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Factors influencing healthcare associated infection among healthcare workers in Sierra Leone

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Abstract
This study is to determine the factors that influence the prevalence of healthcare associated infections among HCWs in Bo City. HAI is one of the leading causes of death and increased morbidity for hospitalized patients. After the principle of the study and its possible outcomes are explained to all subjects. All personal information of the study subjects and result were dealt with confidentially. All healthcare associated infections cases involving HCWs at Rescue Health Center for a period of two years (2020 and 2021) were analyzed even though the data used was not originally collected for any research purposes.
A total of 860 healthcare associated infection patients were recruited for the study. The minimum age of study participants was 40 years and maximum was 80 years and above. The median age was 60 years.
Healthcare associated infections are one of the common medical conditions to be contact in hospital everywhere. Consequently, this study has also discovered that healthcare associated infections are closely connected and associated with the type of job someone had; and that the condition can lead to disastrous consequences. Healthcare associated infections were proven to have led to problems such as heart disease, stroke, vision loss, kidney disease, and nerve damage. It came out clearly during this research that one out of four people who visited Rescue Health Center do not know they had healthcare associated infections.
This study also found out that healthcare associated infections, like any other disease can affect any gender male or Female, whether rich or poor. Results further shows that more female than men are affected, of serious concern to the researcher is the huge difference between those women below the age of 60 years. This seemingly huge difference was attributed to the frequency of hospital visit by women or their children.
In this study, majority of the study participants were males. This is always the case as far as healthcare associated infected patients are concerned and in similar studies earlier, males were majority of the patients. But healthcare associated infections are more prevalence among female than male. The study also shows that healthcare associated infections were more prevalent in July (14.3%) for 2020 while as August (36.1%) had the highest for 2021. The study also shows that healthcare associated infections are more prevalence in 2021 (10.1%) as compared to 2020 (8.1%).
The prevalence of healthcare associated infections was found to be 9.2% which is higher than what has been found in an earlier study in Rescue Health Center as 7.8%.
A total of 860 screened patients were recruited at the Rescue Health Center during this study and (475) were males with a prevalence of (8.4.0%). The findings of this study also conform accordingly regarding those who visited Rescue Health Center
It can be rightly concluded from the summary of the findings that healthcare associated infections depends on frequency of hospital visits and the degree of training received by the medical personnel. These findings are strong and should therefore not be swept under the carpet or taken for granted. It can also be safely concluded that the rate of infection among adult women below 60years is overwhelmingly higher than that of men in that same age bracket.

Keywords: healthcare, Factors, associated, Sierra Leone

1. Introduction

Majority of the people infected during the West Africa Ebola outbreak in Sierra Leone in 2014-2016 were health care service providers and majority of the Ebola incidence among health care workers were as a result of lack of personal safety gears such as personal protective equipment (PPE) or their improper use, as well as the poor handling and management of health care

Infections. Because healthcare associated infections are produced during the course of the duty by health care workers (HCWs), it is believed that these HCWs can play a major role in its management and disposals. Research has shown that the break in the chain of nosocomial outbreaks within a health care facility is the responsibility of health care workers which in turn depends on their level of infection management disposal awareness [12].

Knowledge and practice towards healthcare associated infection management by HCWs varies. A cross sectional study that assessed the knowledge, attitude and practice of doctors, nurses, laboratory technicians, and sanitary staff regarding biomedical infection management and disposal shows that doctors, nurses, and laboratory technicians had basic knowledge than sanitary staff regarding biomedical infection management and disposal, while nurses and laboratory had greater knowledge regarding health care infection at the source compared to doctors [1]. The use of short-term enhanced solution and control support for its control and management is now been implemented in hospitals and nursing homes through several control programs. Generally, short-term enhanced control support programs have been shown to produce reduction in nosocomial outbreaks in hospitals. One study shows a great improvement in control as a result of compliance with safe disposal of clinical infection [14]. The health care infection management and disposal includes the separation of the infection into groups in order to reduce its size for suitable handling and hence disposal. Some countries have no rules and guidelines for dealing with health care associated infections. For most countries however it is, the owner and manager of the health care facility which serves as the source of the healthcare associated infection that borne the responsibility for the disposal of the healthcare associated infection produced in that facility. However, the following principles for healthcare associated infection are important; infection must be separated depending on the likelihood of hazards, separated infection groups should be placed in containers, each container appropriately labeled, areas experiencing delays in infection and disposal demarcated and protected to deny access to unauthorized people, hazardous and non-hazardous infection should be separated during and storage, central infection storage area, risks and hazards associated with handling healthcare associated infection should be clearly understood by infection disposal personnel [15-17]. To make health care infection and disposal the World Health a and colour coding system for health care infection management and disposal [18, 19]. Some countries however have assigned colour codes to healthcare associated infection to aid in their disposal. These colour codes is based largely on the resources and of the country. In this study we assessed the knowledge and level of compliance to IPC and health care infection management and disposal at four main referral hospitals in Sierra Leone the 2014-2015 West Africa Ebola outbreak.

1.1 Statement of the problem

Hospital-acquired infections (HAIs) also called nosocomial infections affects patients in healthcare [1, 2]. The National Institute for Health and Care Excellence guidelines for HAI control states that HAI is acquired during healthcare interventions [3]. HAIs can worsen disease conditions [4] and is increasing in low-income countries [5]. The recent surge in HAI is associated with the rising prevalence of multidrug resistance infections [6] and emergence of infectious diseases [7]. Infectious disease mortality accounts for 26% of years of life lost (YLL) globally [8] and developing countries account for 88% of communicable diseases YLL [9, 10]. Fifteen percent of HAIs cases occur in developing countries [11]. HAI global mortality and morbidity makes finding a solution a global concern [12]. The spread of HAIs in developing countries is due to factors relating to the training and qualification HCWs [13]. The identification of appropriate control interventions for HAIs is an urgent.

1.2 Causes of Healthcare associated infections

The frequency of using HH is crucial in preventing and controlling HAIs [15] but without compliance HH is unsuccessful [16]. The WHO World Alliance for Patient Safety's 'Clean Care is Safer Care' campaign launched in 2015 aim at increasing use of HH strategies [17]. Compliance to HH is still a global concern despite HH being an important HAI control strategy [18-22]. More evidence of HH impact in reducing HAI in developing countries is required [23] though few research have assessed HH effectiveness among HCWs in developing countries [24]. A South African cluster randomized controlled trial (RCT) showed no statistical or clinical significance associating HH products use and HAI reduction [25]. Karabay, et al. reported a statistical and clinical significant association between efficiency and alcohol hand rubbing among HCWs [26]. Salamati, Poursharifi, and Akbar Rahbarimanesh showed a significant association when education was combined with motivational interview to improve HH among HCWs [27]. The Hawthorne effect which affects HH effectiveness and validity can produce varying findings during overt and covert observational studies. Kovacs-Litman, Wong and Shojania reported varying HH compliance due to Hawthorne effect among physicians; 84% in overt observation vs. 50% in covert observation [18]. In this systematic review we are set to identify the most effective and appropriate HH method used by HCWs in developing countries that is associated with HAI and antimicrobial reduction. Methods. We reviewed extant literatures on HH interventions by HCWs in healthcare settings in developing countries published between 2005 and 2016.

1.3 Epidemiology of HAIs

It is estimated that 366million people had healthcare associated infections in 2011 [18], by 2030 this would rise to 552 million [18] and the number of people with health care associated infections is increasing in every country with 80% of people with healthcare associated infections living in low and middle-income countries.

Healthcare associated infections caused 4.6 million deaths in 2011 [19] it is estimated that 439 million [20] people would have healthcare associated infections by the year 2030.

Literature search has shown that there are few data available on the prevalence of healthcare associated infections in Africa as a whole. Studies examining data trends within Africa point to evidence of a dramatic increase in prevalence in both rural and urban setting and affecting both genders equally. It is predicted that the prevalence of healthcare associated infection in adults of which health care associated infections islands becoming prominent will increase in the next 2 decades and much of the increase will occur in developing countries where the majority of patients are aged between 45 and 64 years. As at 2013, 382 million people have healthcare associated infections worldwide and makes up

about 90% of the cases. This is equal to 8.3% of the adult population with equal rates in both men and women. In 2012 it resulted in 1.5 million deaths worldwide, making it the 8th leading cause of death of which more than 80% of HAI death occurring in low and middle -income countries. Healthcare associated infections occurs throughout the world but is more common in more developed countries, the greatest increase in rate was expected to occur in Asia and Africa, where most people with healthcare associated infections will probably live in 2030. The increase in rate in developing countries follows the trend of urbanization and lifestyle changes, including a western-style diet. This has suggested an environmental understanding of the mechanism(s) at present.

1.4 Healthcare associated infections in Sierra Leone

Globally it is estimated that 10% of healthcare workers become infected with healthcare associated infection (HAIs). Currently, an estimated 400 million people are infected worldwide with HAI [2] many of them in Asia and Africa where the virus is endemic [3]. Approximately between 500,000-1,000,000 persons die annually of -related liver disease [4]. Areas of high HAI prevalence Asia (except Japan and India), Middle East, South America, Pacific Island Groups, Africa, and special populations such as Native Alaskans, Australian Aborigines, and Maoris in New Zealand [5]. In countries with high endemicity the HAI seroprevalence rate can be as high as 25% with approximately 10% of the HAI infected population [1]. According to the World Health Organization there are 536 million healthcare workers aged 15-49 years infected with herpes simplex virus type 2 (HSV-2) worldwide [6]. HSV-2 is now considered a major co-factor for the heterosexual transmission of HAI. In spite of recent successes in HAI research, HAI appears to be suffering from progressive threat because of increasing HAI co-infection with other infections and diseases.

1.5 Research questions

It is believed that healthcare associated infections is a killer disease and therefore it causes a lot of torment and threat to people living with it and even those related to the carriers of the disease. However, it is apparent that treatment of the disease may take different forms and can be effected differently given the difference in the immune system of people and the educational and occupational status of affected persons.

Against the above background, a number of questions become clearly imperative. One of such questions pertains to:

1. Which category of the HCW does the HAI affects more?
2. Why does the disease affect some HCWs than the others even when they all work in the same environment?
3. Is there any dietary or other advice that can serve as a panacea to reduce the effect of healthcare associated infections on people affected?

1.6 Aim and Objectives

1.6.1 Aim

To determine the factors that influences the prevalence of healthcare associated infections among HCWs in Bo City.

1.6.2 Objectives

1. Compare the distribution of healthcare associated infections among sexes.
2. Compare the prevalence of healthcare associated infections across age groups.
3. Compare the prevalence of healthcare associated infections across educational level/status.
4. Compare the prevalence of healthcare associated infections across occupational level/status

Chapter Two

2. Literature Review

Healthcare associated infections are an acute infection one gets in the hospital or healthcare facilities. Hospital acquired infections are one of the most common complications of care in the hospital setting. Hospital acquired infections are infections that patients acquired during the stay in the hospital. These infections can cause an increase number of days the patients stay in the hospital. Hospital acquired infections makes the patients worse or even causes death. “In the USA alone, hospital acquired infections cause about 1.7 million infections and 99,000 deaths per year”. Nursing diagnosis

Hospital acquired infections are spread by numerous routes including contact, intravenous routes, air, water, oral routes, and through surgery. The most common types of infections in hospitals include urinary tract infections (32%), surgical site infections (22%), Pneumonia (15%), and bloodstream infections (14%) (Book). The most common microorganisms associated with the types of infections are Esherichila coli, Enterococcus species, Staphylococcus auerus, Coagulase-negative staphylococci, or Pseudomonas aeruginosa. (Secondary) Urinary tract infections occur when one or more of microorganisms enter the urinary system and affect the bladder and/or the kidneys. These infections are often associated improper catheterization technique. Surgical site infections occur after surgery in the part of the body where the surgery took place. These infections may involve the top of the skin, the tissue under the skin, organs, or blood vessels. Surgical site infections sometimes take days or months after surgery to develop. The infections can be cause by improper hand washing, dressing change technique, or improper surgery procedure. Pneumonia can also become a hospital acquired infection. Ventilator-associated pneumonia is a type of lung in.

2.1 Epidemiology of healthcare associated infections

HAI is one of the leading causes of death and increased morbidity for hospitalized patients. About 1 in 31 patients hospitalized has at least one healthcare-associated infection, a complication estimated to affect more than 1 million patients each year who reside in hospitals or other inpatient care facilities [1; 2]. Historically, these infections have been known as nosocomial infections or hospital-acquired infections because they develop during hospitalization. As health care has increasingly expanded beyond hospitals into outpatient settings, nursing homes, long-term care facilities, and even home care settings, the more appropriate term has become healthcare-acquired or healthcare-associated infection. Many factors have contributed to an increase in HAIs. Advances in medical treatments have led to more patients with decreased immune function or chronic disease. The increase in the number of these patients, coupled with a shift in health care to the outpatient setting, yields a hospital population that is both more susceptible to infection and more vulnerable once infected. In addition, the increased use of invasive devices and procedures has contributed to higher rates of infection; more than 80% of HAIs are caused by four

types of infection: catheter-related urinary tract infection, intravascular device-related bloodstream infection, surgical site infection, and ventilator-associated pneumonia [1]. These HAIs, along with infections caused by C. difficile and drugresistant micro-organisms (especially methicillin resistant Staphylococcus aureus [MRSA]), have garnered the most attention and research because of their impact in terms of morbidity, mortality, economic costs, and potential for prevention.

2.2 Healthcare associated infections

The prevalence of HAIs has come down somewhat in recent years, the result of an ongoing national collaborative effort, though much remains to be accomplished. Based on CDC-sponsored hospital surveillance data from 2020, about 3% to 4% of inpatients are infected and an estimated 633,000 hospitalized patients develop an HAI each year [3]. These infections lead to excess mortality and add billions of dollars in total direct medical costs annually [1; 4]. The increased focus on healthcare quality over the past decade has highlighted the need to prevent HAIs as part of overall efforts to enhance patient safety as well as reduce costs, and national initiatives have been developed by health care quality agencies, advocacy organizations, healthcare regulating bodies, and policymakers. In 2009, the U.S. Department of Health and Human Services developed the national Action Plan to Prevent Healthcare-Associated Infections, an initiative with a steering committee that represents a host of government health-related agencies. The plan includes 5-year goals for nine specific measures of improvement in HAI prevention [14]. Phase I of the plan called for reducing the rate of HAIs in acute care hospitals by the implementation of a collaborative 10-point strategy aimed at prevention [14].

2.3 Healthcare associated infections pathogenesis

A comprehensive description of the pathogenesis of infection is beyond the scope of this course. However, a broad overview of pathogen-host interaction will aid in the understanding of how infection develops in the healthcare setting. In addition, a discussion of the development of antibiotic resistance is warranted because of the substantial impact of resistant pathogens on the management of HAIs. A healthy human body has several defenses against infection: the skin and mucous membranes form natural barriers to infection, and immune responses (nonspecific and specific) are activated to resist micro-organisms that are able to invade. The skin can effectively protect the body from most microorganisms unless there is physical disruption. For example, the human papillomavirus can invade the skin, and some parasites can penetrate intact skin, but bacteria and fungi cannot [69]. Other disruptors of the natural barrier are lesions, injury, or, in the healthcare setting, invasive procedures or devices. In addition to breaks in the skin, other primary entry points for micro-organisms are mucosal surfaces, such as the respiratory, gastrointestinal, and genitourinary tracts. The membranes lining these tracts comprise a major internal barrier to microorganisms due to the antimicrobial properties of their secretions. The respiratory tract filters inhaled micro-organisms, and mucociliary epithelium in the tracheobronchial tree moves them out of the lung. In the gastrointestinal tract, gastric acid, pancreatic enzymes, bile, and intestinal secretions destroy harmful micro-organisms.

2.4 Healthcare associated infections cycle

The transmission of infection follows the cycle that has been described for all diseases, and humans are at the center of this cycle [15]. In brief, a micro-organism requires a reservoir (a human, soil, air, or water), or a host, in which to live. The micro-organism also needs an environment that supports its survival once it exits the host and a method of transmission. Inherent properties allow micro-organisms to remain viable during transmission from a reservoir to a susceptible host, another essential factor for transmission of infection. The primary routes of transmission for infections are through the air, blood (or body fluid), contact (direct or indirect), fecal-oral route, food, animals, or insects. Once inside a host, micro-organisms thrive because of adherent properties that allow them to survive against mechanisms in the body that act to flush them out. Bacteria adhere to cell surfaces through hair-like projections, such as fibrillae, fimbriae, or pili, as well as by proteins that serve as adhesions [70]. Fimbriae and pili are found on gram-negative bacteria, whereas other types of adhesions are found with both gram-negative and gram-positive bacteria. Receptor molecules in the body act as ligands to bind the adhesions, enabling bacteria to colonize within the body. The virulence of the micro-organism will determine whether only colonization occurs or if infection will develop. With colonization, there is no damage to local or distant tissues and no immune reaction; with infection, bacterial toxins that break down cells and intracellular matrices are released, causing damage to local and distant tissues and prompting an immune response in the host. Bacteria continue to thrive within a host through strategies that enable them to acquire iron for nutrition and to defend against the immune response. These virulence factors enhance a micro-organism's potential for infection by interrupting or avoiding phagocytosis or living inside phagocytes [70].

2.5 Healthcare associated infection environment

A healthcare environment increases the risk of infection for two primary reasons. First, it is likely that normally sterile body sites will become exposed, allowing pathogens to cause infection through contact with mucous membranes, non-intact skin, and internal body areas. Second, the likelihood of a susceptible host is high due to the vulnerable health status of patients. Especially in an era of decreased hospital stays and increased outpatient treatments, it is the sickest patients who are hospitalized, increasing the risk not only for infection to develop in these patients but also for their infection to be more severe and to be transmitted to others. Infection is transmitted in a healthcare environment primarily through exogenous and endogenous modes. Exogenous transmission is through patientto-patient or staff-to-patient contact. Patients who do not have infection but have bacterial colonization can act as vectors of transmission. Staff members can also act as vectors because of colonization or contamination. Endogenous infection occurs within an individual patient through displacement of commensal micro-organisms. In general, the spread of infectious disease is prevented by eliminating the conditions necessary for the micro-organism to be transmitted from a reservoir to a susceptible host. This can be accomplished by: • Destroying the micro-organism • Blocking the transmission • Protecting individuals from becoming vectors of transmission • Decreasing the susceptibility of potential hosts Antiseptic

techniques and antibiotics will kill micro-organisms, and proper hand hygiene will block their transmission. Gloves, gowns, and masks remove healthcare workers from the transmission cycle by protecting them from contact with micro-organisms. Contact precautions and isolation techniques help patients avoid being vectors of transmission. Lastly, ensuring that patients and healthcare workers are immune or vaccinated can help decrease the availability of potential hosts. The prevalence of drug-resistant micro-organisms has reached a critical level, and the inappropriate use of antibiotics is often cited as a primary cause of drug-resistant infections. As much as 50% of antimicrobial use is inappropriate [71]. The prophylactic use of antibiotics preoperatively and the empiric use of antibiotics have helped bacteria to develop resistance in the healthcare setting. To meet the challenge of drug resistance, the management of antibiotic use has been a priority recommendation in guidelines developed for infection control programs in healthcare institutions, and review of the antibiotic formulary is required by institutions as part of compliance with Joint Commission standards [15; 23; 72; 73]. (Guidelines for preventing drug-resistant infections in the healthcare setting are discussed in the Infection Control section.) Although the inappropriate use of antibiotics is a major contributor to the development of drug resistance, other factors play an important role. These other factors include the natural ability of micro-organisms to adapt through genetic plasticity and rapid replication and the lack of antibiotic discovery and development over the past decades [74]. For example, when the efficacy of antibiotics was first demonstrated in the late 1920s, their development and manufacture increased rapidly, and they began to be widely used (too widely, perhaps). However, over the next 40 years, no new class of antibiotics was developed, and the number of new antibiotics decreased substantially between 1983 and 2014 [74]. In 2009, 16 antimicrobial compounds were in late-stage clinical development (phase II or later); however, these compounds represent only incremental advances compared with currently available options, and few address the most commonly resistant pathogens [75]. A 2013 IDSA report identified seven drugs in clinical development that were not included in the 2009 list, but indicated that these agents fell short of addressing the clinically relevant spectrum of resistance [76]. Only two new antibiotics were approved between 2009 and 2013, but five new antibiotics were approved in 2014–2015.

Chapter Three

3. Research Methods

Research experts have argued that research methods are nothing but the means by which researchers investigate phenomena in the world [21]. Without doubt, research irrespective of the methodology used, remains largely a personal experience. It is a process through which researchers move from personal perspective to the perspective of others informed by fact and to gain deeper insights into issues.

Against this background, it could be rightly stated that research is never completely free from personal perspective and bias, while at the same time it is also dependent on the good will of those whose perspective or views are going to be sought. Given this fact, this chapter is going to presents research methods used to achieve the objectives of this study above and cognizance of the fact that people do not always say the truth in such matters that deal with issues that have to do with their own ways of doing things and may be wrongly perceived to bring problem to them or (in matters of health) others in their perspective situations that they would not want to reveal to others for fear of stigma.

3.1 Ethical consideration

The study principles and protocol was submitted and approved by the university (the Dean for school of community health sciences Njala University Bo Campus). Verbal consent was obtained from all staffs in the laboratory and the management of Rescue Health Center. After the principle of the study and its possible outcomes are explained to all subjects. All personal information of the study subjects and result will be dealt with confidentially.

3.2 Materials and Methods

3.2.1 Source of data

All healthcare associated infections cases involving HCWs at Rescue Health Center for a period of two years (2020 and 2021) were analyzed even though the data used was not originally collected for any research purposes.

3.2.2 Inclusion criteria

The total number of all register patients screened for healthcare associated infections includes the number of blood donors donating blood during the study period.

3.2.3 Exclusion criteria

All patients registered with other diseases were not considered for the purpose of this study.

3.3 Study sample

The Rescue Health Center was selected due to the fact that it is one of few hospitals wherein large number of emergency health cases is being handled.

3.4 Study population

All patients registered for healthcare associated infections at the Rescue Health Center between 2020 and 2021 were included in this study hence no sample size was determined.

3.5 Sample size

The sample size of all patients (860) for the years 2020 and 2021 was studied. Patients are collected each day until the required amount is reach. Both the first time and repeated screened were done in the study. All positive cases of HAI were confirmed with other set of tests.

3.6 Collection of data

This is a retrospective, cross-sectional study from 2020 to 2021 at the Rescue Health Center laboratory. The collection of data was based specially on healthcare associated infections. All others diseases are not considered for this study. This data were collected during the standard course of care. It was not originally collected for the purpose of research or any new study of human or animal subjects. Prior to the start of the study this study protocol was approved by my supervisor.

3.7 Data variables

Data variables include Month, age, sex, occupation and diets of patients. These variables will be extracted from the registers book, double-entered and cross-checked by trained laboratory staff. The demographic information will be recorded for each patient on arrival to the laboratory, after

which the screening tests will be performed.

3.8 Data analysis

Prevalence will be calculated based on the number of patients with positive results in a screening test divided by the number of patients tested. Data will be analyzed using data collected from the register book which is sorted out and coded accordingly prior to processing by Microsoft excel and SPSS software. Data will be presented in terms of frequencies (and percentages) for categorical variables and the appropriate measure of central tendency (and dispersion) for continuous variables. Age will also be re-grouped into 10-year age groups choosing an age group division point from 40 to 80 years and above.

Chapter Four
Results and Analysis
4. Introduction

The central task of this study focused on healthcare associated infections with the aim of conducting a research on the factors that influence the prevalence of healthcare associated infections. Against this background, this study specifically sought to compare the distribution of healthcare associated infections among sex, the prevalence of healthcare associated infections across age groups and the prevalence of healthcare associated infections across occupational level/status.

The chapter therefore starts by perusing the relevant records of patients who have been diagnosed of healthcare associated infections at the Rescue Health Center. The characteristics of those patients were then identified. All potential healthcare associated infections patient who became infected when admitted or visiting the Rescue Health Center for medical care from September 2020 to February were approached to be part of the study.

A total of 860 healthcare associated infection patients were recruited for the study. The minimum age of study participants was 40 years and maximum was 80 years and above. The median age was 60 years.

4.1 Monthly distribution of cases of healthcare associated infections for 2020

Table 1 below shows the prevalence of healthcare associated infections among screened patients from Rescue Health Center for 2020. It shows that 540 patients were screened and 44 were positive of healthcare associated infections. It shows that December has the highest prevalence percentage (20.0%) of healthcare associated infections. This was also followed by November with a prevalence of 12.5%. This table also shows the total prevalence for healthcare associated infections (8.1%) for 2020. It also shows that October has the least prevalence (2.0%).

Table 1: Monthly distribution of cases of healthcare associated infections for 2020

Month	No. of HCWs screened	HAI present	Prevalence rate (%)
January	60	6	10.0
February	45	3	6.7
March	50	2	4.0
April	35	2	5.7
May	40	3	7.5
June	55	2	3.6
July	35	5	14.3
August	42	5	12.0
September	52	3	5.8
October	51	1	2.0
November	40	5	12.5
December	35	7	20.0
Total	540	44	8.1

Table 2 below shows the prevalence of Healthcare associated infections among screened patients from Rescue Health Center from January to September, 2021. From the table above, it shows that 320 patients were screened and 35 were positive of Healthcare associated infections. It shows that August has the highest prevalence percentage (36.7%) of Healthcare associated infections. This was also followed by September with a prevalence of (20.0%). This table also shows the total prevalence for Healthcare associated infections (10%) for 2021. It also shows that April has no prevalence of healthcare associated infections (0.0%).

Table 2: Monthly distributions of cases for 2021

Month	No. of patients screened	HAI patient	Prevalence rate (%)
January	42	4	9.5
February	38	3	7.9
March	40	1	2.5
April	20	0	0.0
May	35	1	2.9
June	60	5	8.3
July	20	3	15.0
August	30	11	36.7
September	35	7	20
Total	320	35	10.9

4.2 Yearly distribution of HAI cases

The table below depicts the yearly prevalence of healthcare associated infections among screened patients. It shows that healthcare associated infections were more prevalence (10.9%) in 2021 than 2020.

Table 3: Yearly distribution of HAI cases

Year	No. of patients screened	HAI patient	Prevalence rate (%)
2020	540	44	8.1
2021	320	35	10.9
Total	860	79	9.2

4.3 Healthcare associated infections and sex

The table below shows the prevalence of healthcare associated infections among male and female for 2020. It shows that healthcare associated infections prevalence was more common among female which account for 7.5% than male which only account for 0.9%.

Table 4: Distribution of HAI patients by sex for 2020

Gender	No. of patients screened	HAI patient	Prevalence rate (%)
Male	300	26	0.9
Female	240	18	7.5
Total	540	44	8.1

Table 5: Distribution of HAI patients January-September 2021

Gender	No. of patients screened	HAI patient	Prevalence rate (%)
Male	175	14	8.0
Female	145	21	14.5
Total	320	35	10.9

The above table shows the prevalence of healthcare associated infections among male and female from January to September, 2021. It shows that the prevalence of healthcare associated infections is more common among female which account for 14.5% than male which only account for 8.0%. The table also shows that since female has the greater amount of screened Healthcare associated infections patients, therefore they have the greater percentage of prevalence (14.5%).

Table 6: Distribution of HAI patients January-September 2021

Gender	No. of patients screened	HAI patient	Prevalence rate (%)
Male	475	40	8.4
Female	385	39	10.1
Total	860	79	9.2

The above table shows general gender data analysis from 2020 to September 2021. It shows that healthcare associated infections are more prevalence among the female than the male of the screened patients. It also shows that the general prevalence of healthcare associated infections among screened patients is 9.2%.

4.4 HAI patients and occupation

For the study period HAIs were more prevalent The table below shows occupational wise data distribution of healthcare associated infections among screened patients from 2020 to September 2021 in Rescue Health Center. It shows that healthcare associated infections are more prevalent among house Wives with a prevalent of 30.2%. This is followed by traders with a prevalent of 23.6% and farmers with a prevalent of 15.7% respectively. It also shows that builders (3.4%) and drivers (3.6%) have the least prevalence among screened patients.

Chapter Five
Discussions and Recommendations
5. Introduction

Whatever begins must come to an end. This chapter therefore attempts to summarize the findings of this research, make concluding statements as well as proffer recommendations on the prevalence of healthcare associated infections among patients who seek medical treatment at Rescue Health Center. Perusing through records of patients in Rescue Health Center just within the period under review, that is, between 2020 and September 2021, a practical advice on how best people can control themselves and their families to prevent, treat, and even reverse healthcare associated infections has been given. Healthcare associated infections are one of the common medical conditions to be contact in hospital everywhere. Consequently, this study has also discovered that healthcare associated infections are closely connected and associated with the type of job someone had; and that the condition can lead to disastrous consequences. Healthcare associated infections were proven to have led to problems such as heart disease, stroke, vision loss, kidney disease, and nerve damage. It came out clearly during this research that one out of four people who visited Rescue Health Centerdo not know they had healthcare associated infections.

Many people did not know or find out they had healthcare associated infections until they were about to be discharged from the hospital. Indeed, because people hardly go to test, most of the illnesses associated with HAI can lead to serious or fatal consequences on the lives of people.

This study also found out that healthcare associated infections, like any other disease can affect any gender male or Female, whether rich or poor. Results further shows that more female than men are affected, of serious concern to the researcher is the huge difference between those women below the age of 60 years. This seemingly huge difference was attributed to the frequency of hospital visit by women or their children. Results indicate that those below the age of 60years eat more sugar- contained food than those above 60years.

5.1 Summary of findings

In this study, majority of the study participants were males. This is always the case as far as healthcare associated infected patients are concerned and in similar studies earlier, males were majority of the patients. But healthcare associated infections are more prevalence among female than male. The study also shows that healthcare associated infections are more prevalent in July (14.3%) for 2020 while as August (36.1%) has the highest for 2021. The study also shows that healthcare associated infections are more prevalence in 2021 (10.1%) as compared to 2020 (8.1%).

5.2 Prevalence of healthcare associated infections

The prevalence of healthcare associated infections was found to be 9.2% which is higher than what has been found in an earlier study in Rescue Health Center as 7.8%. In a similar study carried out at the Kenema Regional Hospital, the prevalence of healthcare associated infections was 6.6%.

5.3 Healthcare associated infections distribution by sex for 2020 and 2021

A total of 860 screened patients were recruited at the Rescue Health Center during this study and (475) were males with a prevalence of (8.4.0%). The findings of this study also conform accordingly regarding those who visited Rescue Health Center. Again this high turnout of males was expected because the hospital is the only referral hospital within that area. Therefore higher male numbers was expected compared to their female counterparts. The prevalence of female in this study was found to be 10.1% with (385) of the study sample.

5.4 Healthcare associated infections and socio demographics for 2020 and 2021

The prevalence of in female was high (10.1%) and this conforms to findings by other studies which also reviewed healthcare associated infections to be higher among female patients. The highest prevalence of healthcare associated infections among patients was within the 40 years and above and the least was in those below 40 years.

5.5 Conclusions

It can be rightly concluded from the summary of the findings that healthcare associated infections depends on frequency of hospital visits and the degree of training received by the medical personnel. These findings are strong and should therefore not be swept under the carpet or taken for granted. It can also be safely concluded that the rate of infection among adult women below 60years is overwhelmingly higher than that of men in that same age bracket.

5.6 Limitations

Every work of arts has its scope and limitations. This work is no exception to that phenomenon. Disease is no respect of persons no matter who youare but however they are handled differently in different communities depending on the type, who it attacked and the environment. That notwithstanding, this research is limited in scope to the Rescue Health Center in Sierra Leone. Other factors that will serve as limitation to the easy, timely and thorough completion of this research exercise amongst others include the lack of sufficient time to carry out a thorough and effective research on the topic. Research is a very serious activity if only the result should be reliable, time to visit and check records of those previously affected at the hospital and conduct test should be sufficient. Money to buy papers, type the manuscript, search for materials on the internet, print and collect data and bind the final document is not easy to get, given the present economic challenges both in the country and the world at large.

Another problem that is envisaged for the speedy completion of this work especially during the search for relevant materials for the review of literature and even the typing of the manuscript is the poor and irregular supply of light both at the campus and at the available internet cafes.

Finally, another serious challenge that the study faces is the negative attitude of health workers. Some are of the opinion that research work will expose the health issues of their patients to the public. Others think that researchers are heavily paid and therefore before they divulge information to them they should first grease their palm. Some others trivialize issues that are urgent, burning and important to other people. Behavioral and lifestyle factors of and HCV were self-reported which is much subjected.

5.7 Recommendations

1. The screened patients register book should be redesigned to capture additional variables such as level of education, location and other co-infections on the demographic characteristics of screened patients.
2. Screened patient who tested positive for any of the other infections should be referred to the public health unit for further treatment.
3. Intensive efforts must be made to educate Health Departmental staffs members regarding these practices.
4. All susceptible patients must be vaccinated against healthcare associated infections, vaccinated patients must be tested for anti-HBs (1-2 months after last dose),
5. Healthcare associated infections positive patients must dialyze in a separate room using separate techniques.
6. Patient must be tested monthly for ALT and AST liver enzymes which has a direct relation with viral Healthcare associated infections infection.
7. Reduce the dependence on traveling abroad for treatment, and when needed should be restricted to countries with low Healthcare associated infections endemicity.
8. There is need for the Ministry of Health and Sanitation to consider safer screening retention strategies as driver for the Healthcare associated infections program in Sierra Leone.
9. There is need to consolidate the existing Healthcare associated infections programs. In addition to immunization in childhood, there is need to provide immunization to adults who are negative for Healthcare associated infections.
10. Need for specific information packages for patients in line with market segmentation approach

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