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Evaluation of Nurses knowledge Toward Medical Waste Products Management at Primary Health Care Centers in Alamara City

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إقرار المشرف

نحن الموقعون أدناه على البحث الموسوم(تقيم معارف الممرضين تجاه أدارة منتجات النفايات الطبية في مراكز الرعاية الصحية الأولية في مدينة العمارة)

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صدق الله العلي العظيم

سورة العلق

الإهداء

الى قوافل التي رحلت مبكرًا الى الأرواح التي عرجت للسماء السابعة من أوسع أبوابها

الى الجباه التي يزخرف الربيع أزهاره عليها

الى ملامحكم المترفة وأنفاسكم الوردية، شهداء الوجود جدران الوطن نهدي أليكم تلك الذرات القليلة التي لا تساوي شيء أمام ما قدمتموه، لولا ورودكم التي ذبلت مخضرات بساتيننا،لا يسعنا الأ أن نقدم إليكم سنين تعبنا وجهدنا في طريق العلم والمعرفة لبناء هذا الوطن الذي قدستموه لدرجة العبادة،

الى أبي العظيم وأمي الزقورة،

الى عمادة كليتنا المحترمة وأساتذتنا المُبجلين، نضع بين أيديكم سهرنا وحلمنا واجتهادنا بنهاية مشوار طويل ملئ بالحياة والتعب، نُهديكم بحثنا وسعينا فشكرا لتواجدكم الذي أنار لنا الطريق

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الشكر والامتنان

الحمد لله حق حمده والصلاة والسلام على من لا نبي بعده

محمد صل الله عليه واله وسلم.

الحمد لله الذي أنار لنا درب العلم والمعرفة وأعاننا على أداء هذا الواجب ووفقنا الى انجاز هذا العمل توجه بجزيل الشكر والامتنان الى كل من ساعدنا على انجاز هذا العمل وفي تلي ما واجهنا من صعوبات

ونخص بالذكر

مشرفا البحث

(م. سعد صبري شامخ) و(م. أسامة ناصر والي)

اللذين لم يبخلوا علينا بتوجيهاتهم ونصائحهم القيمة والتي كانت عونا لنا في أتمام هذا البحث متمنين لهم دوام التوفيق والنجاح في كافة مجالات الحياة.

ABSTRACT

Objectives:

1-To evaluate Nurses knowledge Toward Medical Waste Products Management at Primary Health Care centers.

2-To find out the relationship between nurses knowledge toward medical waste products management and their sociodemographic characteristics of (age, gender, level of education, and number of years in work field)

Material and Methods:

A descriptive study was conducted on nurses at primary health care centers in Al-Amara city. during period from 29th December 2020 to 30th June 2021 a purposive non probability sample of (60) nurses collected from AL-Euruba health care center(20)nurses, (17) nurses from Dijla health care center, (12) nurses from AL-imam Al Husayn health care center, (11) nurses from Shaheed AL-Watan primary health care center, Through comprehensive review of relevant literature, a questionnaire is constructed by the researchers for the purpose of the study. It is comprised of two parts: first part (7) items which are concerned with nurses demographic characteristics and the second part is comprised of (30) items which are concerned with nurses knowledge toward medical waste management.

Results:

The study show that (95%) of sample have good level of knowledge, while (5 %) of the sample had a fair level of knowledge about the medical waste management and also findings which demonstrate that low number of training sessions which can be negatively effect on the knowledge of nurses about medical waste management.

There was a significant relationship between age, gender, work place, participant in training sessions and nurses' knowledge about medical waste management.

Conclusions and Recommendation:

The conclusions of the present study show the study show that majority of sample have good knowledge, while the rest of the sample had a Fair knowledge, high significant between age, gender, work place, Sharing in training session, their number of training courses and level of knowledge towards management of medical waste.

The study recommends the primary health care centers should develop clear plans and policies for proper management of primary health care center waste and should establish periodic workshops, training and education programs for nurses aimed to develop high knowledge related to management of healthcare waste.

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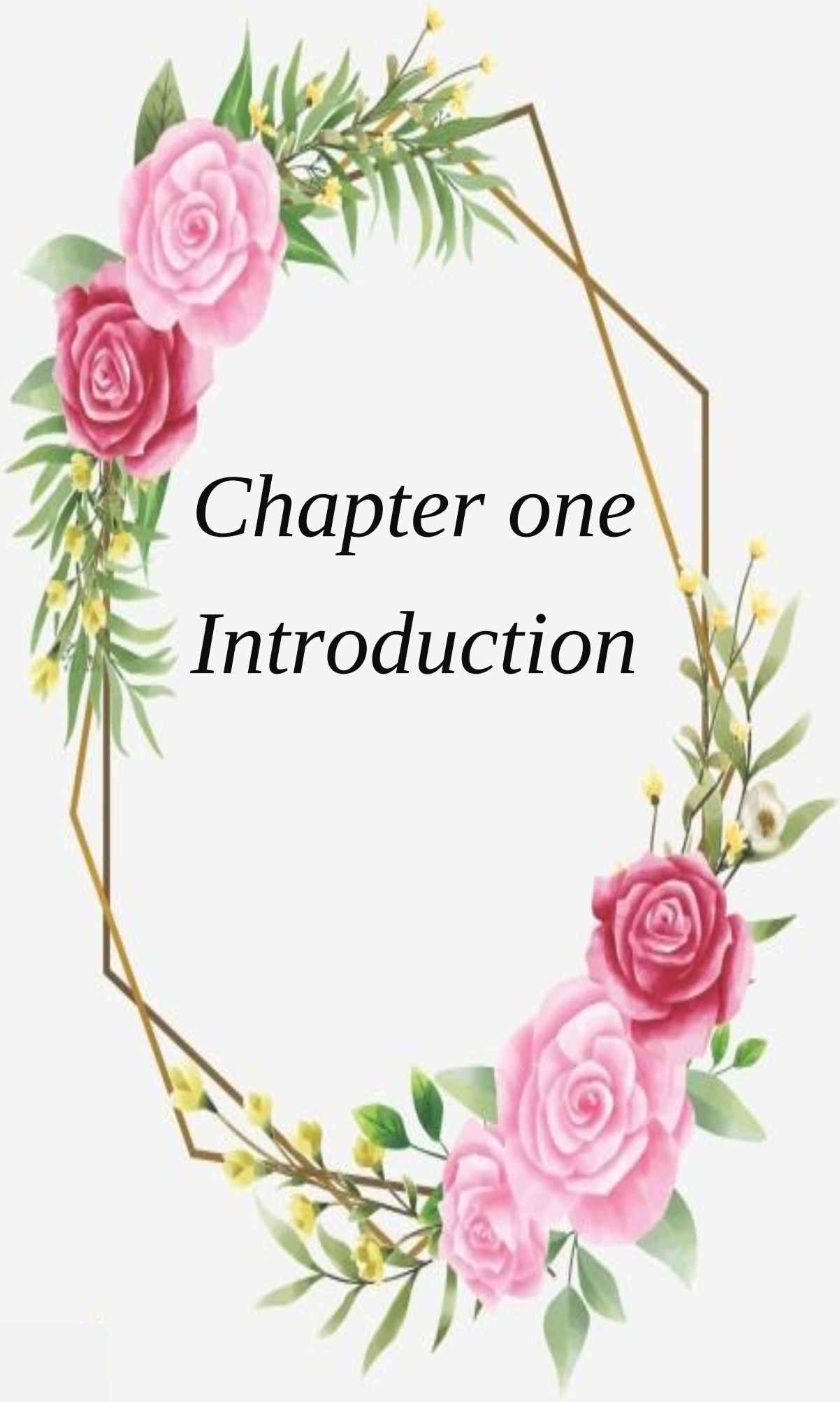
List of Abbreviation

Meaning	Items
Hepatitis C virus	HCV
Human immunodeficiency virus	HIV
Hepatitis B virus	HBV
World Health Organization	WHO
United state of America	USA
Health care waste	HCW
Primary health centre	PHC
Health care facilities	HCFS
Environment protection agency	EPA
Health care waste management	HCWM
Water, sanitation and hygiene	WASH
Acquired immune deficiency syndrome	AIDS
Medical waste	MW
Needle stick injuries	NSIs
Blood borne pathogens	BBPs
Biomedical waste	BMW



Chapter one

Introduction

1.1.introduction

Medical Waste is defined as the waste generated from health-care establishments, such as hospitals, primary healthcare centers, private clinics, research facilities , laboratories used in diagnosis, monitoring, and prevention activities (curative or palliative) drugs in the field of human and veterinary medicine including infectious hazardous materials and humane body parts(Abu-Awwad, 2008).

In an effort to save people's lives, the health care sector produce various hazardous materials to the environment which in turn harmful to the people whom it care for. It has been indicated that unmanaged waste management in the health care can be harmful to the surrounding and can be very gravely to the community(Mukwakungu & Mabasa, 2019).

And surely Medical waste is a public health issue that attracts the attention all over the world(Abu-Awwad, 2008).

Medical wastes are of great importance due to their potential environmental hazards and public health risks. World Health Organization (WHO) has advocated medical wastes as special wastes, and it now commonly acknowledges that certain categories of medical wastes are among the most hazardous, and potentially dangerous of all wastes arising in communities, as exposure to hazardous medical waste can result in disease or injury(Khalifa, 2016).

Between 75% and 90% of the waste produced by health-care providers is comparable to domestic waste and usually called "non-hazardous" or "general health-care waste". It comes mostly from the administrative, kitchen , and housekeeping functions of health-care facilities and may also include packaging waste and waste generated during maintenance of health-care buildings . The remaining 10-25% of

healthcare waste is regarded as hazardous and may pose a variety of environment and health risks(Chartier, 2014).

And the arrangement of waste poses a major problem in most countries, especially Primary Health Care waste. In recent years, medical waste disposal has posed even more difficulties with the appearance of disposable needles, syringes, and other similar items. Primary Health Care s and public health care units are supposed to safeguard the health of patients, Primary Health Care workers and the whole community (Khalifa, 2016).

The public concern about the medical wastes management has increased largely in the past few years on a global basis and a significant effort has been directed toward proper and safe management of hazardous medical waste(Pullishery, Panchmal, Siddique, & Abraham, 2016).

In order to prevent injuries to other employees, patients and to protect the environment from medical waste, health care workers must have adequate knowledge on disposal of medical waste. Hospitals have the responsibility to capacitate their employees with regard to medical waste disposal. The training should include occupational hazards, management of exposure to blood and body fluids, procedures to follow when disposing medical waste and prevention of injury and diseases, management of needle stick and blood and body substance exposure(Makhura,2016).

With this view, it is assumed that the health care providers may be having adequate knowledge, but the practices are inappropriate due to lack of proper facilities, interest of the individual or inadequate knowledge(Nagaraju, Padmavathi, Puranik, Shantharaj, &Sampulatha, 2013).

The several causes towards the poor waste management practices around the globe are: the lack of waste management, lack of consciousness about the health hazards, inadequate financial and human possessions and poor control of waste disposal, lack of strict and suitable rules, the clear attribution of accountability of appropriate management and disposal of waste and according to the 'polluter pays' principle, this responsibility lies with the waste producer, usually being the health-care provider, or the establishing involved in related activities(Ameen,& Abdullah, 2017).

Knowing the current state of the nursing staffs knowledge's on medical waste management will help the concerned authorities to manage medical waste effectively and build a plan for improving the condition in future.

1.2. Importance of the Study:

The waste produced by the health care centers if disposed of improperly can pose an even greater threat than the original diseases. Such practices may contribute to the spread of diseases, as well as pollution of the air, soil and water(Sowmya, 2013).

World Health Organization (WHO) in 2002 carried out a survey on management of medical waste in 22 unindustrialized countries. Findings showed that the ratio of healthcare facilities that did not use appropriate waste disposal methods ranged from 18% to 64%(Ameen,& Abdullah, 2017).

In a study conducted by WHO for the estimation of global burden of diseases attributable to contaminated sharp injuries among health care workers revealed that overall 16000 hepatitis C virus (HCV), 66000 hepatitis B virus (HBV) and 1000 human Immunodeficiency Virus (HIV)

infections may have occurred in the year 2000 worldwide among health care workers due to occupational exposure to occupational percutaneous injuries(Sowmya, 2013).

Also in United states of America (USA) in June 1994, 39 cases of HIV infection were recognized by the centers for Disease control and Prevention as occupational infections. By June 1996, the cumulative recognized cases of occupational HIV infection had risen to 5148(Sowmya, 2013).

Also WHO estimates that each year there are about 8-16 million new cases of HBV, 2.3-4.7 million cases of HCV and 80,000-160,000 cases of HIV due to unsafe injections disposal and mostly due to very poor waste management systems(Mohammed, Nasser, Naif, Abbas, Jawad, &Alabbas, 2016).

In addition, the healthcare staff, patients, visitors, support staff (such as laundries, waste handling and transportation), workers at waste disposal facilities (such as landfills or incinerators), and scavengers are all at risk. There is a particular concern about diseases such as typhoid, cholera, human immunodeficiency virus (HIV), hepatitis viruses B and C, and other agents associated with blood-borne diseases, for which there is strong evidence of transmission via medical waste(Taghipour, &Mosaferi, 2009).

So Through this study, it is possible to determine the knowledge of health care workers regarding medical waste disposal in primary health care centers identify problems faced and assess the current system of medical waste management at primary health centers.

1.3. Problem statement:

Evaluation of Nurses knowledge Toward Medical Waste Products Management at Primary Health Care Centers in Alamara City.

1.4. Objective of study:

1-To evaluate Nurses knowledge Toward Medical Waste Products Management at Primary Health Care centers.

2-To find out the relationship between nurses knowledge toward medical waste products management and their sociodemographic characteristics of (age, gender, level of education, and number of years in work field)

1.5. Definition of terms:

1.5.1.Medical waste

Theoretical Definition

Medical waste was defined as solid or semi-solid waste produced over diagnosis and/or treatment process. Medical wastes include infectious waste containing 10–25% of the waste and non-infectious waste which accounts for 75–95% of the entire waste(Tabrizi, Saadati, Heydari, Rezapour, &Zamanpour, 2019).

Operational definition

Medical waste refers to unwanted materials generated during diagnosis, treatment, immunization from primary health care centers.

1.5.2.Evaluation

Theoretical Definition

As the systematic gathering of information to make decisions. The main characteristic of evaluation making it distinguished from the assessment is the qualitative nature of it plus its utilization for judgment. Evaluations, typically, are in the form of verbal description (bad, good, superb, crazy)(Shahrebabaki, 2018).

Operational definition

Is the collection of, analysis of information about Nurses knowledge Toward Medical Waste Products Management.

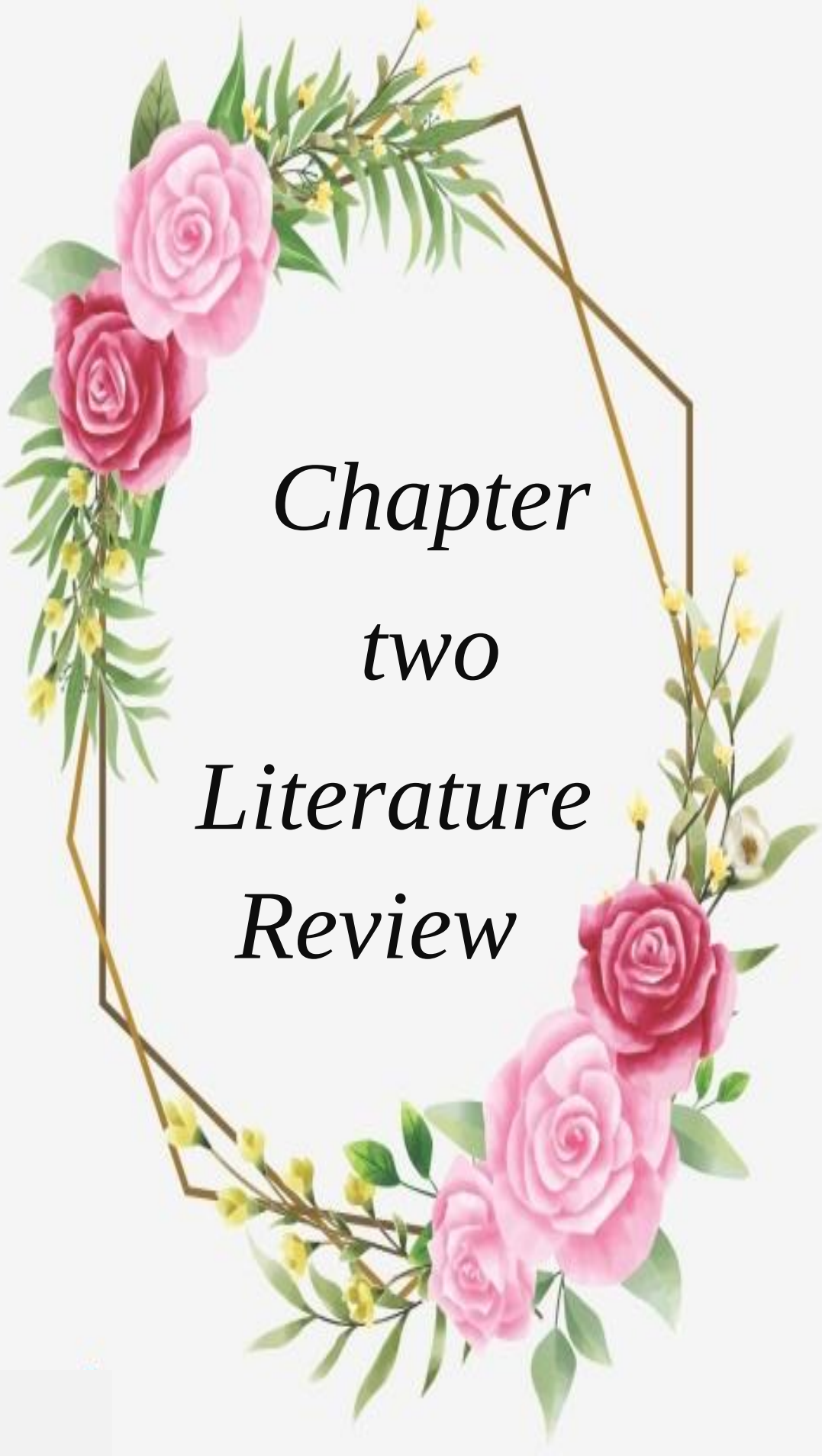
1.5.3. Knowledge:

Theoretical Definition

Knowledge is the information, understanding and skills that one gainsthrough education or experience(Makhura, 2016).

Operational definition

knowledge refers to the awareness of guidelines for medical waste management.



Chapter two Literature Review

2.1.Medical waste overview

Healthcare Waste (HCW) constitutes a special category of waste because they contain potentially harmful materials(Abah, &Ohimain, 2011).

Primary Health Centre (PHC) known as Puskesmas is one of the first-tier of health facilities that serve as primary care providers and simultaneously drive the development vision of health. The government has regulated the availability of healthy environment and avoid any of its adverse effects as part of human rights in law number 36, 2009,Thus regarding health care facilities, efficient medical waste disposal is pre-requisite in every health center. including those located in rural area
(Putra, Surata&Agung, 2017).

Medical waste During the last few decades, the need for better health care has been felt globally and to cater the needs and demands of the increasing population, a rapid. mushrooming of hospitals, both in the private and Government sector has occurred Consequently there has been a proportionate increase in the quantum of waste generated by these health care centers. Ironically the hospitals hoped to bring relief to the sick are themselves creating health hazards to the community due to improper management of waste generated in the course of health care activities(sowmya,2013).

According to the World Health Organization , about 16 billion injections worldwide are, administered every year. Unfortunately, not all needles and syringes are disposed of safely potentially creating risks of injury, infection and opportunities for reuse especially in low-income countries. According to Health Care without Harm , sharps waste is a subset of infectious waste and includes syringes, needles, lancets, broken glass and any other materials that can pierce the skin. The combination of contamination with pathogens and the ability to break through the skin’s

protection makes sharps waste one of the most dangerous wastes produced in healthcare facilities(HCFs)(Hassan, Tudor & Vaccari, 2018).

Although medical waste generated less than domestic waste but potentially major cause of occupational ,accidents and illnesses transmission if not managed properly(Wulandari & Kusnoputranto, 2015).

In many countries, hazardous and medical wastes are not segregated and are managed together with domestic waste, thus creating a great health risk to workers in health care ,facilities as well as to municipal workers, the public and the environment. In other countries waste disposal options are limited, and incineration and open burning have been used as a solution(Al_Khatib, 2014)

Poor healthcare waste management can result in serious environmental and human health risks. Asian developing countries are densely populated, and some are highly resource constrained. These countries commonly fail to practice appropriate healthcare waste management. Moreover, facilities in these countries extensively lack proper waste segregation, collection, safe storage, transportation, and disposal. The absence of waste management training programmes roots ignorance among staff and handlers, which leads to unsafe waste handling and causes different health risks. Unsafe and illegal recycling of hazardous waste is a threat to human health, also ,land filling is often confused with open dumping, causing environmental damage(Khan, Cheng, Khan& Ahmed, 2019)

Improved technological changes are often small and it can be difficult to roll out a huge technological improvement across the world. It is also noteworthy that even if such education is provided and global understanding of HCW disposal improves, we are still left ,with many issues surrounding HCW disposal that remain unsolved such as pollution

global warming and the offset effects on global health. There is a real need for a mass overhaul and change in utilization of methods undertaken in HCW disposal especially in developing world (Kenny &priyadarshin, 2021).

2.2.Medical waste

Waste in general is any substance (solid, liquid, or gas) that has no direct use and is discarded permanently. A waste is considered hazardous if it exhibits any of the ,characteristics such as being flammable, reactive, explosive, corrosive, radioactive ,infectious, irritating, sensitizing, or bio-accumulative. Medical waste is limited to infectious hazardous, and any other wastes that are generated from health care institutions, such as hospitals, clinics, dental offices, and medical laboratories. The management of medical waste has been of major concern due to potentially high risks to human health and the environment. In the past, medical wastes were often mixed with household wastes and disposed of in municipal solid waste landfills(Shareefdeen, 2012).

Medical waste is a source of generation of hazardous biomedical waste. Medical waste generation and disposal is an important aspect, especially in countries with poor hygiene and high population. Medical centers including hospitals, clinics, and places where diagnosis and treatment are conducted generate wastes that are highly hazardous and put people under risk of fatal disease (Padmanabhan and Barik, 2019).

Biomedical waste is hazardous since it has an inherent potential for dissemination of infection, both nosocomial within health care settings as well as risk of infection to persons working outside health care facilities, like waste handlers, scavenging staff and also to the general public. It is reported that 60% of all hospital staff sustain injuries from sharps during

various procedures undertaken in health care facilities(singh, bhalwar, jayaram & tilak, 2001).

2.3.Source of medical waste

Most clinical waste comes from hospitals and clinics providing acute services such as Operating Theatres, Maternity services, Accident & Emergency, Mortuary, Intensive Care, Isolation, Wards, Pharmacy, Pathology Laboratories and other research facilities and laboratories Clinical waste, to a lesser extent also comes from ambulatory services, public health laboratories, blood donation centers, dental surgeries, veterinary surgeons, vaccination clinics and hospitals, clinics and nursing homes providing community care, care of the elderly and mental health (Kenny &Priyadarshini, 2021).

Major sources of health-care waste

- Hospitals
- University hospital
- General hospital
- District hospital
- Other health-care facilities
- Emergency medical care services
- Health-care centers and dispensaries
- Obstetric and maternity clinics
- Outpatient clinics
- Dialysis centers
- Long-term health-care establishments and hospices
- Transfusion centers
- Military medical services
- Prison hospitals or clinics
- Related laboratories and research centers

- Medical and biomedical laboratories
- Biotechnology laboratories and institutions
- Medical research centers
- Mortuary and autopsy centers
- Animal research and testing
- Blood banks and blood collection services
- Nursing homes for the elderly(WHO, 2007).

2.4.TYPES OF MEDICAL WASTE

Medicalwasteiscategorisedintodifferenttypesnamely: infectious waste, pathological waste, sharps, pharmaceutical waste, chemical waste, radioactive waste, cytotoxic agents.

Waste types	Description and examples
Infectious waste	Waste suspected to contain pathogens e.g. laboratory cultures; waste from isolation wards; tissues(swabs), materials, or equipment that have been in contact with infected patients.
Pathological waste	Human tissues or fluids e.g. body parts; blood and other body fluids; fetuses
Sharps	Sharp waste e.g. needles; infusion sets; scalpels; knives; blades; broken glass.
Pharmaceutical waste	Waste containing pharmaceuticals e.g. pharmaceuticals that are expired or no longer ;needed items contaminated by or containing pharmaceuticals(bottles, boxes).
Genotoxic waste	Waste containing substances with genotoxic properties e.g. waste containing cytostatic drugs (often

	used in cancer therapy); genotoxic chemicals.
Chemical waste	Waste containing chemical substances e.g. laboratory reagents; film developer; disinfectants that are expired or no longer needed; solvents.
Radioactive waste	Gas cylinders; gas cartridges; aerosol cans Waste containing radioactive substances e.g. unused liquids from radiotherapy or ;laboratory research contaminated glassware, packages, or absorbent paper urine and excreta from patients treated or tested with unsealed radionuclide's; sealed sources.

Table (1). Types of medical waste

Non Hazardous or general waste that does not pose any particular biological, chemical, radioactive, or physical hazard(Padmanabhan and Barik, 2019).

1-Infectious waste: is any waste generated from health and health related facilities that are capable of producing infectious disease. According to the EPA (environmental protection agency) 3.2 million tons of infectious. Wastes are generated from health and health related facilities yearly. This represents about 2% of the total municipal wastes. Health risk may result from improper management and disposal of infectious waste in the natural environment(Alemayehu, Tegegn, Beyene, Workneh & Endale, 2005).

2-Sharps Waste: Common medical materials treated as sharps waste are injection devices, syringes, blades, lancet and slides . Numbers of studies have indicated that; inappropriate and poor handling disposal of healthcare waste poses health risks such as hepatitis to health workers

who may be directly exposed to waste and to people who live nearby health facilities particularly children and scavengers (Mansab, 2014).

3-Pathological waste:

considered a subcategory of infectious waste, but is often classified separately – especially when special methods of handling, treatment and disposal are used. Pathological waste consists of tissues, organs, body parts, blood, body fluids and other waste from surgery and autopsies on patients with infectious diseases. It also includes human fetuses and infected animal carcasses. Recognizable human or animal body parts are sometimes called anatomical waste. Pathological waste may include healthy body parts that have been removed during a medical procedure or produced during medical research(Chartier, 2014).

4-Pharmaceutical waste : includes expired, unused, spilt, and contaminated pharmaceutical products, drugs, vaccines and sera that are no longer required and need to be disposed of appropriately. The category also includes discarded items used in the handling of pharmaceuticals, such as bottles or boxes with residues, gloves, masks, connecting tubing and drug vials(Rajbongshi Shah, & Sajib, 2016).

When drugs are prescribed prophylactically or in response to an acute or chronic illness, only a portion of the active ingredient of the drug is metabolized. The non-metabolized parent compound, as well as the metabolites, enters the natural aquatic environment through waste discharges into receiving streams, which may pollute recreational lakes or even the intakes of drinking water treatment plants. Pharmaceutical compounds are designed to have biochemical activity in target organisms at relatively low concentrations. Therefore, at the low part-per-trillion levels, there is concern that some of these compounds could have an

ecological and human health effect(Kadam, Patil, Patil, & Tumkur, 2016).

Pharmaceutical waste is not exclusively an environmental issue. The waste is also part of many peoples' working Conditions regarding how it is handled, contained and disposed of. When the material entails serious hazard it requires special handling to ensure safety to people and the environment. Where there are issues with higher risk products, e.g. controlled drugs, increased security in the handling of pharmaceutical waste is also required(Castensson, & Ekedahl, 2010).

5-Cytotoxic agents: are substances that have a deleterious effect upon cells, Commonly used in the treatment of cancer, for example chemotherapy agents. Pressurised containers consist of aerosol cans or disposable compressed gas containers that may explode if incinerated or accidentally punctured. Human or anatomical waste is waste consisting of tissues, organs, body parts, products of conception and animal carcasses(Makhura, 2016).

6-Chemical waste: that have toxic, corrosive, flammable, explosive, and other. properties. Chemical reagents, discarded contrast agents, chemical disinfectants, etc.(Liu & Yao, 2018).

7-Radioactive waste: includes gas liquids and solids contaminated with radio-nuclides whose ionizing radiations have genotoxic effects. are considered as highly hazardous and therefore require special attention Approximate percentage of waste type per total waste in primary health care centers. non-infectious waste, 80%, pathological Sharps waste chemical or pharmaceutical waste 3%, pressurized cylinders, broken ,1%

thermometers less than 1%, and infectious waste 15% "Health-Care Without Harm (Abu-Awwad, 2008).

2.5.Micro-Organisms Associated With Health Care Waste

Medical waste contains potentially harmful micro-organisms which can infect hospital patients, health-care workers and the general public. Other potential infectious risks may include the spread of drug resistant micro-organisms from health-care establishments into the environment(Babanyara, Ibrahim, Garba, Bogoro, & Abubakar, 2013).

Various studies have attempted to analyze the content of health-care wastes, in comparison to domestic wastes. Most of them analyzed the concentration of microorganisms, which was found to be comparable in both types of wastes. The number of microorganisms, without identifying them, does not however provide much indication on the pathogenicity of the waste. One study also analyzed the types of microorganisms, and found that health-care wastes contained a greater variety of microorganisms than domestic wastes, which had a greater content of microorganisms of faecal origin(Salkin, & Kennedy, 2001).

Presence of various microorganisms such as pathogenic viruses and bacteria have been investigated by both cultivation and by (RT)-PCR assays. A number of (opportunistic) pathogenic bacteria, including Pseudomonas spp., Lactobacillus spp., Staphylococcus spp., Micrococcus spp., Kocuria spp., Brevibacillus spp., Microbacteriumoxydans, and Propionibacterium acnes, were identified and reported from the various medical wastes. In addition, pathogenic viruses such as noroviruses and hepatitis B virus have been

also detected in human tissue wastes(Nwachukwu, Orji &Ugbogu, 2013).

Occurrences of clinically relevant bacteria in piles of health service waste in a sanitary landfill and their antimicrobial susceptibility profile have been previously studied and reported that aliquots of leachate from health care waste in Brazil contained pathogenic strains of Staphylococcus sp, Gram-negative rods of the Enterobacteriaceae family and non-fermenters. Bacterial resistance to all the antimicrobials tested was observed in all microbial groups, including resistance to more than one drug. This makes it possible to suggest that viable bacteria in health service waste represent risks to human and animal health(Nascimento, de Almeida Januzzi, Leonel, da Silva, &Diniz, 2009).

2.6.Health Care Waste Management (HCWM)

Health care waste management (HCWM) is a process aims to help ensuring proper hospital and health-care facilities, hygiene and safety of health care workers and communities in dealing with medical waste. It includes planning and procurement, construction, staff training and behavior, proper use of equipment, proper treatment and disposal methods of medical waste inside and outside the healthcare establishment and evaluation for the process of health care waste management (Abu-Awwad, 2008).

Healthcare waste management includes all activities involved in waste generation, segregation, transportation, storage, treatment and final disposal of all types of waste generated in the healthcare facilities, stages of which require special attention. This will ensure that inputs (funds, equipment and facilities), activities and outputs

(safe workplaces, healthy environment, healthy workers) for the safe handling and disposal of healthcare waste are in place(Manyele, &Lyasenga, 2010).

Health care waste management is a crucial public health and environmental issue. The WHO provided HCF with comprehensive guidelines on safe, efficient, and environmentally sound methods of health care waste handling and disposal(Ruoyan, Lingzhong, Huijuan, Chengchao, Jiangjiang, Yoshihisa, &Chushi, 2010).

The safe and sustainable management of health-care waste is a public health imperative and a responsibility of all. Improper management of health-care waste poses a significant risk to patients, health-care workers, the community and the environment. This problem can be solved. The right investment of resources and commitment will result in a substantive reduction of disease burden and corresponding savings in health expenditures(WHO, 2007).

Safe management of health care waste involves three key principles: reduction of unnecessary wastes, separation of general waste from hazardous wastes, and waste treatment that reduces risks to health workers and community. Safe waste management is a cross-cutting issue and while it is being addressed as part of the global activities on water, sanitation and hygiene (WASH) in health care facilities, there are a number of ongoing collaborations with teams working on infection prevention and control, injection safety, immunizations, chemicals, energy, and emergencies(WHO, 2021).

The policy framework surrounding HCWM in a country is extremely important for effectiveness. Not only are applicable laws and regulations important, but a method of enforcement is equally

important. Policy issues surrounding HCWM include: transport, procurement, occupational safety, hazardous materials use and disposal, and pollution prevention. Policy options for HCW management are varied and require local context in order to be effective. Cost is often the main driver for HCW management(Johannessen, Dijkman, Bartone , Hanrahan, Boyer & Chandra, 2000).

- **Advantages of good Health Care Waste Management**

The need for proper HCWM has been gaining recognition slowly. It can help to control diseases (hospital acquired infections), reduce the community exposure, prevent illegal repackaging and resale of e.g. contaminated needles, reduce HIV/acquired- immunodeficiency syndrome (AIDS), sepsis, and hepatitis transmission from dirty needles and other improperly cleaned/disposed medical items, avoid negative long-term health effects, ex: cancer from the environmental release of toxic substances such as dioxin, mercury and others(Abu-Awwad, 2008**).**

Minimizes the spread of infections & reduces the risk of accidental injury to staff, patients, visitors & the community, Reduces the likelihood of contamination of the soil or ground water with chemicals or micro-organisms, Attracts fewer insects and rodents and does not attract animals, and Helps to provide an aesthetically pleasing atmosphere(Babanyara, 2013).

- **Disadvantages of poor health care waste management**

Poor management of health care waste potentially exposes health care workers, waste handlers, patients and the community at large to infection, toxic effects and injuries, and risks polluting the

environment. It is essential that all medical waste materials are segregated at the point of generation, appropriately treated and disposed of safely(Nwachukwu, 2013).

Inappropriate healthcare waste management practices worldwide can have direct and indirect effects on hazards to healthcare staff and patients that include such diseases as cholera, dysentery, skin infection, and infectious hepatitis, as well as environmental pollution (Ghasemi, &Yusuff, 2016).

Health-care waste may cause serious health risks and deteriorate the quality of life of the community through transmission of diseases and injury, if not disposed off correctly. The inappropriate treatment or disposal of that waste is one of the major reasons of environmental pollution(Aryal, Adhikary, Aryal&Adhikari, 2019).

2.7.Basic risks associated with the poor management of health-care waste

Today medical waste management is a crucial public health and environmental issue because poor medical waste management unquestionably exposes healthcare workers, waste handlers, and the community to infections, toxic effects, and injuries.Although the infectious and hazardous waste have a small portion in medical waste (MW), improper medical waste management, and mixing infectious waste with the general waste, can lead to the entire bulkof waste becoming potentially hazardous (Maroufi, &Javadi, 2012).

The following groups of persons are at the risk of health care waste Medical staff: doctors, nurses, sanitary staff and hospital maintenance personnel; In and out-patients receiving treatment in healthcare facilities as well as their visitors. Workers in support services linked to

healthcare facilities such as laundries, waste handling and transportation services; Workers in waste disposal facilities and the general public(Nwachukwu, 2013).

the WHO confirms the risks associated to infectious waste and sharps that nurses are exposed to during healthcare delivery. Other personnel are also exposed to such risks during the transportation of the medical wastes. Furthermore, risks as a consequence of chemical and pharmaceutical wastes are associated with the characteristics of the chemical substance such as its toxicity and flammability. These wastes are generated when they are unwanted or have been expired and may cause poisoning if absorbed through the skin, inhalation or ingestion (Bokhoree, Beeharry, Makoondlall-Chadee, Doobah, &Soomary, 2014).

Sharps injuries can transmit more than twenty pathogens. A person who is exposed to needle-stick injuries (NSIs) can be at risk of immediate consequences such as trauma and long-term consequences such as blood borne pathogens (BBPs). The most serious ones are HBV, HCV and HIV. In 2010, unsafe injections were documented to be responsible for considerable numbers of new infections of HIV, HBV and HCV, with 33,800, 1.7 million and 315,000, respectively(Hassan, 2018).

It has been established that, worldwide, about 5.2 million people (including 4 million children) die each year from waste related diseases. The hazards of exposure to hospital waste can range from gastro-enteric, respiratory, and skin infections to more deadly diseases such as HIV/AIDS, and Hepatitis(Babanyara, 2013).

The most common problems connected with medical waste include the absence of proper waste management, lack of awareness about the health hazards from medical wastes, insufficient financial and human resources, and poor control of waste disposal(Musa, Mohamed, & Selim, 2020).

2.8.minimization, segregation, Collection, **storage**, **and transport of medical waste**

- minimization

Waste minimization is defined as the prevention of waste production and/or its reduction. It involves specific strategies, changes in management and behavioral change. Methods of waste reduction include modification of purchasing procedures, control of inventory, and production of less toxic materials when discarded as wastes. No actions should however be taken that would impact on the quality and limit the access to health care(WHO,2005).

- Segregation

Segregation is useful since it prevents the contamination of non-hazardous waste by the hazardous waste and making the whole waste stream hazardous. Thus, this method will reduce the toxicity and the volume of the waste stream. Moreover, segregation makes it easier to transport the waste. Waste is segregated depending on the quantity, composition, and the disposal method of the waste stream(Zarook, 2012).

The segregation practices as follows: infectious waste was collected in yellow bags; municipal waste was collected in black bags; sharps were collected in plastic containers; and cytotoxic/cytostatic drugs were collected in their original packaging(Yong, Gang, Guanxing, Tao & Dawei, 2009).

Wastes are segregated at their place of production to reduce the health risk from the smaller potentially infectious factions (typically waste items contaminated with body fluids and used sharps)(Chartier, 2014).

categorize the waste generated at the facility as either municipal solid waste or special healthcare waste. The first priority should be segregating sharps and pathological waste from all other waste. Sharps must be put into rigid, puncture-proof containers, which should be available at the health worker's workplace. Pathological waste should be put into non-transparent plastic heavy-duty bags. When three-quarters full, the containers and bags should be disposed of safely. Toxic liquids and pharmaceuticals should also be separated from regular solid waste materials, and disposed of properly(Johannessen et al., 2000).

Factors associated with improper segregation include inadequate awareness, poor HCW attitudes and practices and inadequate management by facility leadership**.** A lack of appropriate labeling can result in improper segregation of medical waste and increased associated costs(Oroei, Momeni, Palenik, Danaei, & Askarian, 2014).

- Separating Different Categories of Medical Wastes

  In medical centers, infectious and pathological waste, and sharps are placed in different containers. The containers are labeled as "biohazard", closed, water tight and of uniform color for each type of medical waste through- out the medical center. The size of the containers depends on the volume of waste generated and the containers used are easy to handle and transport. For used needles specially designed containers are used. The system for segregation, packaging, labeling and marking involves separating the medical

waste into categories, as described. The packaging is done in colored bags. For example, yellow plastic bags are used for infectious medical waste that is meant to be disposed by means of incineration or deep burial in landfill(Zarook, 2012).

Medical waste segregation and labeling include separation into various categories and numerous colored bags utilized. To exemplify this practice, infectious medical waste may be disposed by the process of burial landfilling or via incineration. Such wastes are contained in yellow colored plastic bags. Apart from this, red containers are used to sort wastes treated by microwave or autoclave(Khan, & Alshukri, 2020).

- Collection

General waste should not be collected at the same time or in the same trolley as infectious or other hazardous wastes. the containers should be labeled with the date, type of waste and point of generation to allow them to be tracked through to disposal. Where possible, weight should also be routinely recorded. Anomalies between departments with similar medical services or over time at one location can show up differences in recycling opportunities, or problems such as poor segregation and diversion of waste for unauthorized reuse. Collection should be daily for most wastes, with collection timed to match the pattern of waste generation during the day(Chartier, 2014).

Nursing and other clinical staff should ensure that waste bags are tightly closed or sealed when they are about three-quarters full. Sealed sharps containers should be placed in a labeled, yellow infectious health-care waste bag before removal from the hospital ward or department. Wastes should not be allowed to accumulate at

the point of production.(Prüss-Üstün, Giroult, Rushbrook, &WHO, 1999).

- Storage

After the medical wastes are segregated and collected, the staff should move them from the location of generation to temporary storage. The temporary storage location, storage containers and storage management have a direct impact on the environmental and health risks which must be well sanitized and secured for access only to authorized personnel.(Yong, 2009).

the presence of a temporary storage premise large enough to handle the waste generated. the facilities temporarily store waste before treatment and disposal. The standard time for storing medical wastes recommended by the World Health Organization should not exceed 24 hStorage areas should be fenced, big enough and well ventilated and should be accessible by the authorized personnel only(Manyele, & Lyasenga, 2010).

- transport

On-site transport

Health-care waste should be transported within the hospital or other facility by means of wheeled trolleys, containers, or carts that are not used for any other purpose and meet the following specipcations: easy to load and unload, no sharp edges that could damage waste bags or containers during loading and unloading, easy to clean. The vehicles should be cleaned and disinfected daily with an appropriate disinfectant. All waste-bag seals should be in place and intact at the end of transportation(Prüss, 1999).

2.9.treatment and Disposal Methods

Medical wastes treatment means changing the nature of wastes into a non-infected or less infected condition prior to disposal.

The disposal of medical wastes is an old problem in urban areas. The increasing growth of population has resulted in an increase in the number of patients and it has led to the increase of generated wastes. Hundreds of tones of hospital wastes are daily generated which require appropriate treatment and disposal. Since medical wastes are a source for contamination and pollution, capable of causing diseases and illness to human, special procedures are required for their treatment and disposal (Ferdowsi, Ferdosi, &Mehrani, 2013).

A basic principle in all waste management schemes is to segregate wastes as early as possible in the waste stream and to find the simplest solution for each type of waste. The first step in treatment and disposal is to ensure that all regular healthcare waste that can safely be sent to the normal municipal waste management system is managed in this way. The remaining wastes (special HCW) have characteristics that need particular treatment and disposal(Johannessen, et al., 2000).

Several types of treatment and disposal process, burn and non-burn technology, are available for healthcare wastes(Ghasemi, &Yusuff, 2016).

Several medical waste treatment methods, including incineration, steam sterilization (or sanitation), microwave sanitation, chemical disinfection, dry heat disinfection, and disinfection with superheated steam, may be used(Jang, Lee, Yoon, & Kim2006).

The choice of technology for waste treatment and disposal should always be driven by the objective of improving current health and environmental impacts. The technology choice should also be functional, safe, economically feasible, and sustainable. Choice of

treatment/disposal technology needs to be made with cultural and religious sensitivities in mind. For example, in Hindu cultures, body parts should be cremated while in Muslim cultures, they should be buried below ground(Johannessen, et al., 2000).

Therefore, healthcare facilities must employ cost-effective and effective treatment and disposal technologies for their clinical wastes based on the classification and characteristics of wastes to decrease volume and reduce cost as well as prevent environmental hazards and protect occupational safety(Ghasemi, &Yusuff, 2016).

- Incineration

  Incineration is a high-temperature, dry oxidation process that reduces organic and combustible waste to inorganic, incombustible matter and results in a significant reduction of waste volume and weight. High-heat thermal processes take place at temperatures from about 200 °C to more than 1000 °C. They involve the chemical and physical breakdown of organic material through the processes of combustion, pyrolysis or gasification(Chartier, 2014).

  Incineration is a thermal process, which destroys most of the waste including microorganisms. Combustion processes must be under controlled conditions to convert wastes containing hazardous materials into mineral residues and gases. A suitable site for a hazardous waste incinerator would be a site where the resulting air emissions would not diminish the air quality for the residents of a city or town(Labib, Hussein, Waffaa, Zakaria, & Mohamed, 2005).

Incineration is not the same as burning. Proper incineration is a highly advanced technology that can adequately treat all types of special healthcare waste(Johannessen et al., 2000). Incineration used to be the method of choice for most hazardous healthcare wastes and is still widely used. However, recently developed alternative treatment methods are becoming increasingly popular(Prüss, 1999).

It has several advantages when used to treat medical waste, including a reduction in the waste volume, the sterilization and detoxification of the waste materials, and the recovery of heat or electricity during incineration(Jang, 2006).

A disadvantage of these technologies is the release of combustion by-products into the atmosphere and the generation of residual ash. The combustion of health-care waste produces mainly gaseous emissions, including steam, carbon dioxide, nitrogen oxides, a range of volatile substances (e.g. metals, halogenic acids, products of incomplete combustion) and particulate matter, plus solid residues in the form of ashes(Chartier, 2014).

An incinerator requires skilled operators, extensive flue gas emission controls and, frequently, imported spares and supplies. Properly controlled incineration is relatively expensive. Incineration of wastes generates residues, including air emissions and ash. Environmental controls on incinerators in developed countries have been tightened in recent years, principally because of concerns over air emissions of pollutants such as dioxins(Johannessen, et al., 2000).

The technology of small-capacity incinerators, for use by a single medical facility, is often rudimentary. These installations are not recommended, since they may constitute a serious air pollution hazard to the surrounding area. WHO recommends closing down small incinerators that are not operating satisfactorily. Incineration is an option for certain types of HCW (and is the preferred method for some substances such as cytotoxins and other pharmaceuticals) but it needs to be carefully operated and controlled(Johannessen, et al., 2000).

- Chemical disinfection

Chemical disinfection, used routinely in healthcare to kill microorganisms on medical equipment has been lately extended to the treatment of HCW. Chemicals (mostly strong oxidants like chlorine compounds, ammonium salts, aldehydes, and phenolic compounds) are added to the waste to kill or inactivate pathogens. This treatment is most suitable for treating liquid wastes such as blood, urine stools or hospital sewage, but solid and highly hazardous (Prüss-Üstün&Townend, 1999).

Chemical disinfection processes involve soaking medical wastes in a liquid chemical disinfectant. The disinfectant breaks down organic materials and destroys infectious agents. The wastes are initially ground to insure that the chemical agent can penetrate the wastes and to aid in disposal of the residues. The materials then enter a bath where they are mixed with the chemical agent. Some disinfecting chemicals such as sodium perchlorate will reportedly also breakdown glass. The resulting liquids including any remaining disinfecting agents are released to the public sewer system while the solid residues are dried and disposed of in a landfill(Lee & Huffman, 1996).

At present, chemical disinfection of health-care waste is limited in industrialized countries. Chemical disinfection is usually carried out on hospital premises. Recently, however, commercial, self-contained, and fully automatic systems have been developed for health-care waste treatment and are being operated in industrial zones. The disinfected waste may be disposed of as non-risk health-care waste, but the chemical disinfectants may create serious environmental problems in case of leakage or after disposal(Prüss-Üstün&Townend, 1999).

- Autoclaving

Autoclave with steam, moisture, heat and pressure is used in order to inactivate the micro-organisms, and to sterilize the medical devices and for medical wastes treatment(Ferdowsi, 2013).

Autoclaving/ steam sterilization is the second most commonly used waste treatment method. An autoclave essentially is a metal vessel designed to sustain high pressures and temperatures, with a sealable door and an arrangement of pipes and hatches through which steam is introduced to and removed from the vessel. In other words, in an autoclave the process steams the waste materials to destroy potentially infectious effects and kills pathogens before entombing the wastes(Ghasemi, &Yusuff, 2016).

Autoclaves are capable of treating a range of infectious waste, including cultures and stocks, sharps, materials contaminated with blood and limited amounts of fluids, isolation and surgery waste, laboratory waste (excluding chemical waste) and “soft” waste (including gauze, bandages, drapes, gowns and bedding) from patient care. With sufficient time and temperature, it is technically possible to treat small quantities of human tissue, but ethical, legal, cultural,

religious and other considerations may preclude their treatment(Chartier, 2014).

Autoclave with steam, moisture, heat and pressure is used in order to inactivate the micro-organisms, and to sterilize the medical devices and for medical wastes treatment. Typical operating conditions for an autoclave are a temperature of at least 121°C at a pressure of 105 kPa for a period of at least 60 min. The second option for the temperature, etc., is that biomedical waste (BMW) can be sterilized at 132°C for 30-60 min. Anatomical and pathological wastes, low-level radioactive waste, organic solvents, laboratory chemicals, and chemotherapy waste should not be treated in an autoclave(Ferdowsi, 2013).

a shredder combined with an autoclave can be the best option to treat the medical waste to reduce the size of waste that has to go to the landfill sites(Ghasemi, &Yusuff, 2016).

- Landfilling

In all waste systems, the removal of the remaining health-care waste materials after minimization or treatment will require access to land for final disposal(Chartier, 2014).

The landfill method is one of the popular methods because all wastes after minimization or treatment need access to land for final disposal to remove the remaining healthcare waste materials with the least environmental impact. The treated waste can be disposed of in a regular municipal waste landfill with most non-incineration technologies. Although the landfill method is an easy and low-cost waste disposal method, it can enhance human health risk and environmental pollution if not handledcarefully and properly (Ghasemi, &Yusuff, 2016).

There are two distinct types of waste disposal to land open dumps and sanitary landfills(Prüss-Üstün&Townend, 1999).

In less developed areas, where a municipality or health-care facility lacks the means to treat wastes before disposal, the direct use of a landfill is likely to be required for much of the material produced(Chartier, 2014).

Disadvantages

- ☒ Special healthcare waste is not treated and preserves potential infectiousness
- ☒ Reduces awareness among healthcare workers of need to segregate waste types
- ☒ Potentially long transportation to landfill Special healthcare waste is not treated(Johannessen, et al., 2000).

2.10.Waste management: reasons for failure

Lack of awareness about the health hazards related to health-care waste, inadequate training in proper waste management, absence of waste management and disposal systems, insufficient financial and human resources and the low priority given to the topic are the most common problems connected with health-care waste. Many countries either do not have appropriate regulations, or do not enforce them(Nwachukwu, 2013).

2.11.Previous studies:

Several studies that similar to our study have been showed different results , for example Ameen, M. M., & Abdullah, S. A. and the study about knowledge and attitude of nursing staffs about medical waste management in primary health care centers in Erbil city, Iraq in 2017 they use cross-sectional study .The study was

conducted in 23 primary health care centers in Erbil /City in the Kurdistan region of Iraq and the sample size of the study was180 nurses.A self-administered questionnaire was used for the data collection from nursing staffs in primary health care centers.

Results showed that majority of the nursing staffs' age were between 40-49 years old, female, Secondary school nurses, most of them had 20-29 years of experience, working unit, most of them were minor surgery nurses and did not have training courses about medical waste management.

It was found that more than half (65.6%) of nursing staffs possessed medium levels of knowledge. Very few nurses (5.6%) had low levels of knowledge. Nearly one third of nurses (28.9%) had high levels of knowledge regarding medical waste management.

The study also showed that the majority of nursing staffs had high (positive) attitude regarding medical waste management. There was statistically significant association between level of education and nurses' knowledge about medical waste management. Conducting training courses about medical waste management are necessary for all nursing staffs and preparation of educational programs to be implemented for developed knowledge and attitude of nursing staffs about medical waste management.

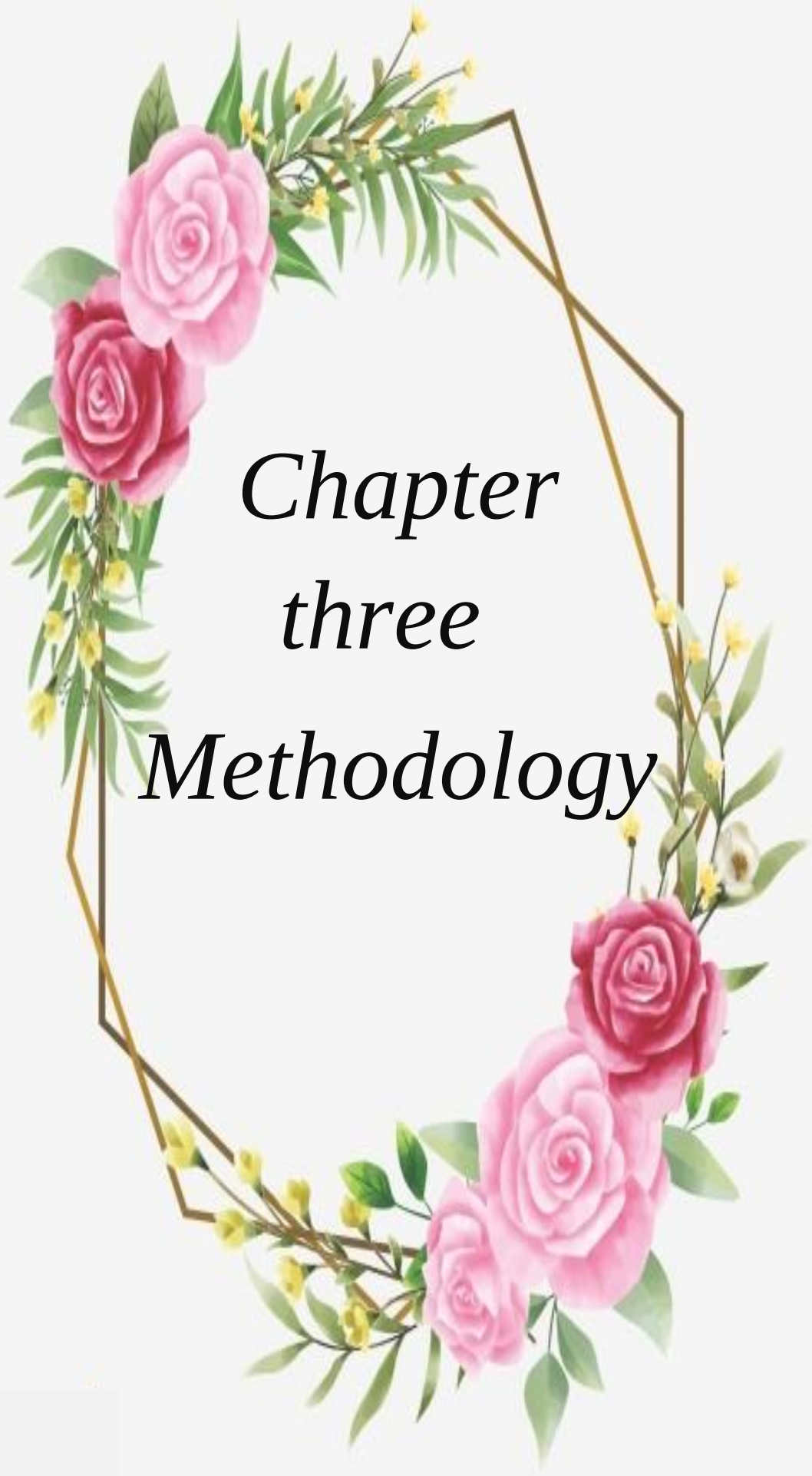
The second study by Sarkees, A. N. study about assessment of nurses' knowledge about health care waste management in Duhok city in 2018 A descriptive study was conducted at all five governmental hospitals and 13 main primary health care centers in Duhok City. A non-probability "purposive" sample of 129 nurses

were recruited from all nurses who work in such hospitals' day shift and main Primary Health Care Centers of Duhok City.

The findings indicated that more than two thirds of nurses show high level of knowledge (69%) toward management of healthcare waste.The present study concluded that the highest number of nurses of present study showed high level of knowledge about how to manage the health care waste that produced due to providing of such health care.

The last study done bySobh, D. R study about knowledge and practice of staff nurses related to health care waste management in El-Zohor hospital/Egypt in 2018 .A descriptive study was utilized, sample of 110 nurses. Data were collected using a knowledge questionnaire sheet and an observation checklist for assessing the practice of the staff nurses.

The results revealed that the majority of nurses had satisfactory knowledge regarding health care waste management and had adequate practices in most areas of waste management and findings pointed to a statistically significant correlation between nurses' knowledge and practice regarding healthcare waste management.



Chapter three

Methodology

Methodology

This chapter presents the methods of the study through the following:

3.1. Design of the Study:

A descriptive quantitative design, which is using the assessment approach in order to assess nurses' knowledge toward medical waste management in the primary health centers in the city of Alamara. It was started from the period 29th December 2020 to 6th July 2021.

3.2. Administrative Arrangements:

An official permission was obtained from the College of Nursing University of Missan to the Missan Health Directorate, and from Missan Health Directorate to the First Alamara sector/primary health care centers(appendix A).

3.3. Setting of the Study

The study was conducted in four primary health care centers (1) Dijla health care center model, (2) AL-imam AlHusayn health care center, (3) AL-Euruba health care center (4) Shaheed AL-Watan primary health care center.

3.4 . Sample of the Study:

A non-probability (purposive) sample of (60)nurses that were visit the primary health care centers, were included in the study sample.(20)nurses from AL-Euruba health care center(17)nurses from Dijla health care center (12)nurses from AL-imam AlHusayn health care center (11)nurses from Shaheed AL-Watan primary health care center.

Criteria for Including the Sample:

a) Nurses who work in primary health centers.

Criteria for Excluding from the Sample:

Health care provider (doctor, etc.).

3.5. Data Collection:

The data were collected through the utilization of the developed questionnaire, by interview technique with the nurses who were individually interviewed in the primary health care centers, by using the Arabic version of the questionnaire, and they were interviewed in a similar way. The data collection process has been performed from 25th may, 2021 to the 8thJune , 2021. Each nurse spends approximately (10-15) minutes to complete the interview.

3.6. The Study of Instrument:

An assessment tool was developed by the researcher to assess the nurses' knowledge who work in primary health centers toward medical waste management . The final study instrument consisting of two parts (appendix B):

Part 1: Socio-demographic Characteristics:

A socio-demographic characteristics sheet, consisted of (7) items, which included age, gender, Educational attainment ,Years of service, Participate in training courses, number of training courses, and the workplace.

Part 2: nurses' knowledge toward medical waste management:

The second part of the questionnaire have been constructed to assess nurses' knowledge toward medical waste management and was comprised of (30) items concerned with assess the nurses ’knowledge toward medical waste management, How to separate it, handle it, and dispose of it.

3.7. Rating and Scoring

The items have been rated and scored according to the following patterns:

Three point likert scales was used for rating the items as (1) for I Know, (2) for Unsure, and (3) for I do not Know in all items.

3.8. Validity of the Questionnaire:

Content validity of the questionnaire has been determined through the use of panel of experts, to investigate the content of the questionnaire for clarity and adequacy in order to achieve the present study objectives. preliminary questionnaire designed to collect the data, to be presented to has been (5) experts in order to determine validity. These experts have been asked to review the questionnaire relative to their responses all of them have agreed on the content and structure of the questionnaire, In addition, the experts’ suggestions were taken into consideration. So far, modifications were employed and the final copy of the developed instrument is completed to be an appropriate tool for conducting the study(Appendix C).

3.9. Pilot study:

A pilot study was conducted on samples of (10) nurse who were excluded from the study sample on 20th may, 2021 to determine the reliability of the questionnaire and to achieve the following:

1. Obtaining the clarity and the content adequacy of the questionnaire.

2. Estimating the time required for the data collection.

3. Identifying the barriers that may be encountered during the data collection process.

4. To determine the reliability of the researcher dependency (Inter Examiners) and to determine the reliability of the respondents(Intra Examiner).

5. To confirm the clarity and content adequacy of the instrument structure throughout the subjects understanding and to determine the required modifications.

3.10. Reliability of the Questionnaire:

Reliability is concerned with the consistency of the research instrument. Determination of reliability of the questionnaire is based on Cronbach's Alpha correlation coefficient. The finding of the pilot study indicates that the instrument is adequately reliable for the present study andat any time in the future.

3.11. Statistical Data Analysis:

The data of the present study are analyzed through the use of statistical package of social sciences (SPSS) version 21. The following statistical data analysis approaches have been used through.

3.11.1. Descriptive Data Analysis

a. Frequencies (F),
b. Percentages (%)
c. Mean of score (MS)

The present study was based on cutoff point (0.66) due to the three point'slikert scales with three levels including: low(1-1.66), moderate (1.67-2.33), and high (2.34-3).

3.11.2. Inferential Data Analysis

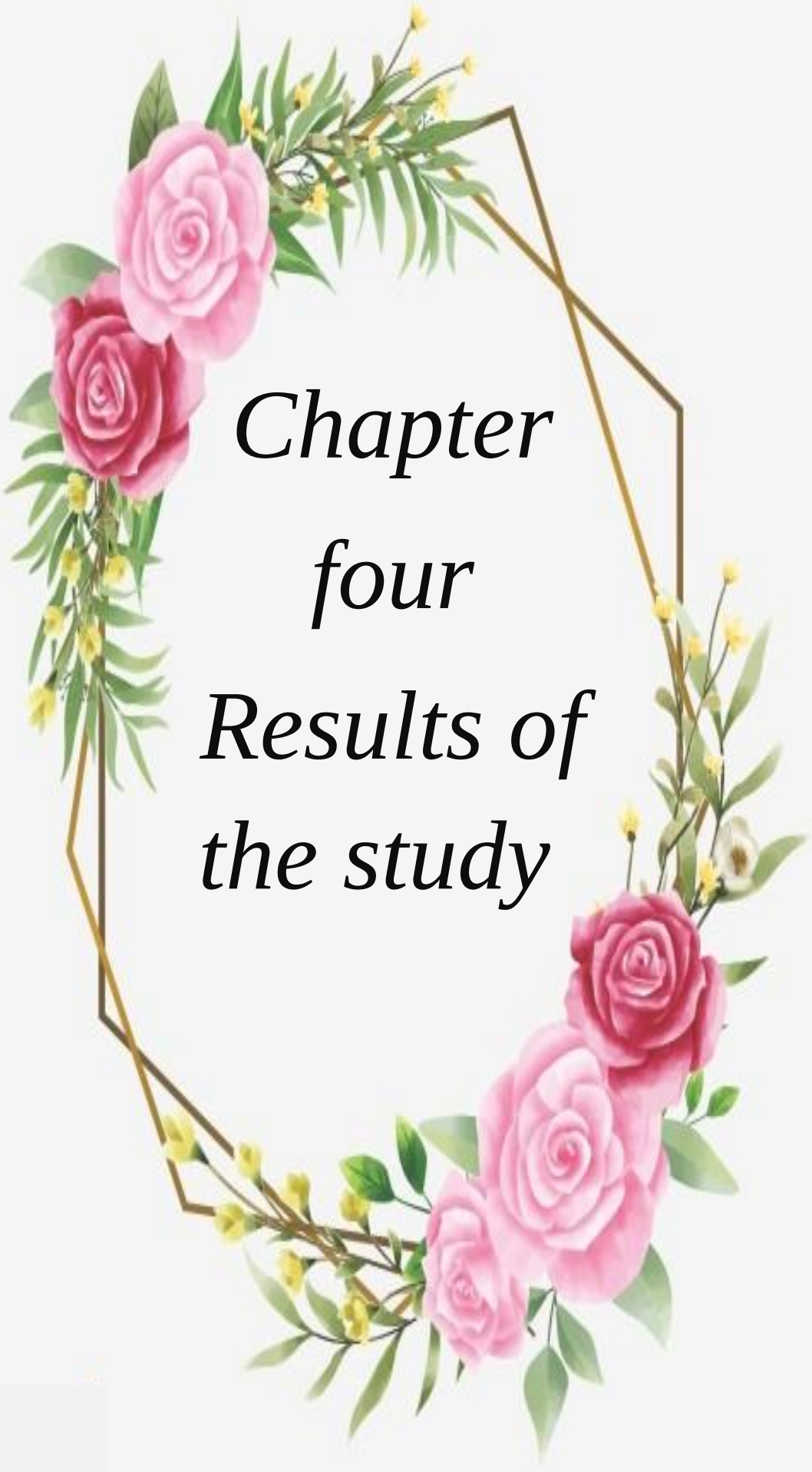
Chi-Square test for the correlation of the association tables.we used the followings:

- NS : Non-significant at P>0.05
- HS : High significant at P<0.01

3.12. Limitations of the Study:

The present study has experienced the following limitations:

1. Some nurses refused of participate in the study.
2. Corona virus and the partial ban have been a hindrance in the sample collection of samples.



Chapter four Results of the study

4. Results and Findings

This chapter presents the findings of the data analysis systematically in tables and these correspond with the objectives of the study as follows:

Table (2): Distribution of the nurses by their demographic data

No.	Variables	Characteristics	F	%
1.	Age (year)	20-29	9	15.0
		30– 39	17	28.3
		40- 49	15	25.0
		≥ 50	19	31.7
		Total	60	100.0
2.	Gender	Male	44	73.3
		Female	16	26.7
		Total	60	100.0
3.	Level of Education	Secondary School Nursing	20	33.3
		diploma in Nursing	35	58.3
		Bachelor in Nursing	5	8.3
		Total	60	100.0
4.	Years of Experience	1 - 5 years	7	11.7
		6 – 10 years	10	16.7
		11 - 15years	14	23.3
		≥ 16 years	29	48.3
		Total	60	100.0
5.	Participant in Training Sessions	Yes	41	68.3
		No	19	31.7
		Total	60	100.0
6.	Number of Training Sessions	None	19	31.7
		1 session	16	26.7
		2 sessions	16	26.7
		3 sessions	8	13.3
		4 sessions	1	1.7
		Total	60	100.0
7.	Work Place	Vaccines	13	21.7
		Maternal and child care	8	13.3

		Dressing	22	36.7
		Health school	1	1.7
		Family planning	7	11.7
		Surgical ward mini	4	6.7
		Care health dental	1	1.7
		Others	4	6.7
		Total	60	100.0

No. = number ofVariable ,F= Frequencies , % = Percentages, Arithmetic Mean ($\bar{x}$) and Std. Dev.= Standard. Deviation.

The results of this table show that more than one-quarter of age group in the study sample were within (≥50years)it presented 19(31.7%). The above table also shows that the majority of participants 44(73.3%)were male. Also in regarding the subjects level of education, the results show that more half of nurses have diploma in nursing35(58.3%). In addition, years of experience of nurses29(48.3%)have(> 16 years) in the service. The subject of participant in training sessions appear that two-third of them were have training sessions 41(68.3%), and most them were participant in one and two sessions 16(26.7%). Concerning work place more than one-third of participants were working in the dressing, as their percentage reached 22(36.7%).

Table (3): Assessment of nurses' knowledge about management of medical waste .

No	items	I know		Unsure		I do not know		M.S.	S.D.	Ass.
		F	%	F	%	F	%			
1	Isolates medical waste from other wastes.	59	98.3	-	--	1	1.7	2.97	0.2	G
2	Infectious waste is isolated from other medical wastes	57	95.0	3	5.0	-	-	2.95	0.2	G
3	Acute waste is separated from other wastes in primary health-care centers.	59	98.3	-	--	1	1.7	2.97	0.2	G

4	Toxic medical waste is classified by its toxicity.	50	83.3	7	11.7	3	5.0	2.78	0.5	G
5	Acute infectious medical waste is classified as a section and is a very dangerous waste.	59	98.3	-	--	1	1.7	2.97	0.2	G
6	Medical waste is collected from medical units as a daily base.	51	85.0	7	11.7	2	3.3	2.82	0.4	G
7	Medical waste is collected in the section separate from other wastes	53	88.3	3	5.0	4	6.7	2.82	0.5	G
8	Acute infectious waste is disinfected inside the department and transported to storage sites.	43	71.7	13	21.7	4	6.7	2.65	0.6	G
9	Waste collection stores are available for primary health care centers	39	65.0	10	16.7	11	18.3	2.47	0.7	G
10	Colors for contaminated waste containers are used to distinguish between waste by marking.	59	98.3	-	--	1	1.7	2.97	0.2	G
11	Use of bags for each type of waste taking into account the size of the container with the volume of waste.	57	95.0	1	1.7	2	3.3	2.92	0.3	G
12	There are two containers in each section of the center, one with a red bag for medical waste and the other with a black bag of waste for food residues, paper or bottles and plastic cans	55	91.7	4	6.7	1	1.7	2.90	0.3	G
13	Waste bags are transported in small vehicles to the place where they are collected.	53	88.3	4	6.7	3	5.0	2.83	0.4	G
14	Use small plastic preservers or containers with a hazardous biological waste signal to collect needle residues and injections immediately after use and not to throw them completely with garbage bags.	59	98.3	1	1.7	-	--	2.98	0.1	G
15	Do not collect waste by workers and put it in the corridors in front of passers-by or visitors until it is transported outside the health center.	54	90.0	4	6.7	2	3.3	2.87	0.4	G
16	Waste is not stored in open areas prone to rain, animals, birds, insects and rodents carrying diseases.	54	90.0	5	8.3	1	1.7	2.88	0.3	G
17	It is preferable to store waste in closed places with adequate ventilation.	45	75.0	10	16.7	5	8.3	2.67	0.6	G
18	There are enough wheeled containers to transport medical waste inside the primary health care center.	48	80.0	9	15.0	3	5.0	2.75	0.5	G
19	Having a water source to clean the floor and drain properly.	44	73.3	11	18.3	5	8.3	2.65	0.6	G

20	Keep temporary waste collection centers away from food stores, restaurant and kitchen.	57	95.0	3	5.0	-	--	2.95	0.2	G
21	Immunize all medical waste workers against hepatitis B, tetanus, tuberculosis and any other infectious diseases that may be widespread or suspected to exist.	45	75.0	13	21.7	2	3.3	2.72	0.5	G
22	ear gloves and protective coats for medical waste transport workers in case of any needle prick or leakage of some contaminated liquids.	58	96.7	2	3.3	-	--	2.97	0.1	G
23	There is a fixed time to transport garbage from the health facility, at least once a day.	44	73.3	14	23.3	2	3.3	2.70	0.5	G
24	Collect black bags for regular garbage at a different time than when to collect red bags for medical waste so that they are not confused.	51	85.0	3	5.0	6	10.0	2.75	0.6	G
25	Garbage bags are not filled with more than three quarters of the bag so that they are easy to close and handle so as not to rupture due to full fullness.	51	85.0	3	5.0	6	10.0	2.75	0.6	G
26	Heavy water discharge in health centers depends on the sewage system	41	68.3	14	23.3	5	8.3	2.60	0.6	G
27	The presence of a medical waste official in health centers and whether they have been trained.	35	58.3	18	30.0	7	11.7	2.47	0.7	G
28	Primary health care centers dispose of waste at the health exploration site.	38	63.3	16	26.7	6	10.0	2.53	0.6	G
29	Health care centers have a incinerator for the disposal of medical waste.	34	56.7	16	26.7	10	16.7	2.40	0.7	G
30	Primary health care centers are developing a plan for the management of medical waste.	43	71.7	8	13.3	9	15.0	2.57	0.7	G

No. = number ofitem ,F=frequencies , % = Percentages, M.S.= mean of score. Ass.= assessment; assessment levels : (1.00- 1.66) = Poor; (1.67- 2.33) = Moderate; (2.34 - 3.00) =high.

Table (3) reveals that there are a good level of arithmetic mean in all items of assessment of nurses' knowledge regarding management of medical waste at the study sample.

Table (4):Overallassessment of nurses' knowledgeregarding management of medical waste .

Levels of Assessment	Frequency	Percent
Poor : (1.00 - 1.66)	0	0.0
Fair: (1.67 - 2.33)	3	5.0
Good: (2.34 - 3.00)	57	95.0
Total	60	100.0
$\bar{x} \mp$ Std. Dev	2.77 ± 0.224	

Arithmetic Mean ($\bar{x}$) and Std. Dev.= Standard. Deviation.

This table reveals that the majority of participants have a good level of nurses' knowledge regarding management of medical waste at the study sample(n=60;57(95%), with mean and standard deviation (2.77 ± 0.224).

Table (5): Association between the nurses' knowledge and their ages

Age (years)		Nurses' Knowledge			Total
		I don't Know	Uncertain	I know	
29-20	F	24	34	212	270
	%	1.3%	1.9%	11.8%	15.0%
30– 39	F	40	65	405	510
	%	2.2%	3.6%	22.5%	28.3%
40- 49	F	19	60	371	450
	%	1.1%	3.3%	20.6%	25.0%
≥ 50	F	20	43	507	570
	%	1.1%	2.4%	28.2%	31.7%
Total	F	103	202	1495	1800
	%	5.7%	11.2%	83.1%	100.0%
Chi-Square		χ2obs.= 29.443 000	χ2crit. =12.59df=6	P =	P value=0.

F=Frequencies , % = Percentages,χ^2obs. = chi-square observed, χ^2crit= chi-square critical , df= degree of freedom, p = probability value, P< 0.01=High significant,

Table (5) indicates that there was a high significant relationship between nurses' knowledge regarding management of medical waste and their age at (P< 0.01), when analyzed by chi-square test.

Table (6): Association between the nurses' knowledge and their gender

Gender		Nurses' Knowledge			Total
		I don't Know	Uncertain	I know	
Male	F	80	122	1118	1320
	%	4.4%	6.8%	62.1%	73.3%
Female	F	23	80	377	480
	%	1.3%	4.4%	20.9%	26.7%
Total	F	103	202	1495	1800
	%	5.7%	11.2%	83.1%	100.0%
Chi-Square		χ2obs.= 19.885	χ2crit. =5.99df=2	P =	P value=0. 000

F=Frequencies , % = Percentages, χ^2obs. = chi-square observed, χ^2crit= chi-square critical , df= degree of freedom, p = probability value, P < 0.01= High Significant.

The data analysis presented in table (6) shows that there was a highly significant relationship between nurses' knowledge regarding management of medical waste and their gender at (P<0.01),when analyzed by chi-square test.

Table (7): Association between the nurses' knowledge and their work place

work place		Nurses' Knowledge			Total
		I don't Know	Uncertain	I know	
Vaccines	F	17	58	315	390
	%	0.9%	3.2%	17.5%	21.7%
Maternal and child care	F	18	31	191	240
	%	1.0%	1.7%	10.6%	13.3%
Dressing	F	42	63	555	660
	%	2.3%	3.5%	30.8%	36.7%

Health school	**F**	12	1	17	30
	%	0.7%	0.1%	0.9%	1.7%
Family planning	**F**	3	26	181	210
	%	0.2%	1.4%	10.1%	11.7%
Surgical ward mini	**F**	4	11	105	120
	%	0.2%	0.6%	5.8%	6.7%
Care health dental	**F**	5	1	24	30
	%	0.3%	0.1%	1.3%	1.7%
Others	**F**	2	11	107	120
	%	0.1%	0.6%	5.9%	6.7%
Total	**F**	103	202	1495	1800
	%	5.7%	11.2%	83.1%	100.0%
χ^2obs.=98.038 χ^2crit. =23.69df=14 P> 0.05 p value=0.000					

F=Frequencies , % = Percentages, χ^2obs. = chi-square observed, χ^2crit= chi-square critical , df= degree of freedom, p = probability value, P< 0.01=High-significant,

The table (7) indicates that there was a high significant association between nurses' knowledge concerning management of medical waste and their work place at (P< 0.01), when analyzed by chi-square test.

Table (8): Association between the nurses' knowledge and their educational level

Educational level		**Nurses' Knowledge**			**Total**
		I don't Know	**Uncertain**	**I know**	
Secondary School Nursing	**F**	26	59	515	
	%	1.4%	3.3%	28.6%	600
Diploma in Nursing	**F**	71	120	859	33.3%
	%	3.9%	6.7%	47.7%	1050
Bachelor in Nursing	**F**	6	23	121	58.3%
	%	0.3%	1.3%	6.7%	150
Total	**F**	103	202	1495	8.3%
	%	5.7%	11.2%	83.1%	1800
Chi-Square		**χ2obs.= 8.971 χ2crit. =9.49df=4 P value=0. 062**			

F=Frequencies , % = Percentages, χ^2obs. = chi-square observed, χ^2crit= chi-square critical , df= degree of freedom, p = probability value, P > 0.05= non-significant.

The findings in table (8) revealed that there was a non-significant relationship between nurses' knowledge toward management of medical waste and their educational level at (P> 0.05),when analyzed by chi-square test.

Table (9): Association between the nurses' knowledgeand their years' experience

Years of experience		Nurses' knowledge			Total
		I don't Know	Uncertain	I know	
1 - 5 years	F	15	24	171	210
	%	0.8%	1.3%	9.5%	11.7%
6 – 10 years	F	14	41	245	300
	%	0.8%	2.3%	13.6%	16.7%
11 - 15years	F	19	33	368	420
	%	1.1%	1.8%	20.4%	23.3%
≥ 16 years	F	55	104	711	870
	%	3.1%	5.8%	39.5%	48.3%
Total	F	103	202	1495	1800
	%	5.7%	11.2%	83.1%	100.0%
Chi-Square		χ^2obs.=10.559 χ^2crit. =12.59df=6 P> 0.05 p value=0.103			

F=Frequencies , % = Percentages, χ^2obs. = chi-square observed, χ^2crit= chi-square critical , df= degree of freedom, p = probability value, P > 0.05= Non-significant

The results of data analysis, as presented in table (9) revealed that there was a non-significant relationship between years of experience and their nurses' knowledge related to management of medical waste at (P>0.05),when analyzed by chi-square test.

Table (10): Association between the nurses' knowledge and their Sharing in training session

Sharing in training session		Nurses' knowledge			Total
		I don't Know	Uncertain	I know	
Yes	F	52	135	1043	1230
	%	2.9%	7.5%	57.9%	68.3%
No	F	51	67	452	570
	%	2.8%	3.7%	25.1%	31.7%
Total	F	103	202	1495	1800
	%	5.7%	11.2%	83.1%	100.0%
Chi-Square		χ2obs.= 16.791	χ2crit. =5.99df=2	P =	P value=0. 000

F=Frequencies , % = Percentages, χ^2obs. = chi-square observed, χ^2crit= chi-square critical , df= degree of freedom, p = probability value, P < 0.01= High Significant.

The data analysis presented in table (10) shows that there is a high significant relationship between nurses' knowledge regarding management of medical waste and their training session at (P<0.05),when analyzed by chi-square test.

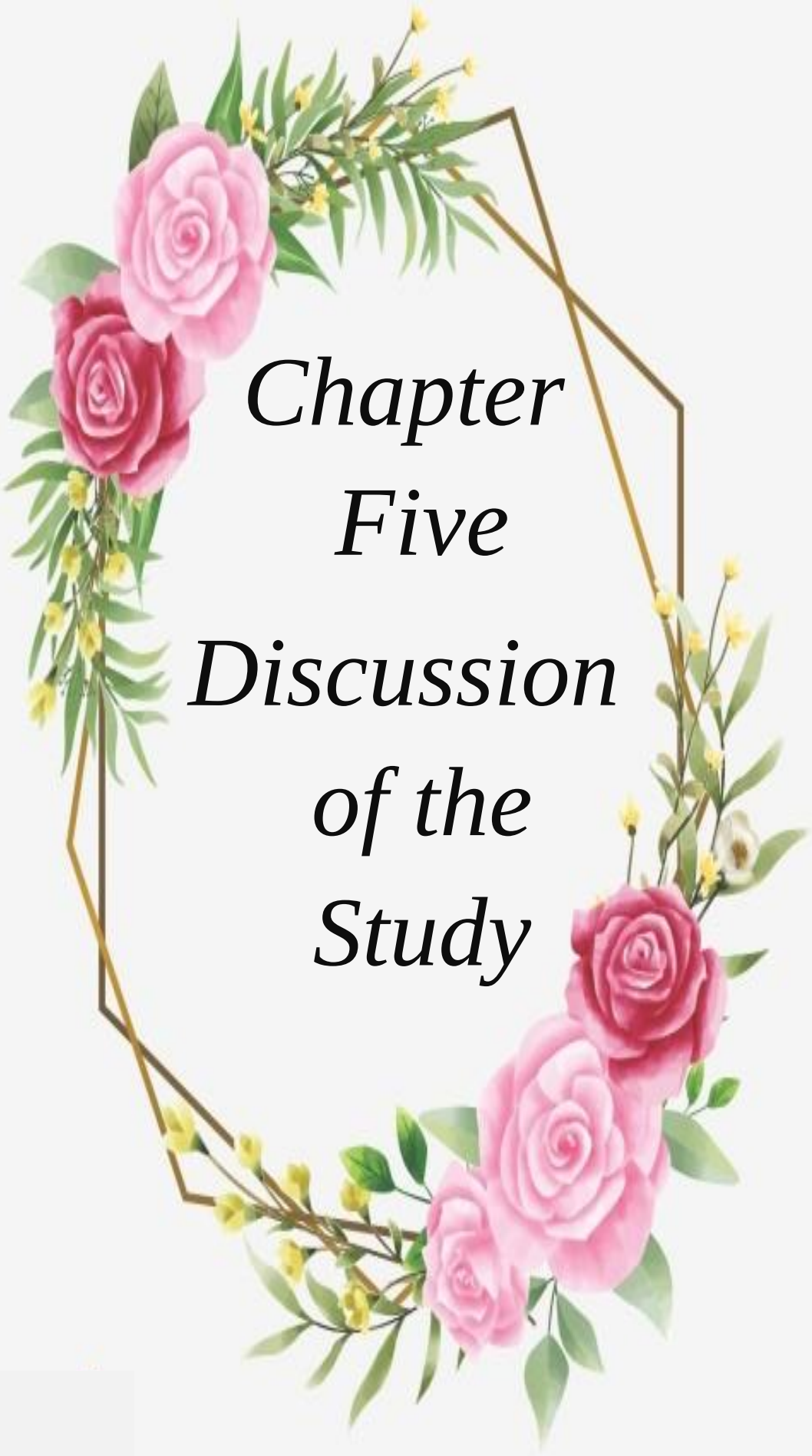
Table (11): Association between the nurses' knowledge and their number of training courses

Number of Training Courses		Nurses' knowledge			Total
		I don't Know	Uncertain	I know	
None	F	51	64	455	570
	%	2.8%	3.6%	25.3%	31.7%
1 session	F	10	52	418	480
	%	0.6%	2.9%	23.2%	26.7%
2 sessions	F	31	67	382	480
	%	1.7%	3.7%	21.2%	26.7%
3 sessions	F	8	15	217	240

	%	0.4%	0.8%	12.1%	13.3%
4 sessions	**F**	3	4	23	30
	%	0.2%	0.2%	1.3%	1.7%
Total	**F**	103	202	1495	1800
	%	5.7%	11.2%	83.1%	100.0%
Chi-Square		**χ^2obs.=38.013 χ^2crit. =15.51df=8 P> 0.05 p value=0.000**			

F=Frequencies , % = Percentages, χ^2obs. = chi-square observed, χ^2crit= chi-square critical , df= degree of freedom, p = probability value, P< 0.01=High-significant.

The table (10)indicates that there is a high significant relationship between nurses' knowledge regarding management of medical waste and their number of training courses at (P< 0.01), when analyzed by chi-square test.



Chapter Five

Discussion of the Study

Discussion of the Study Results

This chapter presents a systematically organized observation and reasonably derived discussion from the results, with the support of the available literature and related studies.

Part(1): Discussion of Demographic Characteristics of the Sample (table2):-

According to the data analysis, the findings of the study indicated that more than one-quarter of age group in the study sample were within (≥ 50years) it presented 19(31.7%).This result does not agrees with a study conducted by(Ameen & Abdullah, 2017),dependent A study to assess the knowledge and attitude of nursing staffs about medical waste management in primary health care centres in Erbil city, Iraq., who found that the majority of the nursing staffs (51.7%) were in the age group (40-49 years).

Regarding gender majority of sample in our study were male(73.3%) , this result agree with a study conducted by(Maina, Andrew & Caroline, 2016),Assessment of Level of Knowledge in Medical Waste Management in Selected Hospitals in Kenya., who founds the majority of his sample(55.7%) were male.

Relative to level of education the results show that more half of nurses have diploma in nursing35(58.3%), this result agree with a study conducted by (Sarkees, 2018),assessment of nurses' knowledge about health care waste management in Duhokcity.,who found (53, 41.1%) of sample were having diploma.

In addition , majority of nurses in our study have years of experience (> 16 years) which form (48.3%) , this result close to a study conducted by (Ameen & Abdullah, 2017),dependent A study to assess the knowledge and attitude of nursing staffs about medical waste management in primary health care centres in Erbil city, Iraq, who found that majority of sample was having experience between (20-29 years) which form (51.67%).

The subject of participant in training sessions appear that two-third of them were have training sessions (68.3%)and most them were participant in one and two sessions (26.7%) .This result agree with study conducted by (Uddin, Islam &Yesmin, 2014),Knowledge on Hospital Waste Management amongSenior Staff Nurses Working in a Selected Medical College Hospital of Bangladesh. ,who found (61.6%) had trained on hospital waste management .

Finallyconcerning work place more than one-third of participants were working in the dressing, as their percentage reached (36.7%).This result does not agree with study conducted by (Ameen & Abdullah, 2017),dependent A study to assess the knowledge and attitude of nursing staffs about medical waste management in primary health care centres in Erbil city, Iraq, who found thatmajority (33.3%) of the nurses was working in minor surgery units.

Part (2) Discussion the Overall assessment of nurses' knowledge regarding management of medical waste-:

According to the data analysis the findings in table (4) assessment of the nurses knowledge toward management of medical waste shows majority of participants have a good level of nurses' knowledge (95%). This result agrees witha study conducted by (Sarkees, 2018),assessment of nurses' knowledge about health care waste management in Duhok city. ,who found that two thirds of nurses show high level of knowledge (69.0%) regarding management of health care waste.

Part 3: Discussion association between dependent variable (nurses' knowledge) and independent variables (Age ;gender; level of education; years of experience;Participant in Training Sessions; Number of Training Sessions; work place):-

Results of the study have shown that there was a high significant relationship between nurses' knowledge regarding management of medical waste and their age at ($P< 0.01$), this result agrees with a study conducted by(Sarkees, 2018),assessment of nurses' knowledge about health care waste management in Duhok city. ,who found that there highly significant positive relationship between such knowledge with nurses' years of age (0.01).

The data analysis shows that there was a highly significant relationship between nurses' knowledge regarding management of medical waste and their gender at (P<0.01), this result agrees with a study conducted by (Dash, Das, &Satapathy, 2021), Assessment of Knowledge, Attitude, and Practices about Biomedical Waste Management among Nursing Professionals in a Tertiary Care Hospital, Bhubaneswar, Odisha. ,who found that Knowledge was relatively better among female nursing personnel.

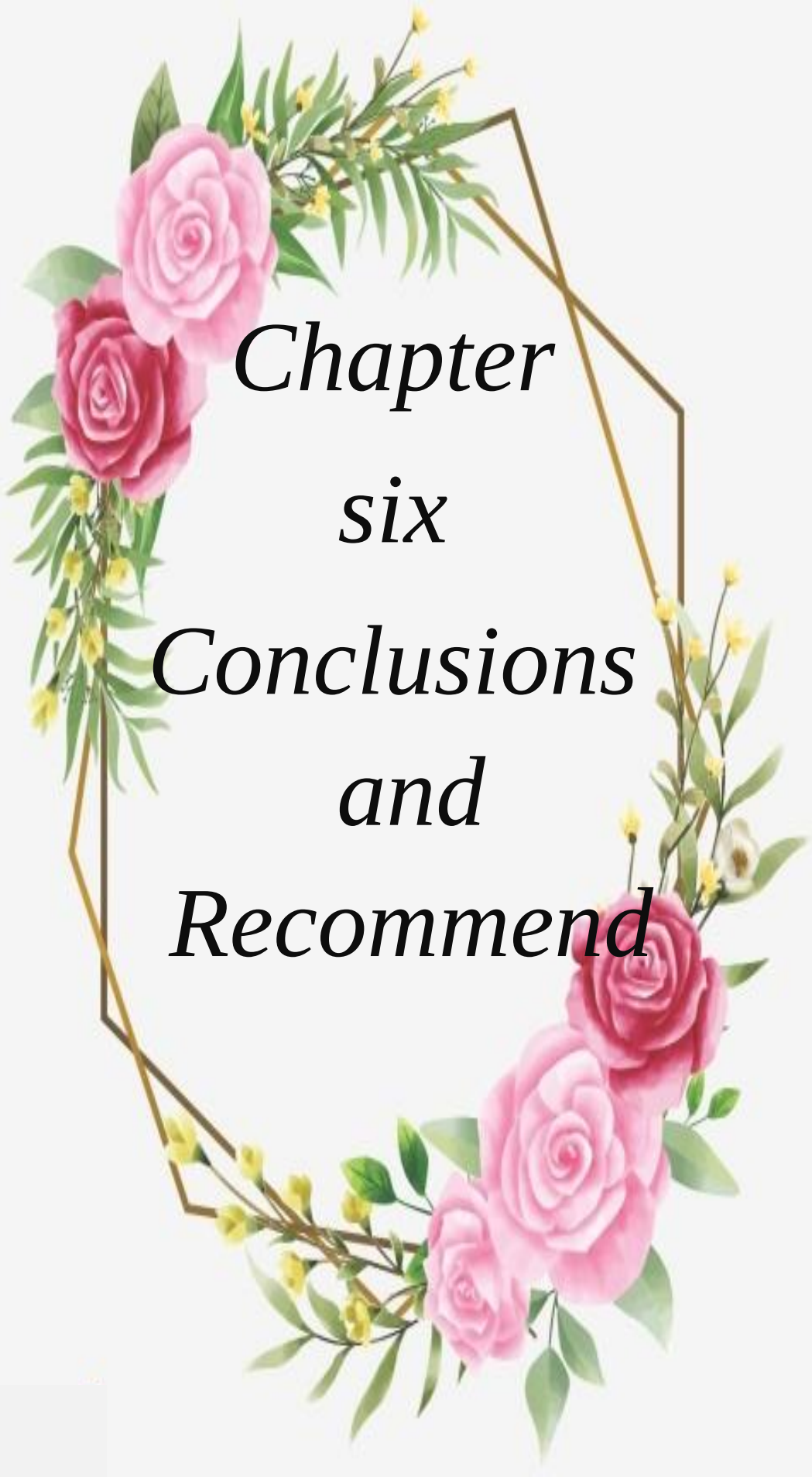
In concerning to workplace was a high significant association between nurses' knowledge concerning management of medical waste and their work place at (P< 0.01), This result does not agrees with a study conducted by (Sarkees, 2018),assessment of nurses' knowledge about health care waste management in Duhok city. ,who found that there a highly significant negative relationship between nurses' knowledge towards healthcare waste management and their place of working.

While in regarding to level of education that there was a non-significant relationship between nurses' knowledge toward management of medical waste and their educational level at (P> 0.05), this result agrees with a study conducted by(Calikoglu& Aras, 2019),Nurses' Knowledge of Hospital Medical Waste Management:Areas to Improve ,who found that There wereno statistically significant differences (p>0.05) between medical waste knowledge and educational status.

In regarding years of experience the findings of the study show there was a non-significant relationship between years of experience and their nurses' knowledge related to management of medical waste at (P>0.05),This result agrees with a study conducted by (Maina, Andrew & Caroline, 2016), Assessment of Level of Knowledge in Medical Waste Management in Selected Hospitals in Kenya, who found that there was no statistical difference among the various years of job experiences.

In concerning Sharing in training session the study show that there is a high significant relationship between nurses' knowledge regarding management of medical waste and their training session at (P<0.05), this result agrees with a study conducted by(Kumar, Gorar, Ahmed, Ali, Chandio, Magan, &Somrongthong, 2013), Assessment of health care waste management practices and knowledge among health care workers working at tertiary care setting of Pakistan, who found that Knowledge was more in those cadres who were trained during different trainings conducted by the hospital administration.

Finally, in concerning number of training courses the study show there is a high significant relationship between nurses' knowledge regarding management of medical wasteand their number of training courses at (P< 0.01),and this reasonable if we know that these courses provide information on the latest developments in medical waste management, and develop awareness of the health, safety and environment issues relating to the healthcare waste management, and how these can affect nurses in their daily work.



Chapter six Conclusions and Recommend

Conclusions and Recommendations

6.1. Conclusions

Here are the conclusions of the present study:

1-The study show that The majority of sample have good knowledge, while the rest of the sample had a Fair knowledge and there was not poor knowledge regarding management of medical waste.

2-The findings which demonstrate that Sharing in training session and number of training courses, can be effect on the knowledge of nurses about management of medical waste.

3-In regarding to associations between level of knowledge and the demographic characteristics the result shows there is no significant relationship between educational level, years of experience and knowledge of nurses but there are high significant between age, gender, work place, Sharing in training session, their number of training courses and level of knowledge towards management of medical waste.

6.2. Recommendations

Based on the conclusions, the present study recommends the following:

1-The primary health care centers should develop clear plans and policies for proper management of primary health care center waste.

2-The healthcare institutions should establish periodic workshops, training and education programs for nurses aimed to develop high knowledge related to management of healthcare waste.

3-Allocate sufficient financial and manpower resources for the implementation of HCWM plan.

4-There should be close monitoring and supervision to ensure the application of safety regulations in waste handling and to develop effective implementation of HCWM in primary health care center.

5-Motivating the staff nurses through the application of specific rewards schemes for safe waste management practices.

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Appendix A

Administrative Arrangements

Republic of Iraq
Ministry Of Higher Education&
Scientific Research
Misan University
College of Nursing
Scientific Affairs

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
جامعة ميسان
كلية التمريض
الشؤون العلمية

NO: العدد: ش ت/ ١٥٤

Date: التاريخ: ١٤/ ٢/ ٢٠٢١

إلى/المراكز الصحية في ميسان

م/ تسهيل مهمة

تحية طيبة ...

يرجى تسهيل مهمة طلبة كليتنا المدرجة أسمائهم أدناه وذلك لإكمال متطلبات بحث التخرج الخاص بهم .

١-مريم قاسم منشد .
٢-نورا صباح حسون .
٣-ماجد حمدان عبد .

.... مع التقدير...

أ.م.د رشيد رحيم حتيتة
عميد الكلية
٢٠٢١/٢/

صورة منه إلى//

- مكتب السيد عميد كلية التمريض... مع التقدير .
- مكتب السيد معاون العميد للشؤون العلمية/... مع التقدير.
- شعبة الشؤون العلمية .
- الصادرة .

Republic of iraq
Ministry of Health
Misan Health Directorate
Training & Human Development Center
Research and knowledge division

جمهورية العراق
وزارة الصحة
دائرة صحة ميسان
مركز التدريب والتنمية البشرية
شعبة البحوث وإدارة المعرفة

No :
Date :

العدد : ١٦٤
التاريخ : ٢٤/ ٥ /٢٠٢١

الى / م.صحي العروبة/م.صحي دجلة النموذجي/

م.صحي شهيد الوطن/م.صحي الامام الحسين ع

م/ تسهيل مهمة

يهديكم مركزنا اطيب التحيات ...

استنادا الى كتاب جامعة ميسان /كلية التمريض/الشؤون العلمية المرقم ١٥٤ في ٢٠٢١/٢/١٤

يرجى تسهيل مهمة الطلبة المدرجة اسمائهم فيما يأتي لغرض حصولهم على المعلومات الخاصة ببحث تخرجهم الموسوم ب (تقييم معارف الممرضين تجاه النفايات الطبية) .

اسم الطالب:

١.ماجد حمدان عبد

٢.نورا صباح حسون

٣.مريم قاسم منشد

وفق الضوابط واصوليا .مـــــع التقديـــــر

الدكتورة الصيدلانية
أنعام صدام لفته
ك/مدير المركز
٢٠٢١/٥/٢٤

نسخة منه الى:
_قطاع العمارة الاول/للتفضل بالاطلاع مع التقدير.
_شعبة ادارة البحوث والمعرفة / للحفظ .

Appendix B questionnaire

Research questionnaire for the fourth stage graduation, Faculty of Nursing, University of Maysan, 2020-2021

Evaluation of Nurses knowledge Toward Medical Waste Products Management at Primary Health Care Centers in Alamara City

1-age ☐ **years**

2- Gender : **Male** ☐ **female** ☐

3- Educational level :

a-nursing school ☐ **b-High school** ☐

c-Diploma ☐ **d-Bachelor** ☐

4- years of Experience : ☐

5-Have you participated in training courses in the field of giving medical waste management? :-

Yes ☐

No ☐

6- If the answer is :yes

How many courses? One course ☐ **two courses** ☐

three courses ☐ **four courses** ☐

7-Work place:

Vaccines ☐ **Maternal and child care** ☐ **Dressing** ☐ **Health school** ☐

Family planning ☐ **Surgical ward mini** ☐ **Care health dental** ☐

Nurses knowledge Toward Medical Waste Products Management

no	Items	type of answer		
		I know	Unsure	I do not Know
1	Isolates medical waste from other wastes.			
2	Infectious waste is isolated from other medical wastes.			
3	Acute waste is separated from other wastes in primary health-care centers.			
4	Toxic medical waste is classified by its toxicity.			
5	Acute infectious medical waste is classified as a section and is a very dangerous waste.			
6	Medical waste is collected from medical units as a daily base			
7	Medical waste is collected in the section separate from other wastes.			
8	Acute infectious waste is disinfected inside the department and transported to storage sites.			
9	Waste collection stores are available for primary health care centers.			
10	Colors for contaminated waste containers are used to distinguish between waste by marking.			
11	Use of bags for each type of waste taking into account the size of the container with the volume of waste.			
12	There are two containers in each section of the center, one			

	with a red bag for medical waste and the other with a black bag of waste for food residues, paper or bottles and plastic cans.			
13	**Waste bags are transported in small vehicles to the place where they are collected.**			
14	**Use small plastic preservers or containers with a hazardous biological waste signal to collect needle residues and injections immediately after use and not to throw them completely with garbage bags.**			
15	**Do not collect waste by workers and put it in the corridors in front of passers-by or visitors until it is transported outside the health center.**			
16	**Waste is not stored in open areas prone to rain, animals, birds, insects and rodents carrying diseases.**			
17	**It is preferable to store waste in closed places with adequate ventilation.**			
18	**There are enough wheeled containers to transport medical waste inside the primary health care center.**			
19	**Having a water source to clean the floor and drain properly.**			
20	**Keep temporary waste collection centers away from food stores, restaurant and kitchen.**			
21	**Immunize all medical waste workers against hepatitis B, tetanus, tuberculosis and any other infectious diseases that may be widespread or suspected to exist.**			

22	Wear gloves and protective coats for medical waste transport workers in case of any needle prick or leakage of some contaminated liquids.			
23	There is a fixed time to transport garbage from the health facility, at least once a day.			
24	Collect black bags for regular garbage at a different time than when to collect red bags for medical waste so that they are not confused.			
25	Garbage bags are not filled with more than three quarters of the bag so that they are easy to close and handle so as not to rupture due to full fullness.			
26	Heavy water discharge in health centers depends on the sewage system			
27	The presence of a medical waste official in health centers and whether they have been trained.			
28	Primary health care centers dispose of waste at the health exploration site.			
29	Health care centers have a incinerator for the disposal of medical waste.			
30	Primary health care centers are developing a plan for the management of medical waste.			

استمارة استبيان حول معارف الممرضين تجاه أدارة النفايات الطبية في مراكز الرعاية الصحية الأولية في مدينة العمارة.

المحور الأول:-الصفات الشخصية

1.العمر:- **سنة**

2.الجنس:-

ذكر ☐ **أنثى** ☐

3. التحصيل العلمي :-

أ- مدرسة تمريض ☐ ب-أعداديه تمريض ☐

ت-معهد تمريض ☐ ث- كلية تمريض ☐

4.عدد سنوات الخدمة في مجال العمل : ☐

5.هل شاركت في دورات تدريبيه في مجال إعطاء أدارة النفايات الطبية ؟ :-

نعم ☐

كلا ☐

6.أذا كان الجواب : نعم

فكم هي عدد الدورات ؟ دورة واحدة ☐ **دورتين** ☐ **ثلاث دورات** ☐ **أربع فأكثر** ☐

7.مكان العمل:

اللقاحات ☐ رعاية الأم والطفل ☐ الضماد ☐

خدمات الصحة المدرسية ☐ العمليات الصغرى ☐ رعاية صحة الأسنان ☐

التخطيط العائلي ☐

المحور الثاني: معارف الممرضين تجاه أدارة النفايات الطبية

ت	الفقرات	نوع الإجابة		
		لا اعرف	غير متأكد	اعرف
1	تعزل النفايات الطبية عن النفايات الأخرى			
2	النفايات المعدية تعزل عن النفايات الطبية الأخرى.			
3	يتم فصل النفايات الحادة من النفايات الأخرى في مراكز الرعاية الصحية الأولية.			
4	تصنف النفايات الطبية السامة حسب سميتها.			
5	النفايات الطبية المعدية الحادة تصنف ضمن قسم كما أن تكون نفاية خطرة جدا.			
6	النفايات الطبية تجمع من الوحدات الطبية كقاعدة يوميا.			
7	يتم جمع النفايات الطبية في القسم منفصلة عن النفايات الأخرى			
8	النفايات المعدية الحادة تطهر داخل القسم وتنقل الى مواقع الخزن .			
9	تتوفر مخازن جمع النفايات لمراكز الرعاية الصحية الأولية .			
10	يتم استخدام الألوان لحاويات النفايات الملوثة للتمييز بين النفايات بوضع علامات مميزة .			
11	استخدام الأكياس المخصصة لكل نوع من المخلفات مع الأخذ بنظر الاعتبار حجم الحاوية مع حجم النفايات .			
12	وجود حاويتان في كل قسم من أقسام المركز احدها بكيس احمر خاص بالنفايات الطبية والأخرى بكيس اسود لنفايات لبقايا الغذاء أو الورق أو القارورات والعلب البلاستيكية.			
13	تنقل أكياس النفايات بعربات صغيرة الى مكان جمعها .			

14	استعمال حافظات أو حاويات صغيرة من البلاستيك الصلد عليها أشارة المخلفات البيولوجية الخطرة لجمع بقايا الإبر والحقن بعد استخدامها مباشرة وعدم رميها نهائيا بأكياس القمامة .			
15	عدم تجميع النفايات من قبل العاملين ووضعها في الممرات أمام المارة أو الزوار لحين نقلها خارج المركز الصحي .			
16	عدم تخزين النفايات في مساحات مفتوحة معرضة للإمطار والحيوانات والطيور والحشرات والقوارض الناقلة للإمراض .			
17	يفضل خزن النفايات في أماكن مغلقة مع جود تهوية ملائمة .			
18	وجود عدد كافي من الحاويات ذات العجلات لنقل النفايات الطبية داخل مركز الرعاية الصحية الأولية.			
19	وجود مصدر للمياه لتنظيف الأرضية وتصريف مناسب لها.			
20	إبعاد مراكز تجميع النفايات المؤقتة عن مخازن الأغذية و المطعم والمطبخ.			
21	تحصين جميع العاملين في تداول النفايات الطبية ضد التهاب الكبد الوبائي (ب) والكزاز والسل وأية أمراض معدية أخرى قد تكون منتشرة أو يشتبه بوجودها.			
22	ارتداء القفازات والمعاطف الواقية للعاملين المكلفين بنقل النفايات الطبية تحسبًا لأي وخز بالإبر أو تسرب بعض السوائل الملوثة.			
23	وجود وقت ثابت لنقل القمامة من المرفق الصحي،على الأقل مرة واحدة يوميا.			
24	جمع الأكياس السوداء للقمامة العادية في وقت يختلف عن وقت جمع الأكياس الحمراء			

	للمخلفات الطبية حتى لا يحدث خلط بينهم			
25	يراعى عدم امتلاء أكياس القمامة أكثر من ثلاثة أرباع الكيس حتى يسهل إغلاقه أو التعامل معها وحتى لا تتمزق بسبب الامتلاء الكامل.			
26	يعتمد تصريف المياه الثقيلة في المراكز الصحية الى شبكة الصرف الصحي			
27	وجود مسؤول عن النفايات الطبية في المراكز الصحية وهل تم تدريبهم.			
28	تتخلص مراكز الرعاية الصحية الأولية من النفايات بموقع التنقيب الصحي .			
29	مراكز الرعاية الصحية لديه محرقة للتخلص من النفايات الطبية .			
30	مراكز الرعاية الصحية الأولية تضع خطة لإدارة النفايات الطبية .			

Appendix C

Expert's Panel

قائمة خبراء تحكيم الاستبانة

ت	اسم الخبير	الشهادة والاختصاص	المرتبة العلمية	سنوات الخبرة	مكان العمل
1	حيدر كريم عبود	دكتوراه طب باطني ووقائي بيطري	أستاذ مساعد	13 سنوات	جامعة ميسان /كلية التمريض
2	غزوان عبد الحسين	دكتوراه تمريض صحة مجتمع	مدرس دكتور	17 سنة	جامعة ميسان /كلية التمريض
3	حيدر علي حسين	دكتورا تمريض بالغين	ممرض جامعي اختصاص	10سنوات	معهد المهن الصحية العالي/ ميسان
4	عقيل عزيز عرار	دكتوراه تمريض بالغين	مدرس مساعد	14سنوات	جامعة ميسان /كلية التمريض
5	عباس جلوب مريسل	دكتوراه	أستاذ مساعد	20 سنة	جامعة ميسان /كلية التمريض

الخلاصة

هدف الدراسة:

الدراسة الحالية هي تقييم معرفة الممرضين تجاه أدارة النفايات في المراكز الصحية الأولية في مدينة العمارة.

المواد والطرق:

أجريت دراسة وصفية على الممرضين في مراكز الرعاية الصحية الأولية في مدينة العمارة. خلال الفترة من 29 كانون الأول 2020 إلى 30 حزيران 2021 تم جمع عينة غرضيه غير احتمالية قوامها (60) ممرضة من مركز العروبة للرعاية الصحية (20) ممرضة و (17) ممرضة من مركز دجلة للرعاية الصحية و (12) ممرضة من مركز الإمام الحسين للرعاية الصحية ، (11) ممرضًا من مركز شهيد الوطن للرعاية الصحية الأولية ، من خلال مراجعة شاملة للأدبيات ذات الصلة ، تم إنشاء استبيان من قبل الباحثين لغرض الدراسة. وتتكون من جزأين: الجزء الأول (7) عناصر التي تتعلق بالخصائص الديموغرافية للممرضين والجزء الثاني يتكون من (30) فقرة تختص بمعرفة الممرضات تجاه إدارة النفايات الطبية.

النتائج:

أظهرت الدراسة أن (95٪) من العينة يتمتعون بمستوى جيد من المعرفة،في حين أن (5٪) من العينة يتمتعون بمستوى معقول من المعرفة حول إدارة النفايات الطبية وأيضًا النتائج التي تثبت انخفاض عدد الدورات التدريبية التي يمكن أن يكون لها تأثير سلبي على معرفة الممرضين حول إدارة النفايات الطبية.

كانت هنا كعلاقة ذات دلالة إحصائية بين العمر والجنس ومكان العمل والمشاركة في الدورات التدريبية ومعرفة الممرضات حول إدارة النفايات الطبية.

الاستنتاجات والتوصيات:

تظهر نتائج الدراسة الحالية أن غالبية أفراد العينة لديهم معرفة جيدة، في حين أن باقي أفراد العينة لديهم معرفة مقبولة، ودلالة عالية بين العمر والجنس ومكان العمل والمشاركة في الدورة التدريبية وعدد الدورات التدريبية. ومستوى المعرفة تجاه إدارة النفايات الطبية.

توصي الدراسة بضرورة قيام مراكز الرعاية الصحية الأولية بوضع خطط وسياسات واضحة للإدارة السليمة لمخلفات مراكز الرعاية الصحية الأولية وإنشاء ورش عمل دورية وبرامج تدريبية وتعليمية للممرضين بهدف تنمية المعرفة العالية المتعلقة بإدارة نفايات الرعاية الصحية.

وزارة التعليم العالي والبحث العلمي

جامعة ميسان/كلية التمريض

تقييم معارف الممرضين تجاه أدارة النفايات في المراكز الصحية الأولية في مدينة العمارة

مشروع تخرج مقدم

من قبل

مريم قاسم منشد

نورا صباح حسون

ماجد حمدان عبد علي

الى

كلية التمريض – جامعة ميسان كجزء من متطلبات نيل شهادة البكلوريس في علوم التمريض

إشراف

م. سعد صبري شامخ

م. أسامة ناصر والي

ذو القعدة 1442 **تموز2021**