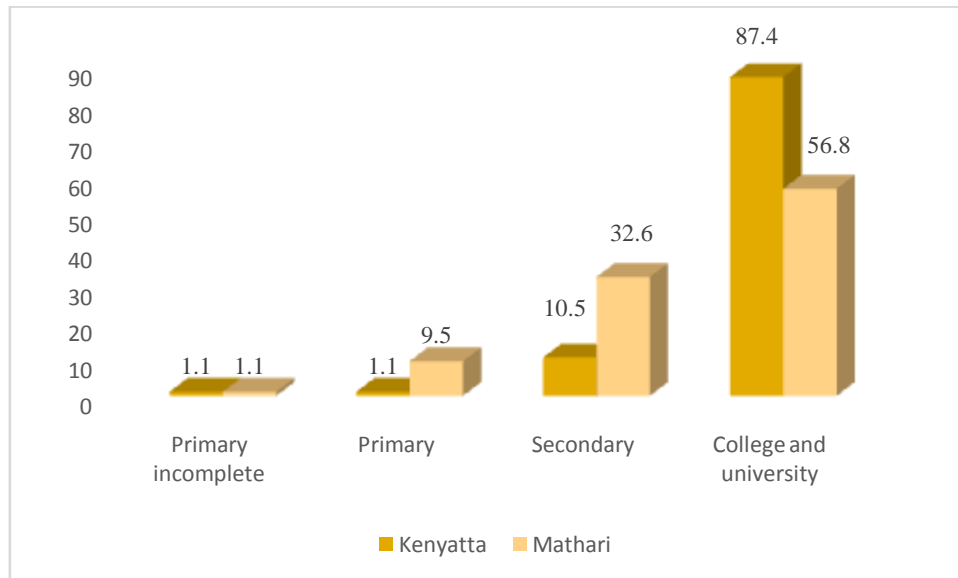


Figure 3.1: Comparison of participants by level of education

The results show that there were more participants from both hospitals with college and university level of education than the other categories. There were 87.4 per cent and 56.8 per cent of participants from Kenyatta National Hospital and Mathari National Teaching and Referral Hospital respectively with college and university level of education. The second highest category was those with secondary school level of education of which 32.6 per cent were from Mathari National Teaching and Referral Hospital and 10.5 per cent from Kenyatta National Hospital.

Participants were categorized per their designation: security officers, police officers, medical practitioners, administrative staff, patients, and visitors. The distribution is presented in figures 3.2.

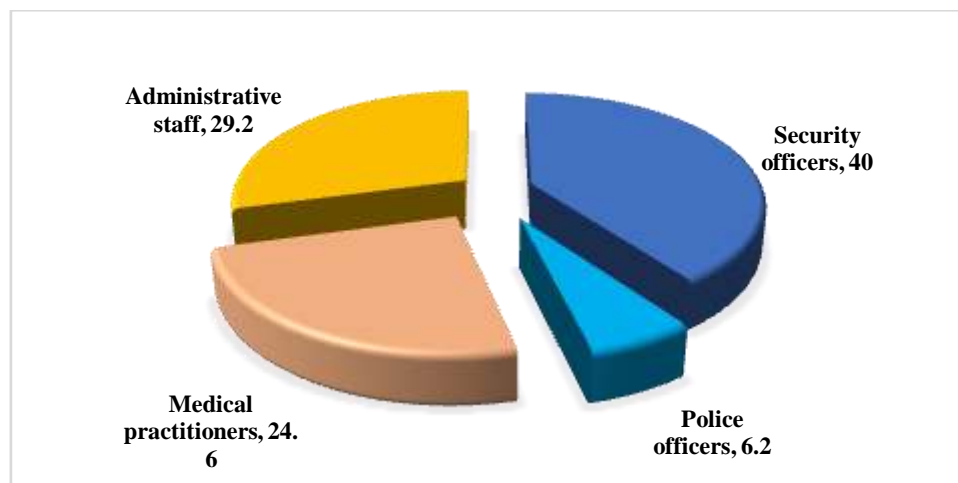


Figure 3.2: Distribution of participants by designation

The results show that security officers were the majority participants (40 %). The second largest category in the sample was administrative staff at 29.2 per cent while medical practitioners and police officers were third and fourth at 24.6 per cent and 6.2 per cent respectively. This was not unusual since study participants had been determined and selected through both purposive and proportionate sampling. The data collected reflected a true status of the implementation of ISMS in the hospital since majority of the respondents were the security officers who understands their core function of security.

3.2 Integrated security management system components used to address insecurity in public hospitals in Nairobi County

The objective of the study was to establish the components of integrated security management system (ISMS) used to address insecurity in public hospitals in Nairobi County. One of the ways of establishing this was by

identifying the physical security measures used to in both Kenyatta National Hospital and Mathari National Teaching and Referral Hospital.

3.2.1 Perimeter fence

The first component of the integrated security management system under consideration was a perimeter fence. Perimeter fences can typically be defeated by adversaries by going around, lifting the skirt of the fence (often with a pole or lever), over, under, or through. Fences can also be flattened by brute force to access the facility. The researched therefore did not assess the existence of the perimeter fence alone. Critical specifications of a good perimeter fence to achieve the desired effect were assessed and this included the height of the perimeter fence, the coverage and strength to resist adversaries' penetration.

Though perimeter fence is considered passive, the perimeter offers a clear defined boundary and is thus considered the first line of defense³. In addition, perimeter fence also create a psychological deterrent for anyone thinking of unauthorized entry and it acts as a framework of attaching perimeter intruder detection system (PIDS) a critical component in integrated security management system to detect intrusion, relay information to the control center for timely response¹⁶

From the sampled participants, 97.4 per cent indicated that the two facilities had a perimeter fence while 2.6 per cent did not respond to the question item.

³ writing on physical perimeter security indicates ideal specifications for a perimeter fence including a height of 7 feet (2.13 metres). Study participants were provided with three statements on protection specifications measures and asked to their responses through a Likert scale. The first specification was a height of between 2 – 2.4 metres. The results are presented in figures 3.3 a, b and c.

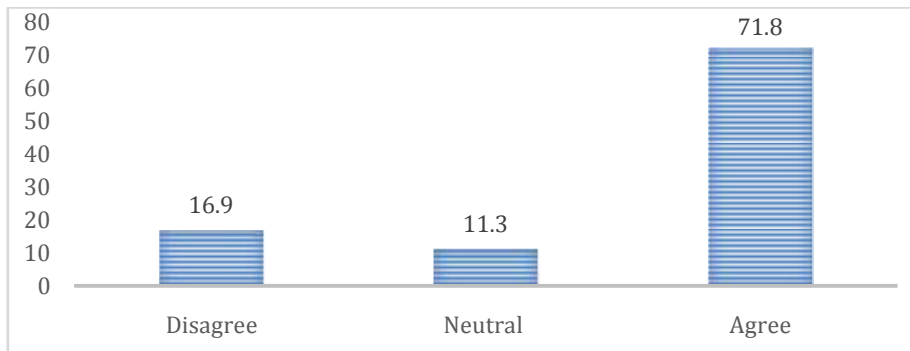
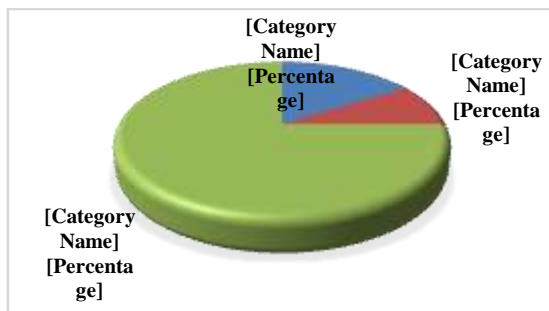
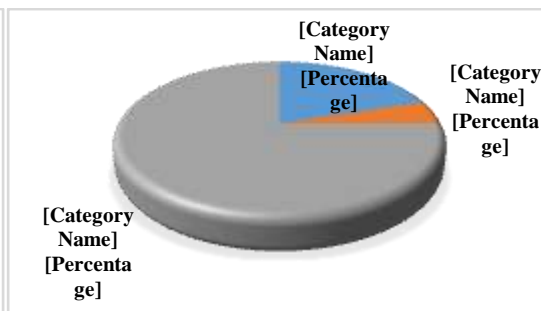


Figure 3.3: Participants view on protection measure specifications (2 to 2.4 metres height)

The results show that in both Kenyatta and Mathari hospitals, participants were in agreement that the protection measures as measured by the perimeter fence were sufficient. This is because 71.8 percent of the participants agreed that the perimeter fence was to the recommended height. On the other hand, only 16.9 per cent of the participants were of a contrary opinion. The researcher further analyzed the findings from the two hospitals separately as indicated in figures 3.3 (a) and 3.3 (b).



Figures 3.3 (a) Participants view on the height of a perimeter fence (Kenyatta National Hospital)



Figures 3.3 (b) Participants view on the height of a perimeter fence(Mathari National Hospital)

The results in figures 3.3 (a) and (b) show that 75 per cent and 16 per cent of participants Kenyatta Hospital indicated that they “agreed” and “disagree” respectively that the perimeter fence was as per the required height. On the other hand, 75 per cent and 20 per cent of participants from Mathari Hospital “agreed” and “disagreed” respectively that the perimeter fence was to the required height. This is a confirmation of the availability of a perimeter fence with the required height as a protection measure in both hospitals.

On whether the fence covers the entire premises, the findings show that even though a perimeter fence was in place in both hospitals, it did not cover round the facility. Overall, 69.1 per cent of the participants indicated that they were in disagreement to the statement that the perimeter fence covers all round the facility. The Key informants confirmed these findings that the perimeter wall did not cover the entire hospital. One key informant stated thus:

The facility has a very good perimeter wall but it does not cover the entire premises. About 30 percent is not yet covered. (Key informant 1 Mathari National teaching and referral Hospital)

Another Key informant was in agreement with the statement:

The perimeter fence is strong with a height of over 2.4 metres but some parts are not covered. We can estimate that 40 percent opposite the Thika super highway is not covered. We still have people walking through it freely. (Key informant 3 Mathari National teaching and referral Hospital)

The data was confirmed by another two key informant from Kenyatta National Hospital that the facility has security wall but it does not cover the entire premises:

The Perimeter wall is partially constructed but the process is still ongoing. The southern part of the hospital is the remaining part. The wall is constructed using building block up to around one metre but the top part is ecstasically constructed by use of iron bars (Key informant 1 KNH)

The Perimeter wall which is partially constructed with about 60% is still open awaiting phase II Construction plan to be rolled out. (Key informant 2 KNH)

The Security wall covers only some parts of the hospital. It is a strong wall but someone can easily jump over it because the top part is made of grills. (Key informant 3 KNH)

Any security system is as strong as its weakness point. The weakest point of a physical perimeter fence is the gaps created by incomplete coverage of the fence. The two hospitals is at great risk of intrusion by adversaries without being detected.

Another aspect of the perimeter fence was whether as a protection measure was strong to resist adversary access. The results are presented in table 3.3.

Table 3.3: Participants opinion on the strength of perimeter fence to resist adversary access

	Frequency	Percent	Valid Percent
Disagree	111	56.9	64.9
Neutral	22	11.3	12.9
Agree	38	19.5	22.2
Total	171	87.7	100
No Response	24	12.3	
Total	195	100	

The results show that 64.9 per cent of the participants disagreed with the view that the perimeter fence as a protection measure was strong to resist adversary access. In addition, there were missing responses from 12.3 per cent of the participants. The possible reason for this could be that some category of participants found this technical to respond to. This is supported by results that show out of those who disagreed with the statement, 71.4 per cent and 66.7 per cent were security officers and police officers respectively while only 24 per cent and 21.2 per cent were medical personnel and administrative assistants respectively. The results were disaggregated between the two hospitals as shown in figure 3.4.

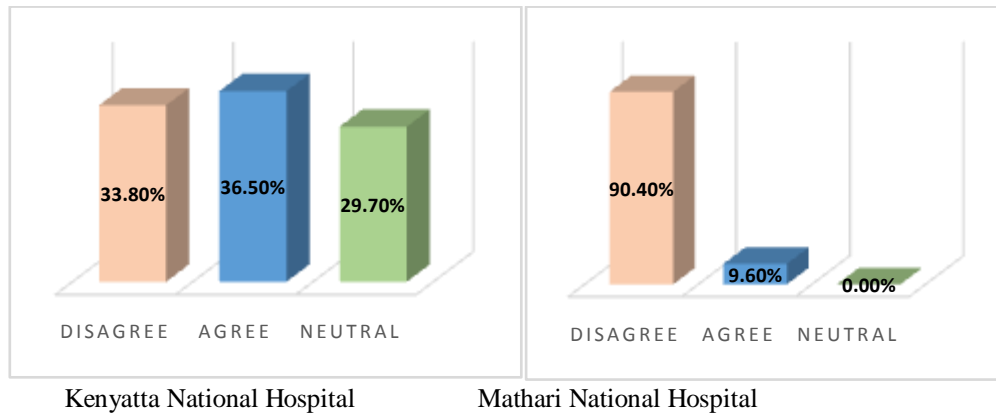


Figure 3.4: Participant's opinion on the strength of perimeter fence to resist adversary access

The results show that there were more participants who disagreed on the opinion that the perimeter fences resist adversary access from Mathari hospital than from Kenyatta Hospital. Combined, 90.4 per cent of participants from Mathari Hospital disagreed with the statement. This contrasts with the results from Kenyatta Hospital where 33.8 per cent of the participants disagreed with the statement that the perimeter wall could resist adversaries' access. It is evident from these results that through the two facilities had perimeter fences; they were not strong enough to resist adversary access, more so in Mathari Hospital. This is attributed to the fact that some parts of the perimeter fence is covered by barbed wires and shrubs. Perimetre fence should be strong enough to deny access to unauthorized persons or vehicles ⁴.

3.2.2 Barriers

Another component of the integrated security management system considered was a barrier. Often, anti-ram barriers configurations are used in a series, whereby the first "wedge" is lowered to allow the vehicle entry to a search and inspection area, while a second wedge in front of the vehicle remains elevated. Once the vehicle is between the two wedges, the first wedge also rises. As with regular double-entry portals, this will deny Vehicle borne improvised explosive the opportunity to reverse-escape from the control point and as a result may detonate the device at that point.

The barrier are usually automated and critical electronic gadgets like Automated Number plate Readers (ANPR) are installed near the barriers to allow the cameras record the registration numbers of all vehicles accessing the premises for security analysis at the security control room.

Existence of strong barriers gives the security officers adequate time to record the vehicle occupants' personal details in the electronic visitors' management system for positive identifications before access. The system relays information to the security control room for analysis and visitors with fake identification cards or are in the list of wanted criminals shall be arrested. Lack of strong barriers in the hospital access control system therefore poses a great risk to the hospital personnel and assets.

Participants were asked to indicate whether the facility had barriers and if so, whether they were strong enough to resist vehicle ramming. All participants from both Kenyatta and Mathari hospitals indicated the facilities had barriers even though opinion on whether they could resist vehicle ramming varied. The results are presented in table 3.4.

Table 3.4: Opinion on whether barrier could resist vehicle ramming

	Frequency	Percent	Valid Percent
Disagree	111	56.9	67.3
Neutral	16	8.2	9.7
Agree	38	19.5	23.1
Total	165	84.6	100
No Response	30	15.5	
Total	195	100	

The results show that 9.7 per cent of the respondents did not respond to the question item while 67.3 per cent were for the opinion that the barrier could not resist vehicle ramming. On the other hand, only 23.1 per cent of the participants were for the opinion that the barriers could resist vehicle ramming. There were more security officers than any other category who disagreed with the statement since 74 per cent of them disagreed

while 26 per cent were in agreement with the statement. The results were also considered as per facility as shown in figures 3.5.

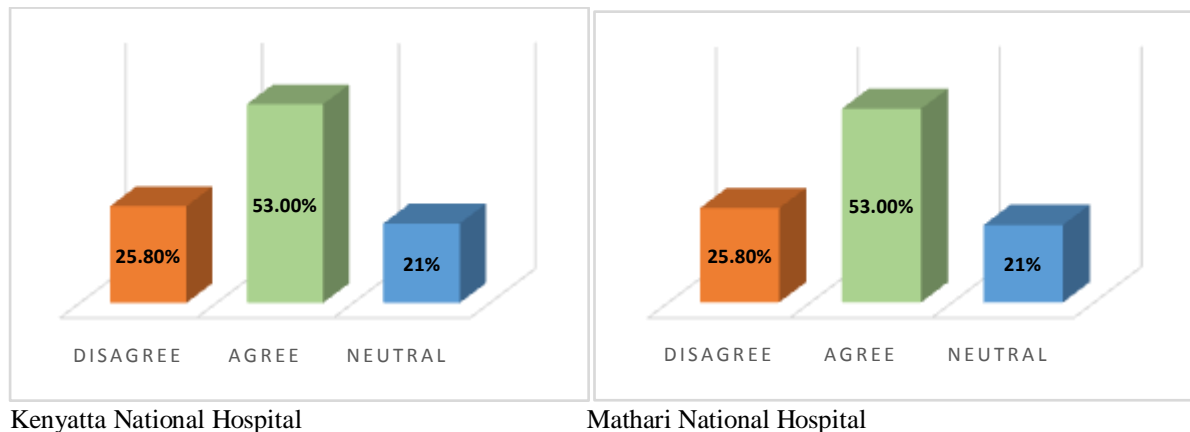


Figure 3.5: Participants opinion on whether barriers were strong enough to resist vehicle ramming

The results in figure 3.5 indicate that there was a difference in opinion by participants from both hospitals on whether barriers were strong enough to resist vehicle ramming. In Mathari Hospital, 97.9 per cent of the participants disagreed with the statement compared to 25.8 per cent from Kenyatta Hospital. This shows that though barriers were in place in both hospitals, it is highly likely that those found in Mathari Hospital could not resist vehicle ramming.

The Key informants confirmed this finding that the barriers installed in the facilities were not strong enough to resist vehicle ramming thus:

The hospital does not have security barrier on the external gates but we have access control barriers inside the facilities used specifically to collect parking fees. As earlier mentioned it to allow emergency vehicles access (Key informant 1 KNH)

Another Key informant was in agreement with the statement:

The hospital has newly constructed security barriers that are used to control movement of vehicles and earn fee out of it. The barriers cannot resist vehicle ramming (Key informant 3 KNH)

3.2.3 Gatehouse

Other features that the study considered as part of the Integrated Security Management System (ISMS) are the availability of a gatehouse, search areas, badge issue areas, visitors reception, and vehicle control points. Ideally, the perimeter gatehouse should be designed to serve as a: Vehicle control point for those vehicles that are allowed entry into the site, pedestrian access control point, badge issue point, visitor reception and search area¹⁶. Gatehouse is considered the most vulnerable part of the perimeter wall where personnel and vehicles ingress and egress the facility therefore the nerve of integrated security management system. Physical security components like the gatehouse and the security officers' uses electronic security components like the x ray luggage machine, electronic visitor's management system and the alarm systems to trigger response to any incident.

From both hospitals, 80.7 per cent of the participants indicated that the facility had a gatehouse; 46.1 per cent search areas; 30.8 per cent badge issue areas; 35.6 per cent visitor's reception, and 47.4 vehicle control points. The patterns observed were likely due to the different categories of study participants. For instance, when the results were presented as per the designation of participants, 74.4 per cent and 100 per cent of security officers and police officers respectively agreed that both facilities had gatehouses. In addition, 75.6 per cent of security officers and 83.3 per cent of police officers indicated that the facilities lacked badge issue areas. This is contrasted by 41.5 per cent of administration assistants who indicated that the hospitals had gatehouses and 57.9 per cent indicating that the hospitals lacked search areas. This indicates that there was a high likelihood for a security officer or a police officer to be familiar with the security features compared to other categories of participants.

Though the respondents confirmed that they have a gate house, Key informant who are the specialist in security functions stated that the gatehouse cannot function as security gate house. One key informant stated that:

The hospital has two main gates one at the front side and the rear part being shared by KMTCC and University of Nairobi medical students. The gate is constructed just to provide shelter to the security officers

deployed at the gate. There is no space to issue security badges and search of personnel and vehicles. Personnel use a different gate with vehicles. The vehicles are searched on the access road. This was deliberately made to minimize delay of delivering patients in and out of the hospital by ambulances or private vehicles for emergency purposes (Key informant 1 KNH)

Another Key informant agrees with the comments that:

The hospital has a gate house made of wood to provide shelter for the security guards not gate space for the search area, card issue areas or any other security control. Here the main focus is the construction and installations of medical issues not security. (Key informant Mathari National Teaching and referral hospital 1)

3.2.4 Doors

Participants were asked to indicate whether the facility had security doors, another component of the ISMS. The results show that both hospitals have security doors since 90.1 per cent of the participants were in agreement. The study went further to consider the components of the security doors by asking respondents to indicate whether the components of the security measure (door) were strong. The results are presented in figure 3.6.

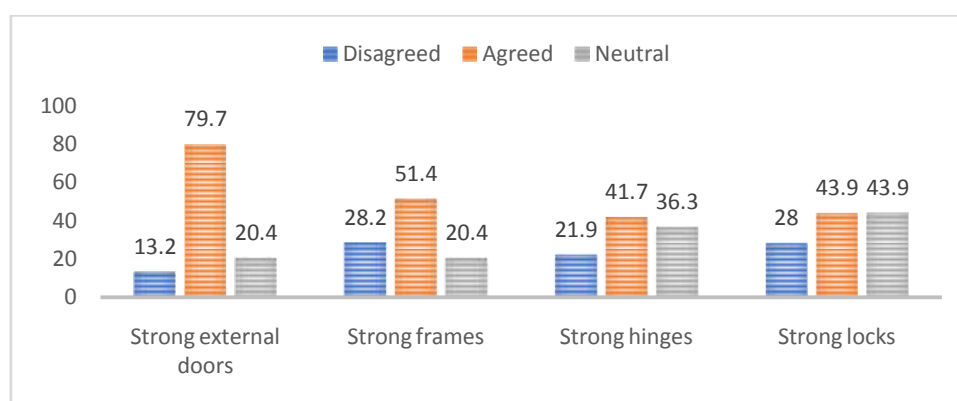


Figure 3.6: Participants' opinion on whether components of the security doors were strong

The results show that participants were in agreement that the two hospitals had strong security doors and frames with 79.7 per cent and 51.4 per cent respectively in agreement. However, for the other two features (hinges and locks), it participants were not very clear on whether they were strong. For example, 43.9 per cent of participants were neutral on the opinion that the security doors had strong locks while another 43.9 per cent agreed with the opinion. When the two facilities were compared, there were more participants from Kenyatta Hospital who agreed with the statement than those from Mathari Hospital. For instance, 63.5 per cent of participants from Kenyatta Hospital indicated that the facility had strong external doors compared to 48.4 from Mathari Hospital. While 50.6 per cent of participants from Kenyatta Hospital indicated that the doors had strong frames, 33.7 per cent of from Mathari Hospital agreed with the statement.

The hospital has strong doors as confirmed by key informant especially on critical rooms and areas. Some of the key informants stated that:

The Hospital has strong doors and windows especially in specific areas like drug stores and pharmacy where portable high value drugs can be stolen. Yes the windows and the doors are well framed and fitted with strong hinges to deny unauthorized access (key informant 1 KNH)

The data was confirmed by another key informant from Mathari National teaching and referral Hospital that the facility has strong doors in critical areas:

The hospital has strong doors and windows especially in specific areas like drug stores and pharmacy where portable high value drugs can be stolen. The security of the wards especially at mental illness wards is enhanced with strong doors and windows to prevent patient's subconductions. (Key informant 1 Mathari National teaching and referral Hospital)

¹² emphasizes that baseline security standards for buildings can be through the use of imposed physical measures such as strong locks and doors, patrolling security officers, intrusion detection, electronic access control and CCTV, designed to deny, delay or regulate access to a building. The integration of security components in critical doors like drug stores or high value equipment deters criminal freedom of action in the facility.

External doors should be strong and resistant to removal or penetration. It provides a baseline for holding electronic access control systems in position for its operational function of authorizing or denying access into the building. Though the hospital had strong doors at critical areas like the drug stores, there is need

to install electronic access control systems like the biometric system as an integrated system with access procedures.

3.2.5 Windows

Another physical security measure considered in the study was the existence of security windows. Participants were in agreement that the two facilities had security windows; with 83 per cent of them agreeing with the statement. The results, however, show that participants were in agreement (75.5%) that as a protection measure, the security windows were lockable with only 9.6 per cent disagreeing with the statement while 15 per cent were neutral. The other two features used as an indicator that the security windows acted as a security measure were the glazing material used and the frame mounting. Participants did not seem to be certain whether the security windows had strong glazing material or strong frame mounting. For instance, 46.5 per cent indicated that the windows had strong glazing material, 31.5 per cent were neutral while 22.1 per cent disagreed. Opinion on frame mounting was that 43.8 per cent were in agreement that the mounting was strong, 33.7 per cent were neutral and 22.5 per cent were in disagreement. The plausible explanation for this is that the participants could easily identify whether the security window was lockable unlike telling whether the glazing material was strong or not or how strong the frame mounting was.

A secure window is located as far as possible from easy adversary reach, it should be constructed with appropriate glazing material, be fitted with adequate locks on the frames, be built into strong frames and mounting be augmented with additional protection (bars, grilles, shutters) and be fitted with intrusion detection⁴.

Though most of the windows were well grilled especially in critical areas like drug stores, equipment storage areas and cash points, there was lack of intruder detection system to sound an alarm for quick response to any intrusion.

3.2.6 Security officers

Security officers plays very important role in implementing security and safety policies, they respond to alarm systems and monitor the electronic systems. The procedures of access control from the gate to the hospital are usually implemented by the security officers both internal and contracted security officer. Though electronic security components have been invented to supplement human functions like surveillance, automated registration of persons, scanners and intruder detection devices. There is still need to employ adequate security officers to operate the systems and respond to the alarms.

The study also established that the two hospitals had hired security officers (n = 76) with 37 in Kenyatta Hospital and 37 from Mathari Hospital. The participants were asked to indicate their opinion on whether the security officers were adequate to cover all critical areas of the facility. The results are presented in table 3.5.

Table 3.5: Opinion on whether the security officers were adequate

	Frequency	Percent	Valid Percent	Cumulative Percent
Disagree	49	25.1	25.7	25.7
Neutral	24	12.3	12.6	13.3
Agree	118	60.5	61.7	61
Total	191	97.9	100	
No response	4	2.1		
Total	195	100		

The results show that out of the sampled 195 participants, 2.1 per cent did not respond to the question item. There were more participants (61%) who agreed than those who disagreed (25.7%) that the facilities had adequate security officers to cover all critical areas while 13.3 per cent were neutral. A comparison of the two facilities shows that there were more participants from Mathari Hospital (76.8%) than from Kenyatta Hospital (44.6) who were in agreement with the statement; likelihood that the former could be better staffed with security officers than the latter.

Key informant were not in agreement with the data that both hospitals are well staffed with security officers deployed as internal security officers, outsourced security officers and the use of police officers to protect the hospital. Some of the key informants commented as follows:

The hospital has both internal and external security officers. Internal security officers are 152 in number who are recruited and deployed by the hospital on permanent terms. Outsourced security guards are 200 in number who just replaced another security company . Police officers are 39 in number who have a police station in the hospital facility but they serve KMTTC, University of Nairobi and other hosted institutions in the

facility. For direct support we are allocated two police officers during the day and two officers during the night. This assists in immediate response to any incidence. The hospital is big with so many critical areas that needs protection but the current deployment is not adequate. (Key informant 2 KNH)
In Mathari Hospital another Key informant stated as follows:

The hospital have both internal and external security officers where Internal security officers is only one, Outsourced security officers are thirteen and police officers are deployed two during the day and two at night. Police officers are sources from Muthaiga police station which is around a platoon strength. The Hospital is fairly staffed with security officers but there is need to recruit more internal security officer who is currently one. (Key informant 2 Mathari National teaching and referral hospital)

3.2.7 CCTV Cameras

The study posed a second question to participants as a further response to the first objective of the study which sought to establish the types of electronic security gadgets used in the hospitals. These were: CCTV camera systems, biometric systems, lighting systems, metal detectors, and patient tagging. The results show that 50 per cent of the participants indicated that the facilities had CCTV camera systems. Further analysis shows that the 50 per cent that indicated that the facility did not have CCTV camera systems were from Mathari Hospital. When the participants were categorized into facility, 97.9 per cent of the participants from Mathari Hospital indicated that the facility did not have CCTV camera systems while 95.8 per cent of the participants from Kenyatta Hospital were in agreement. This is a clear indication that Kenyatta National Hospital have installed CCTV Cameras while Mathari hospital have not installed CCTV Cameras in the hospital.

The participants were asked to indicate whether the CCTV camera systems had the ability to detect, observe and recognize human figures. The results show that 65.1 per cent of the participants' response was "neutral" while only 19.1 per cent and 15.9 per cent respectively agreed and disagreed with the statement. This is not a strange finding bearing in mind that this is a technical issue that respondents were not trained on the active CCTV surveillance and the specification of CCTV Cameras for instance a CCTV camera with over 150 pixels per meter square has the capability to recognize human faces at a distance of 100 meters from the camera.

¹¹ Stresses that CCTV offers the greatest possible benefits when integrated with other sensing systems and used to monitor remote areas. However, there were CCTV cameras installed in the hospital, the quality of cameras and ability to integrate with other electronic equipment like the intruder detection systems, lighting systems and biometric system seemed to be lacking. These limit the impact of CCTV Cameras in the hospitals.

3.2.8 Biometric systems

The results show that overall, 74.1 per cent of participants indicated that the facilities lacked biometric systems with 95.8 per cent from Mathari Hospital indicating that system lacked the system compared to 52.1 per cent from Kenyatta Hospital who shared the same opinion. Out of those participants indicating that the facilities had biometric systems, only 17.6 per cent agreed that the systems could register biometric data while 71.6 per cent were in disagreement. On whether the biometric systems could store data, 71.3 per cent of the participants disagreed with the statement. Further analysis revealed that 97.9 per cent of participants from Mathari Hospital disagreed that the biometric systems could store data while 60.6 per cent of participants from Kenyatta Hospital were in agreement that the systems could store data. This was a technical issue that the respondents were not able to determine on how long the data can be stored and what is the storage capacity of their biometric storage systems.

The participants were not in agreement that the biometric systems could deny unauthorized personnel access. Out of those who indicated that the facilities had the systems, 69.6 per cent of them disagreed that the systems could deny unauthorized personnel access while 25 per cent were in agreement with the statement. When the results were disaggregated between the two facilities, the same pattern observed on whether the systems could store data recurs with 67.1 per cent of the participants from Kenyatta Hospital agreeing that the systems could deny unauthorized personnel access while 18.8 per cent were in disagreement while 15.1 while neutral. On the other hand, 98.9 per cent of participants from Mathari Hospital disagreed with the statement with only 1.1 per cent in agreement. The availability of biometric system in KNH is limited only to renal wards and very few security officers attached to the wards are trained on the system while the no biometric system is installed at Mathari hospital hence the response from the respondents.

A biometric systems works on the basis of storing "biological attribute" profiles of enrolled users (as a digitized record) on a central database. To gain access, the user presents the specific biological attribute to a reader for conversion to a digital signal and comparison against the database. The most common biological attributes used in biometric systems are, facial recognition, fingerprints and Iris ⁴.

The biometric system used in the hospital is the fingerprint system especially at critical areas. This limits access to other areas especially for medical officers who most of th time have their medical gloves on.

There is need to consider iris or facial recognition biometric system in the hospital to allow a secure access by the doctors while their gloves are still on.

3.2.9 Lighting system

Another component of the protective security system considered was the facilities' security lighting system. Security lighting systems are an integral part of physical security. In both facilities, participants were in agreement (97.9) that security lighting systems were available. As a protection measure, a lighting system is part of crime prevention through environmental design (CPTED), whose "design and effective use of the built environment can lead to a reduction in the fear and incidence of crime and an improvement in the quality of life"⁷. In addition, the view that improved street lighting can lead to reduced crime is supported by the fact that "improved lighting leads to increased surveillance of potential offenders and hence to increased deterrence"¹⁷. The importance of security lighting is emphasized by^{9,18}, who indicate that it is "installed to help protect people and property from criminal. Activities and to create a perception of a reasonably secure environment". One of the indicators for the security lighting systems as a protection measure was whether they provided clear illumination. The results are presented in figure 3.7.

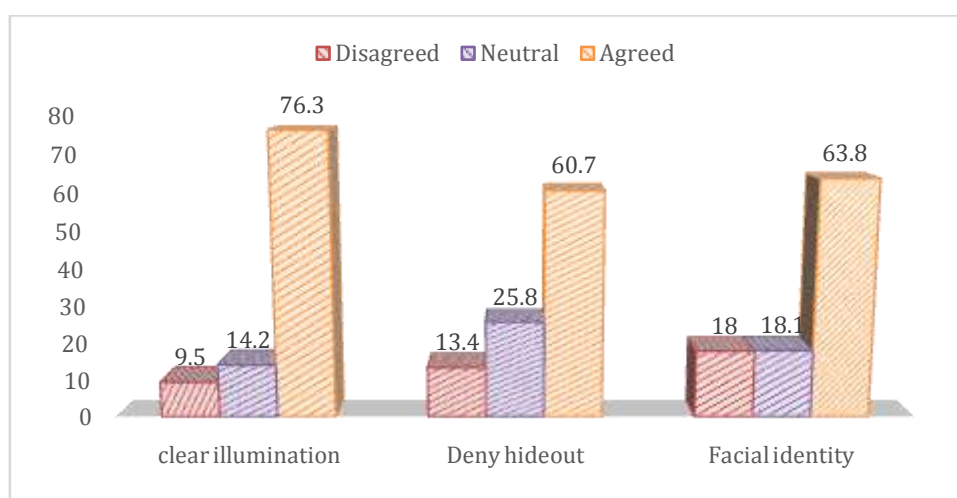


Figure 3.7: Opinion on the security lighting systems as a protection measure

The results show that there were more participants (76.3%) who agreed that the security lighting systems provided a clear illumination than those who disagreed (9.5%). Another 14.2 per cent of the respondents were neutral. On whether the security lighting systems could deny potential hideouts, 60.7 per cent of the participants were in agreement, while only 13.4 per cent disagreed with this statement. Similarly, there were more participants (63.8%) who were in agreement that security lighting systems permitted facial identification at night while 18.1 per cent disagreed.

A comparison between the two hospitals shows that there were more participants from Mathari Hospital with agreement than from Kenyatta hospital. The results are presented in figures 3.8a and 3.8b.

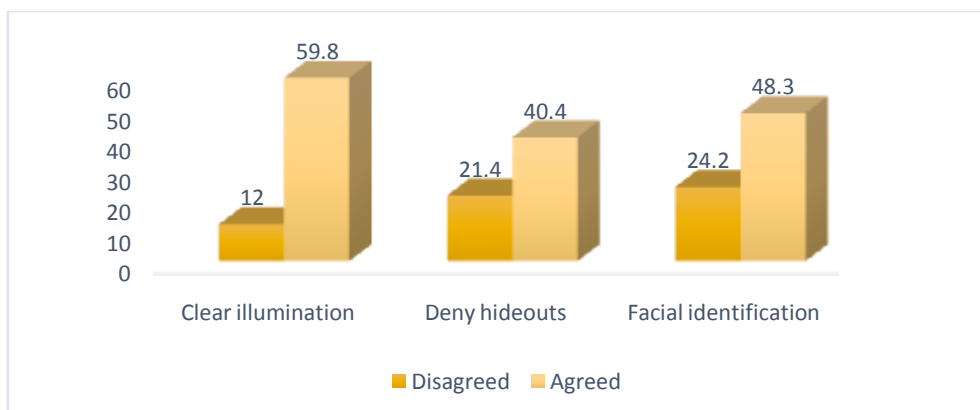


Figure 3.8a: Opinion on the security lighting systems as a protection measure (Kenyatta Hospital)

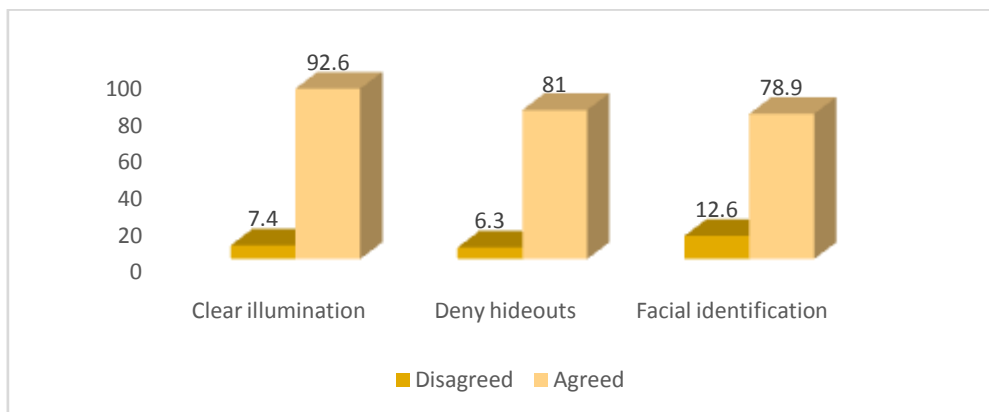


Figure 3.8b: Opinion on the security lighting systems as a protection measure (Mathari Hospital)

The results show that 92.6 per cent of participants from Mathari Hospital were in agreement that security lighting system provided clear illumination lighting compared to 59.8 per cent. Another 81 per cent of participants from Mathari Hospital compared to 40.4 per cent from Kenyatta Hospital were in agreement that the security lighting system denied potential hideouts. The results also show that 78.9 per cent of participants from Mathari Hospital were in agreement that the security lighting system permitted facial identification at night compared to 48.3 per cent from Kenyatta Hospital.

3.2.10 Metal detector

Another electronic security management system considered was the metal detector. Participants were asked to indicate the facility had metals detectors of which 82.2 per cent agreed to the statement compared to 17.8 who disagreed. The metal detector used in the hospital is hand held that requires the use of security officers while conducting the search as opposed to walk through scanners where personnel walks through a scanning gadget and sounds an alarm on detection of metallic materials.

Participants were asked to indicate whether they agreed or disagreed with the statement that the metal detectors were capable of detecting metallic items like firearms or knives. The results are presented in figure 3.9.

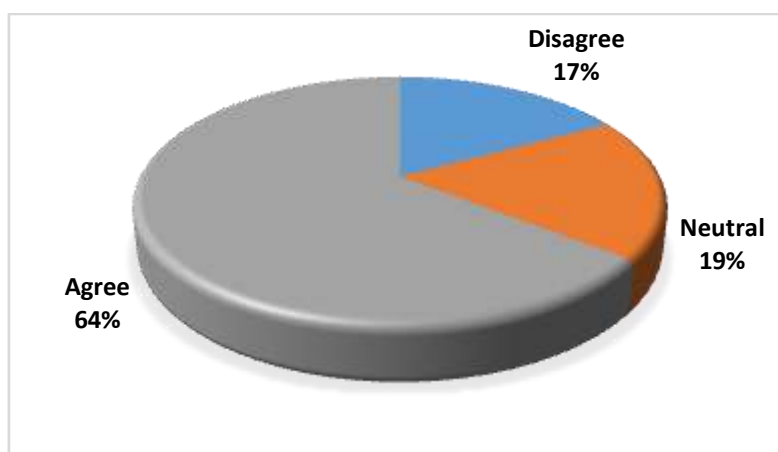


Figure 3.9: Participants opinions on metallic detectors ability to detect metallic items

The results show that 64.4 per cent of the participants were in agreement that metallic detectors had the ability to detect metallic items. It was only 17 per cent that were in disagreement. A comparison between the two institutions was done and the results presented in figure 3.10.

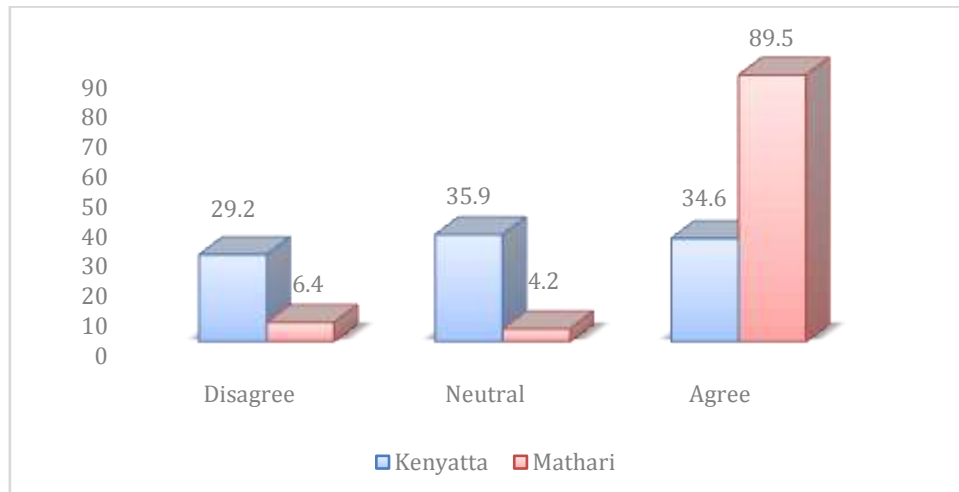


Figure 3.10: A comparison Participants opinions on metallic detectors ability to detect metallic items

The results show that even though 64.4 per cent of the participants were in agreement that the metallic detectors had the ability to detect metallic items; there was a difference in opinion in both hospitals. There were more participants in Mathari Hospital (89.5%) than in Kenyatta Hospital (34.6%) who agreed that the metallic detectors ability to detect metallic items. Conversely, more participants from Kenyatta Hospital (29.2%) disagreed with the statement compared to only 6.4 from Mathari Hospital. Clearly a metal detector is a common electronic device used to control movement of items in and out of the hospital. The security guards deployed at Kenyatta Hospital were less trained on how to operate the metal detectors than Mathari hospital who seemed to understand its operations.

3.2.11 Patients tagging

Another component of the electronic security management system considered was patient tagging's. The study established that 47.4 per cent were in agreement that the facilities had patient tagging while 52.6 per cent disagreed. This pattern is explained by the difference in opinion between the two hospitals as shown in figure 3.11.

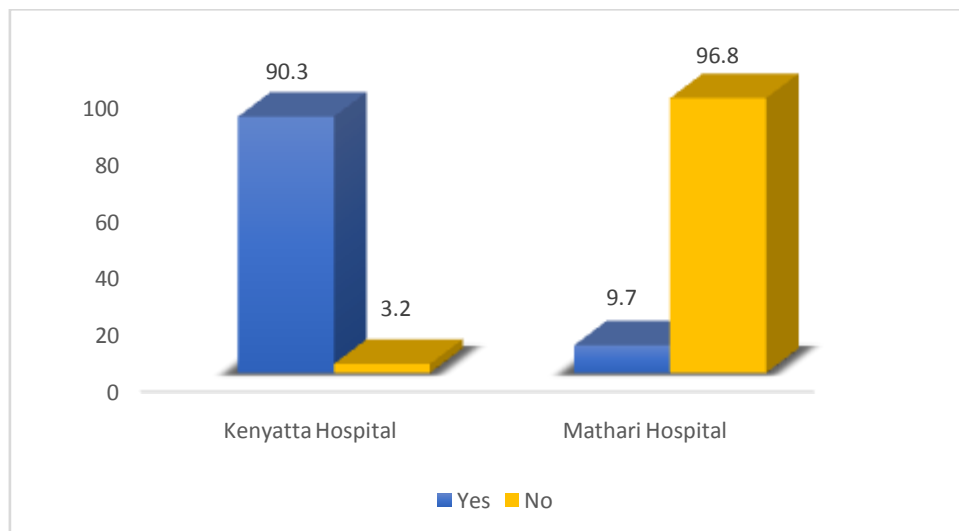


Figure 3.11: Availability of patients tagging's in Kenyatta and Mathari hospitals

The results show that that 96.8 per cent of participants from Mathari Hospital indicated that the facility lacked patient tagging's. This contrasts with 90.3 per cent from Kenyatta Hospital who indicated that the facility had patients tagging's. This explains the almost 50 per cent difference in opinion by participants from both facilities on availability of patient tagging's.

Study participants were asked to indicate their level of agreement on whether the patient's tagging had antenna and memory chip and whether they had the ability to detect patients tags and sound alarm system. The results are presented in table 3.6 and 3.7.

Table 3.6: Participantslevel of agreement on patients taggings

	Frequency	Percent	Valid Percent
Disagree	141	72.3	77
Neutral	19	9.7	10.4
Agree	23	11.8	12.6
Total	183	93.8	100
No response	12	6.2	
Total	195	100	

The results show that 77 per cent of the participants disagreed that the patients' tagging's had both an antenna and memory chip. An additional 6.2 per cent of the participants did not respond the question item hence the missing data. The missing data was likely due participants who did not have the technical understanding of the components. For example, those who did not respond to the question item included 10 per cent of the administration assistants. Further analysis reveals that participants from both facilities were in disagreement with the statement though there was variation in the level of disagreement. For instance, 59.3 per cent of participants from Kenyatta Hospital disagreed compared to 93.6 per cent from Mathari Hospital.

Table 3.7: Participantslevel of agreement on patients tagging functionality

	Frequency	Percent	Valid Percent
Disagree	143	73.3	78.6
Neutral	19	9.7	10.5
Agree	20	10.2	10.9
Total	182	93.3	100
No response	13	6.7	
Total	195	100	

Participants indicated that they were in disagreement that the patient tagging could detect patients' tags and sound an alarm system since 78.6 per cent disagreed compared to only 10.9 per cent in agreement. When disaggregated between the two hospitals, the results show that there were more participants from Mathari Hospital (95.8%) who disagreed with the opinion compared to those from Kenyatta Hospital (62.7%). The patients tagging done in the hospitals were purely for medical procedures not for security and safety reasons. This explains a lot of reported cases of missing patients and patients' abscondments.

3.2.12 Intruder Detection System (IDS)

Perimeter Intrusion Detection System (PIDS) is the use of dedicated electronic systems which detect and notify any intrusion, or attempted intrusion, through a specific external area, usually, but not always, a boundary. The most common kind of PIDS is CCTV, especially when coupled with video motion detection (VMD). Specific technologies used in PIDS systems include, but are not limited to; taut wire, vibration, electrostatic disturbance, magnetic field disturbance. Ported and movement-based fibre optics ⁴.

The availability of electronic security management system was also captured by establishing whether the facilities had intruder detection systems (IDS). The study established that 80.6 per cent of the participants were in disagreement that the facilities had intruder detection systems. In addition, those that indicated the availability of the systems varied in the level of agreement on whether the systems could detect intruders. For example, 80.6 per cent of the participants were in disagreement that the intruder detection systems could detect intruders, transmit information and raise an alarm for response team. This compares to only 12 per cent of those who indicated that they "agree" and 7.7 per cent: neutral".

The data was confirmed by key informants that Kenyatta National Hospital has installed CCTV Cameras, ID and uses electronic search gadget. One key informant stated thus:

The hospital has installed CCTV Cameras deployed externally and internal part of the hospital to cover critical areas. Measures have been put in place for CCTV masking where privacy of patients and stakeholders are factored. Biometric system have been installed only at Cancer treatment centre where the Americans is believed to have stored uranium that should be protected by all means.it is only medical officers allowed to access the centre and the system is being monitored by only few security officers and ICT officers who knows well how to get the data of those accessing the premises. The same facility has been installed with Intruder

detection system where any unauthorized access shall be detected and an alarm raised at the CCTV command centre for response. The qualities of the cameras are not very good because of the low internet services and megapixels of the camera. So it just does basic security. The tendering process is always done through ICT who are believed to understand better the operational capability of the Cameras. We only come in as a user department. (Key informant 2 KNH)

Mathari National Teaching and referral hospital on the other hand had not invested in electronic security measures as confirmed by the data. The only electronic security measure was electronic search gadget. This data was confirmed by key informant who stated that:

The hospital has an electronic search gadget used for searching personnel accessing the premises but there are no CCTV Cameras or Intruder detection devices.(Key informant 3 Mathari National Teaching and referral Hospital).

3.2.13 Security procedures

The last research question to respond to the first objective was on the security procedures used in referral hospitals in Nairobi County. Participants were asked to indicate whether the facility had certain security procedural components. The results are presented in figure 3,12.

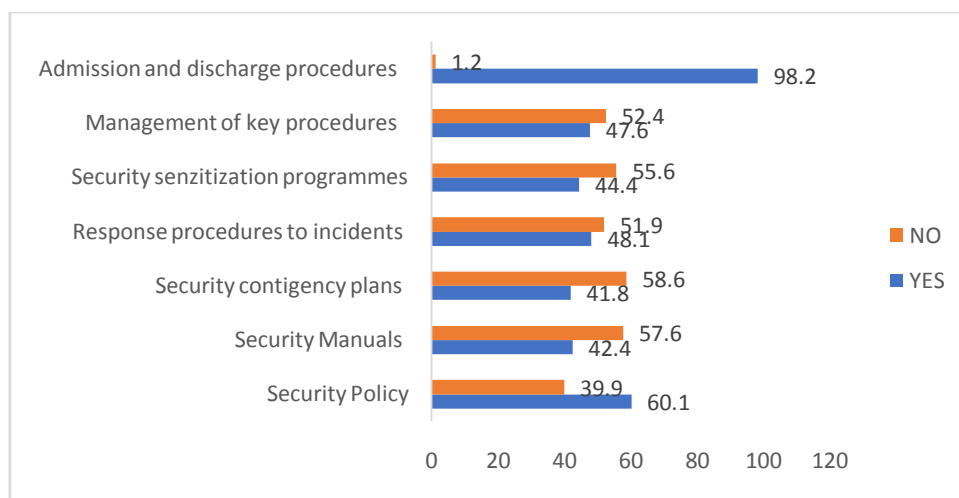


Figure 3.12: Security procedure components in referral hospitals in Nairobi County

The results show that the only component that participants were in agreement (98.2) was available in both facilities was admission and discharge of patients' procedures. When asked about security policy, 60.1 per cent of the participants indicated that they were in existence. There were more participants who disagreed that the facilities had security manuals and security contingency plans at 57.6 per cent and 58.6 per cent respectively. On whether the facilities had response procedures to incidents, 51.9 per cent disagreed while 55.6 per cent of the participants disagreed that there were security sensitization programmes. Likewise, there were more participants (52.4%) who disagreed that the facilities had management of key procedures in place. A different pattern, however, emerges when responses were considered per facility as shown in figure 3.13.

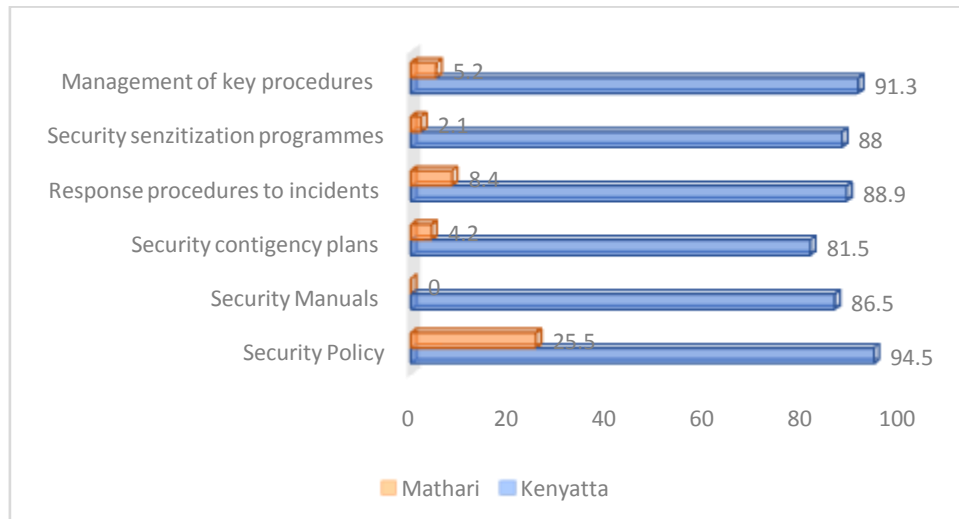


Figure 3.13: Level of agreement on security procedure components in Kenyatta and Mathari hospitals

The results show the participants from Kenyatta and Mathari hospitals who agreed that the indicated security procedures were available in the facility. It is evident that Kenyatta Hospital had the security procedures unlike Mathari Hospital. This explains the patterns observed in figure 3.12 in cases where the percentages for those responding yes and no were almost equal.

The Key informants confirmed this finding that the hospital has security policy and security manuals that guides them in security operations. One key informant stated thus:

The hospitals have security policy, security strategic plan incorporated in the hospital strategic plan. We are in the process of developing business continuity plan as directed by the government. The security procedures are sensitized occasionally depending on the hospital programme. But not as expected. The other procedures like the admission and discharge procedures are in place and are being followed. Many training, sensitization and academic programs are slotted on medical matters, But more emphasis is put on management drills where we partner with fire response from Nairobi County. We manage the keys manually where the keys are stored in the control room and a key register maintained. This has challenges like duplication of keys because the keys are not high quality that cannot be duplicated. The system is serving us well as for now. (Key respondent 2 KNH)

On the other hand Mathari National teaching and referral hospital data confirms that there were no security procedures as compared to KNH. This was also observed by the key informants from Mathari National teaching and referral hospital who stated that:

The hospital has security instructions and standard operating procedures that are developed by the service providers when deploying the security guards in the premises. The rest of the documents we don't have (Key informant 1 Mathari National teaching and referral hospital)

Security procedures are fundamental component in implementation of integrated security management system where it gives what should be done from the time an incident is detected to the time when the incident is responded to including what actions after the incident. The hospitals need to have all the security procedure in place for preventive and responsive security measures in order to secure the hospital environment.

CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

The first objective sought to establish the components of ISMS commonly used in public hospitals in Nairobi City County. The studies found out that most hospital have installed first line protection measures by the use of a perimeter wall though it does not cover the entire premises. The study established that as a protection measure the perimeter fence was not strong to resist adversary access. The study established that facility had barriers though not strong enough to resist vehicle ramming. The facilities had a gatehouse to provide shelter to security officers deployed at the gate but it did not have search areas, badge issue areas, visitors' reception, and vehicle control points as part of the ISMS. The hospitals had security doors and windows though some components of features security doors like strong hinges and frames were missing in most external doors. The facilities had inadequate security officers to cover all critical areas

The study established that Kenyatta Hospital had installed CCTV camera systems while Mathari Hospital had not installed the CCTV camera systems as indicated by 97.9 per cent of the participants. It was, however, not possible to ascertain whether the CCTV camera systems had the ability to detect, observe and

recognize human figures because the security officers were not well trained on electronic security systems. Mathari Hospital lacked biometric systems and though Kenyatta Hospital had biometric systems, there was no prove that the systems could register biometric, store data or deny unauthorized personnel access.

Another feature of physical security installed by the facilities were security lighting systems. The study established that the security lighting system could act as a protection measure since it had the ability to provide clear illumination, permit facial identification at night, and deny potential hideouts.

There were metals detectors installed as part of electronic security management system in both facilities and that the metallic detectors had the ability to detect metallic items. Kenyatta Hospital had patient tagging as a security feature though the same was lacking in Mathari hospital, though not all patients tagging had both an antenna and memory chip. The patient tagging was aimed at patient's identification during treatment procedures not for security purposes.

Another component that lacked in the facilities was the intruder detection system (IDS), which is part of the electronic security management system.

Referral hospitals have some of the security procedures in place like the security policy and the admission and discharge of patients. The other security procedures were skeleton and the security officers were not well aware if it exists, these includes Security manuals, security contingency plans, response procedures to incidences, security sensitization programs and management of keys.

The hospital deployed internal hospital security officers, outsourced security officers and police officers to protect the facility. Though the deployment arrangement was made, the number of security officers were not adequate to cover the entire premises. The police officers were also not available always because of other commitments in the state.

The use of ISMS in referral hospitals in Nairobi County to achieve the effect of deterrence and reduce response time to an incident is not yet achieved thus the increase of criminal activities in the hospitals. This is attributed to lack of adequate and operational specifications of ISMS components in the hospitals, low capacity of security officers to implements ISMS due to inadequate training and the systems of early detection and response of an incident is not well maintained There ISMS in the hospital is not synchronized.

4.2 Recommendations

The study recommends the following based on the findings.

- i). To enhance the security of the hospitals, there is need to construct a perimeter wall that covers the whole hospital facility to act as deterrence and clearly mark the boundaries of the facility from intrusion by other businesses that can be a security risk. The wall should be 2 to 2.4 meters high to block adversaries' intrusion and vegetation around the perimeter fence, which would otherwise assist the intruder's access the facilities, should be cleared. A perimeter road should be created inside the facility in order to act as a fire breaker and assist the security guards conduct vehicular or foot patrols.
- ii). There is need to construct strong barriers that can stop or prevent vehicle rumming by use of strong barriers like jersey barriers and raising bollards.
- iii). The security gate house in all the hospitals should be contracted to meet the security operation requirements like it should provide shelter, provide a space for personnel and luggage search, badge issue area and a space for visitors especially those visitors who have accompanied patients or relatives to wait in order to minimize congestion in the hospital. The gate house should also have a space for vehicle control where emergency vehicles like ambulances can access and egress the facility without being inconvenienced with one critical security functions of vehicle search.
- iv). All critical rooms or buildings like the drug stores, high value equipment's areas and cash offices should be protected by strong metallic doors and windows which should have, strong frames, strong hinges and strong locking system. This will deter criminal activities and assist to increase penetration time.
- v). Electronic security equipment is increasingly forming part of the security solutions in any organization. Therefore there is need to invest in electronic security gadgets like the CCTV Cameras, Biometric systems, Metal detectors, x ray luggage machines, electronic visitors management systems, intruder detection system, electronic key management systems, automated vehicle number plate recognition and many more that will assist the security officers ensure safety and security of personnel and equipment in the hospital.
- vi). The security officers deployed in the hospital should be adequate to cover the whole hospital. Any gap should be supplemented by electronic security gadgets like the CCTV Cameras and intruder detection system. The officers should be well trained on basic security functions. The training should cover physical security, electronic security and procedural security.
- vii). Refresher courses should be done to remind the security officers on their roles and standing operational procedures and continuously updating them on the ever changing security threats and technology. Management of patients in the hospital is a very difficult task.

viii). The hospital should consider the use of electronic patients tagging which is fitted with radio frequency identification so that the movement of the patient was monitored. This assist the management of the hospital minimize losses incurred by patients' abscondment and disappearance.

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