COLLEGE OF DEVELOPMENT STUDIES

CENTER FOR ENVIRONMENT AND SUSTAINABLE DEVELOPMENT

EFFECT OF MONITORING AND EVALUATION ON SUASTAINABLE PHARMACEUTICAL WASTE MANAGEMENT: THE CASE OF PHARMACEUTICAL SUPPLY AGENCY IN ETHIOPIA

BY

KUMA WORDOFA

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE MASTER OF ART IN ENVIROMENT AND SUSAINBLE DEVELOPMENT

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DECLARATION

This thesis is my original work and has not been presented for the MA/MSc degree in any other University and that all the sources and materials used for the thesis have been properly acknowledged.

Declared By: Kuma Wordofa

Signature: _____

Date: _____

This is to certify that the above declaration made by the candidate is correct to the best of my knowledge as an advisor.

Dr. Dawit Diriba _____

(Advisor) Signature Date

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This is to certify that this thesis prepared by Kuma Wordofa Robi, entitled: **Effect of Monitoring and Evaluation on Sustainable Pharmaceutical Waste Management in Ethiopia: Case study in Ethiopian Pharmaceutical Supply Agency,** and submitted in partial fulfillment of the requirements for the Degree of Master of Art in Environment and Sustainable Development complies with the regulations of Addis Ababa University and meets the accepted standards with respect to originality and quality.

Signed by the examining committee:

External Examiner: _____ Signature _____ Date _____

Internal Examiner: _____ Signature _____ Date _____

Advisor: _____ Signature _____ Date_____

Chairman of the Center _____ Signature_____ Date_____

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BPR	Business Process Reengineering
CARE	Cooperative for Assistance and Relief Everywhere
COVID-19	Coronavirus Disease 2019
ECPE	Ethiopian Country Program Evaluation
EPSA	Ethiopian Pharmaceutical Supply Agency
FDRE	Federal Democratic Republic of Ethiopia
FMoH	Federal Ministry of Health
FMHACA	Food, Medicines and Health Care Administration and Control Authority
GTP II	Growth and Transformation Plan Two
IFRC	International Federation of Red Cross and Red Crescent Societies
MoFED	Ministry of Finance and Economic Development
M&E	Monitoring and Evaluation
NGOs	Non-Governmental Organizations
NPC	National Planning Commission
PWM	Pharmaceutical Waste Management
PSTP	Pharmaceutical Supply Transformation Plan
SDGs	Sustainable Development Goals
SPSS	Statistical Package for Social Science
ToC	Theory of Change
UK	United Kingdom
UNEP	United Nations Environment Program
UNDP	United Nations Development Program
UNFPA	United Nations Population Fund
WHO	World Health Organization

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ABSTRACT

The poor disposal of wastes leads to serious personal and environmental health hazards. Preventing these wastes from being generated and improving the environment through preferable healthful options needs: the importance of monitoring and evaluation during an implementation. When the performance of monitoring and evaluation is carried out correctly and at the right time and place, it ensures the success of sustainable pharmaceutical waste management (PWM). But in the Ethiopian Pharmaceutical Supply Agency (EPSA), attempts do not undertake on the focus of monitoring and evaluation effects on sustaining development of waste management. The purpose of this study is to evaluate the effects of monitoring and evaluation (monitoring and evaluation) implementation on enhancing pharmaceutical waste management in EPSA.

This study used both quantitative and qualitative research methods. Purposive sampling procedure used to select five branches EPSA out of nineteen. The study used stratified sampling and simple random sampling technique to select the sample frame of 384 professional staffs that use the monitoring and evaluation system for designing, planning, and implementing pharmaceutical supply chain in EPSA's from which 161 samples selected for data collection using the self-administered questionnaire. Quantitative data were analyzed using descriptive statistics, whereas qualitative data were analyzed using content analysis.

The finding showed that variable such as decision-making, use of a legal and regulatory framework, access to monitoring and evaluation training and data quality has a significant effect on the performance of PWM in EPSA. The study recommends that EPSA should implement an efficient and effective monitoring and evaluation system based on the purpose of the PWM. EPSA Management should be committed and provide high emphasis in designing and implementing of monitoring and evaluation related to PWM. The finding of this study will be significant to the organization, to the stakeholders, researchers, Government Public Sectors, Ministry of Health and Environment Protection Authority.

Key words: Sustainable Pharmaceutical Waste Management, Monitoring and Evaluation, Challenge and Practice, Knowledge and Perception.

CHAPTER ONE

Introduction

1.1 Background of the study

Hazardous pharmaceutical wastes harm humans and the environment. Pharmaceutical wastes contain drugs that are expired, damaged or no longer needed for use. Thus, it is necessary to reduce the risks that may arise for human health and protect the environment by managing the pharmaceutical wastes that are the results of the activities of health institutions Mohmad et al. (2019)

WHO (1999), pharmaceutical wastes management are activities that to be done without harming people and the environment, which includes technical, administrative, and legal processes during the removal, collection, temporary storage, recycling, transportation, and disposal. Improper management of waste makes the air, water and land a waste disposal of sinks in most of the developing countries. When pharmaceutical is wasted, it leads to contamination of the environment if they are not properly managed or discarded. Thus, tracking key problems through monitoring and evaluation performance is used for making corrective and right decisions for sustainable waste management. Monitoring and evaluation is the systematic setting into motion a series of managerial actions for the purpose of determining the realization of set objectives and goals.

UNDP (2012) has pointed that the goal of monitoring and evaluation is to improve current and future management of outputs, outcomes, and impacts. The aim of monitoring and evaluation is to provide timely assessments of the relevance, efficiency, effectiveness, impact and sustainability of interventions and overall progress against original objectives.

Medicines Waste Management and Disposal System Report on Progresses and Achievements in Ethiopia (2012) stated there was a huge accumulation of medicines waste because of the absence of good pharmaceutical management practices and the shortage of appropriate disposal. The continued accumulation of medicines waste may create administrative burdens and can be a threat to the environment and the health of the public. Dangerous disposal methods that could be detrimental to the environment and the health of the public exist due to inefficient monitoring and evaluation. Generally, monitoring and evaluation has developed a progressively significant

instrument within the universal determinations in accomplishing ecological, economic and social sustainability.

The EPSA is a public organization that was established to operate pharmaceutical procurement and distribution systems; establish a modern storage management system; supply essential pharmaceuticals of quality, safety, and efficacy in Ethiopia. EPSA (2017) stated that one of the major milestones identified is to reduce the wastage rate from 3.5% to less than 2% in the pharmaceutical supply chain.

Therefore, the study focuses on selected branches and head office to track performance processes and waste management initiative. This can examine effects of monitoring and evaluation on sustainability of waste management in EPSA based on contribution of management action, challenge and practice system and knowledge status and perception of employees in keeping implementation structure strategies.

1.2 Statement of the problem

The poor management of waste has increasingly continued to generate. The wastes must be managed and handled in a way that is friendly to the environment. When the impacts of wastes in the environment are not monitored and evaluated in a scheduled manner, and no effective decision is made, it leads to environmental degradation.

The World Bank (2011) described that in the absence of effective monitoring and evaluation, it would be difficult to know whether the intended results are being achieved as planned, what corrective action may be needed to ensure delivery of the intended results, and whether initiatives are making positive contributions towards sustainable development.

PSTP (2015/16-2019/20) stated that the average wastage rate of pharmaceuticals at the EPSA level (both at central and branch warehouses) estimates the average wastage rate above 2% which is larger than standard. If they are not properly managed, these pharmaceutical wastes are contaminating the water, air and all environments.

Vipula (2016) described that improper disposal of pharmaceutical waste leads to serious personal and environmental health hazards. But there were no established PWM programs in most of the developing countries. This indicates the proper PWM is such a difficult new leading edge in environmental management for healthcare institutions.

Asnake (2018) identified that PWM is not the only problem of health facilities, but it is a crucial problem in EPSA, and since health facilities are re-supplied by EPSA, problems related to PWM in EPSA are correlated with the health facilities.

Hailu et al. (2012) described that wastes should be managed and disposed of by who generated them. Any institution managing and using pharmaceuticals should be responsible for disposing of medicines in a way that is safe for the public and the environment. The studies indicate there is a huge accumulation of pharmaceutical waste in Ethiopia. However, adequate, and reliable information with regard to the volume and type of medicines waste accumulated has to be made available to make informed decisions on subsequent interventions for sustainable management.

Okello et al. (2015) also observed that the majority (58%) of monitoring and evaluation practitioners was not regularly involved in conducting monitoring and evaluation in their respective organizations. The devolved structures BPR of (EPSA, 2017) stated devolution with respect to the development policies, programs and projects in the organization have brought to light the need for a comprehensive monitoring and evaluation framework. However, most devolved systems have been found not to have the monitoring and evaluation systems in place. Due to this high number of stalled projects, experiences of cost overruns and weak PWM. Ethiopian Country Program Evaluation (ECPE, 2010) stated that most of the government organizations in Ethiopia do not use the monitoring and evaluation system in the appropriate way for their projects.

Studies on the effect of monitoring and evaluation performance on enhancing pharmaceutical waste management in Ethiopia and elsewhere are quite limited. However, there is literature on various aspects, components and dimensions of monitoring and evaluation systems and waste management challenges and practices. Some studies have been done on monitoring and evaluation in the Ethiopian based on what (Samuel, 2018) did on the role of monitoring and evaluation at Performance of Public Organization Projects in Ethiopia: A Case of Ethiopian Public Health Institution. Mikias (2017) conducted a study on Challenges of monitoring and evaluation of Development Programs: A Case Study of UNFPA Ethiopia. Asnat (2018) also examined an Assessment of Practice and Challenges of monitoring and evaluation: Case of Local NGOs Executing Health Projects.

Many of these previous studies do not focus on the monitoring and evaluation effects to change poor pharmaceutical waste management. However, this study analyzed factors which account for the successes and challenges encountered in the implementation of the monitoring and evaluation system when harmonizing it with pharmaceutical waste management. Thus, this study investigated the monitoring and evaluation effect in sustainable pharmaceutical waste management (PWM) in the EPSA of Ethiopia.

1.3 Objectives of the study

1.3.1 General objective

The general objective of this study is to examine effects of monitoring and evaluation performance on sustainable pharmaceutical waste management in the Pharmaceutical Supply Agency of Ethiopia.

1.3.2 Specific objective

1. To access challenges and practice of monitoring and evaluation effect of pharmaceutical waste management in the study area.
2. To assess the contribution of sustainable monitoring and evaluation to improve pharmaceutical waste management (PWM) in EPSA.
3. Identify the knowledge and perception of employees on the monitoring and evaluation system to strengthen sustainable PWM at EPSA.

1.4 Research questions

The study attempt to answers the following research questions:

1. What are influences of monitoring and evaluation implementation in pharmaceutical waste management in EPSA?
2. What are the contributions of sustainable monitoring and evaluation in sustainable pharmaceutical waste management?
3. How are the knowledge and perceptions of the employees regarding monitoring and evaluation affecting waste management improvement?
4. What are the outcomes of using monitoring and evaluation in the system pharmaceutical waste management?

1.5 Scope of the study

The focus of this study is monitoring and evaluation effect on sustaining pharmaceutical waste management in the Ethiopian under FMoH in EPSA at selected five branches and head office. The study assessed the monitoring and evaluation effect and its contribution to PWM at EPSA framework during the Ethiopian GTP II (2015/16-2019/20) years.

The study was limited to the pharmaceutical waste management in EPSA. It does not include other health facilities. This study also does not incorporate or consider technical wastes management, such as incineration operation and so on. Hence, this study focused on pharmaceutical waste system management only in five branches and the head office of EPSA. The geographical scope of the study was delimited to Adama, Hawasa and Nekemte town and Addis Ababa City in Ethiopia where the expected branches exist.

1.6 Limitation of the study

The main challenge during this research work was the problem faced in scheduling interviews with some respondents who were busy, and several reschedule was made due to shiftwork by staffs and work from home strategy to fight COVID-19. In some cases, respondents are also afraid to fill questionnaires due to transmission of the corona virus. The research was further limited by geographical dispersal location of EPSA branches and financial resource.

Some respondents were also unavailable, and others did not have enough time to give the required information due to their busy schedule which delayed effective data collection and findings. However, the researcher addressed this problem by making a follow-up to allow them to respond at their most convenient time.

Despite the limitation, the researcher committed and took time and attempts to collect all the necessary information. Thus, an acceptable level of data and information was collected, analyzed, and tested which show that the finding of the study is reliable. Thus, since the sample size and response rate are sufficient, and the research uses creditable primary data sources, the findings are consistent.

1.7 Significance of the study

The findings of the study contribute to address the gap and help EPSA staff, directors, and managers with a better understanding of the monitoring and evaluation effect on sustainable PWM. The study helps the management for decision-making and enhances sustainable PWM to meet social corporate responsibility of the socio-economic and environmental sustainability.

Since no policy guideline for government organization on how to implement monitoring and evaluation when and where necessary in Ethiopia available, the study will contribute to be important to policymakers during formulation and indicate areas of improvement to public organizations and stakeholders.

Conducting a study on pharmaceutical waste management has importance in terms of creating a clean, safe, and healthy environment and to improve long-run socio-economic activity. The finding of the study adds value to the small existing body of literature and is also beneficial to the environment and sustainable development students who will be involved for further study in the designing and implementation of monitoring and evaluation.

1.8 Organization of the thesis

This study is organized and presented in five chapters. Accordingly, the first chapter one is deliberating the introduction part which contains a background of the study, a statement of the problem, objectives of the study, research questions, and significance of study, limitation of the study, definition of terms and organization of the research paper.

The second two discusses the details of theoretical and empirical reviews on the effect of monitoring and evaluating performance of pharmaceutical waste management study. The third chapter explains information about the methodology. Chapter four talks over the data analysis and summary of findings of the study while the final chapter five presents the conclusions and recommendations reached based on the study finding.

CHAPTER TWO

Review of Related Literature

2.1 Introduction

This chapter reviews theoretical foundation of monitoring and evaluation and PWM the literature related to the study of the effect of monitoring and evaluation performance on PWM from the global, African, and Ethiopian perspective considering three theories in the subject area, namely the theory of change, sustainability theory, monitoring and evaluation theory and waste management view theory and empirical review. The researcher used review findings from the previous related studies carried out in this field and point out the knowledge gap and thereafter suggest the possible solutions for effective monitoring and evaluation performance to make the PWM sustainable in the study area.

2.1.1 Concept of sustainable waste management

Cheyne and Purdue (1995) argue that waste management is concerned not only with the final disposal of waste but with the whole cycle of waste creation, means of transport, storage, treatment, and recovery, and does so to prevent pollution and harm from pollution taking place. Therefore, waste management strategies, should include a wide range of policies, such as controls over collection, transport, and disposal and, not the last, reduction and/or elimination of waste.

Sustainable pharmaceutical waste management is described as practice or activity capable of maintaining pharmaceuticals without causing any damage to the environment as Mbeng et al. (2009).

2.2 The Sustainability theory

Sustainability theory attempts to prioritize and integrate social responses to environmental problems. Some critics have been raised against the theory claiming that the term is too widely used as Bermejo et al. (2010).

Bermejo et al. (2010) also stated the theory of the sustainability in generals concerned on the ecological aspect as something of secondary importance. The growth of rich countries is only mentioned as a possibility to be considered assuming there is a consideration on their part for the environment that they allow other countries access to vital resources, and that they assure the future availability of non-renewable resources. The theory of the sustainability triangle, by relegating ecological factors to a sphere (the environment) separate from economics, is conducive to a denial that the economy is in large part determined by ecology.

2.2.1 Monitoring and Evaluation and sustainability of PWM

As described by UNEP (2012), sustainability of PWM is a major concern in this incorporates technical suitability, environmental aspects, social acceptability, and economic feasibility. Thus, monitoring and evaluation with Sustainability Assessment of Technologies (SAT) will be important to save the environment during pharmaceutical waste management (PWM).

2.2.2 Monitoring and Evaluation, PWM and sustainable development

GTP II (2015/16 - 2019/20) stated that the government of Ethiopia is putting extra effort in accelerating progress towards the achievement of those SDGs targets that are slightly off-track like environmental sustainability. Which is reinforced through SDGs is managed by determining changes in strategic direction based on much more data-driven with the ongoing data and analyses from monitoring and evaluation processes.

Caballe et al. (2011) defined sustainable monitoring and evaluation as that which generates regular and reliable feedback to the stakeholders on the project progress that resulting in increased project efficiency, project success and minimizes wastage of resources and open ways to sustainable development. Mahdi (2017) described that waste management is a pressing issue for sustainable development, particularly in developing countries. Its urgent nature is an outcome of the increasing waste produced and the poor waste management in several developing countries. Waste is associated with negative environmental impacts, dangers to public health, social acceptability, and economic aspects.

2.2.3 Impact of pharmaceutical waste

Health impact

Unless pharmaceutical waste is properly segregated, handled, transported and disposed, it can present a risk to the health and safety of people at work, members of the public and the environment as pointed by Coker et al. (2009).

The WHO (2010) has pointed that many of the chemicals and pharmaceuticals are hazardous like toxic, corrosive, flammable, reactive, explosive, shock- sensitive substances. They may cause intoxication, either by acute or by chronic exposure and injuries, including burns. Thus, monitoring and evaluation strongly recommended work to avoid such impact.

Most medicines after expiry are less effective and a few develop different adverse drug reaction profiles. The main sources of health risks exist as a result of medicines waste or contamination of drinking water and air pollution that caused the release of toxic pollutants and endangered the environment as stated by Hailu et al. (2012).

Social and economic impact

WHO (2010) stated that pharmaceutical wastes are contaminating the drinking water, air pollution and so are caused by the release of toxic pollutants, endangered aquatic life due to non-biodegradable chemicals and reuse of expired medicines.

Trueman et al. (2010) studied that the financial burden resulting from medical waste is utterly huge. In the UK, the value of dispensing medicines which are discarded each year is about £3 billion. A survey undertaken by the Viennese Sickness Fund revealed the value of returning medicines to be €8.1 million as studied by Vogler et al. (2014).

According to the annual report of EPSA (2016), indicated in EPSA warehouse stock, there were values of pharmaceutical wastage estimated to be 69 million Ethiopian Birr.

Environmental impact

WHO (2010) describes dumping of pharmaceutical waste in uncontrolled areas can have a direct environmental effect of contaminating soils, underground waters and other natural ecosystems. These wastes include antibiotics and other drugs, heavy metals such as mercury, phenol and derivatives, and disinfectants and antiseptics.

2.2.4 Factors affecting Monitoring and Evaluation performance

Decision making

Themistocleous and Wearne (2010) noted that management support and participation in the course of the programming cycle guarantees ownership, solid and sustainability of the project results. Continued support of management during monitoring and evaluation institutionalized for wider impact. Specific procedures programmed for consistency, the management review procedures for updates, accuracy and validity. These ensure all project teams are aware of the management involvement at the various stages of the project cycle. Thus, at all level's management has the vital role in making critical decisions.

Use of legal and regulatory framework

Implementing effective pharmaceutical waste management requires multi-sectional cooperation and interaction at all levels. Establishment of national policy and a legal framework, training of personnel and raising public awareness as essential elements of successful healthcare waste management. Management of healthcare waste should thus be put into a systematic, multifaceted framework and should become an integral feature of healthcare services as stated by (WHO, 1999).

Monitoring and Evaluation training

World Bank (2011) human capital, with proper training and experience is vital for the production of monitoring and evaluation results for sustainability. There is a need to have an effective monitoring and evaluation human resource capacity in terms of quantity and quality. Thus, the monitoring and evaluation human resource is required in order to implement planned activities in the organization. Human capital, with notable experience is vital for the achievement of monitoring and evaluation results. Thus, human resource strategies are needed for the achievement and maintenance of a stable monitoring and evaluation.

Kumari et al. (2012) have pointed that smooth running of many medical waste management's system requires regular training. Proper training must be carried out by health institution employees in developing awareness of health, safety and environmental issues. The staff members who are involved in handling waste should be provided with training in handling, segregation, storage and disposal procedures.

Educational level of employee

Gorgens and Kusek (2009) pointed that competent employees are a major obstacle in selecting monitoring and evaluation practices. Monitoring and evaluation is a new tool in the management field; it faces challenges in sustainable results and performance matrices. There is a big gap for skilled monitoring and evaluation professionals, capacity building of monitoring and evaluation systems, and harmonization of development management courses and technical support.

Data quality and dissemination

Rist et al. (2011) refer to the existence of a monitoring and evaluation plan, monitoring and evaluation tools, and guidelines, information systems and statistical capacity to help in producing quality data, data collection process, survey systems, data processing, validation, storage, analysis and dissemination.

Frequency of Monitoring and Evaluation

Birhanu et al. (2010) noted that frequent data collection means more data points; more data points enable managers to track trends and understand intervention dynamics, hence the more often measurements are taken, the less guess work there will be regarding what happened between specific measurement intervals. But the more time that passes between measurements, the greater chances that events and changes in the system might happen that may be missed.

2.3 Theory of change

This theory was established in the 1990s to encourage projects and programs geared towards positive social, political and economic change.

CARE (2012) described theory of change as a tool used for developing solutions for complex social problems by monitoring and evaluation.

Gorgens and Kusek (2010) monitoring and evaluation systems have been in existence since ancient times, however, today the requirements for monitoring and evaluation systems as a management tool are changing. The performance has grown with demand by stakeholders for accountability and transparency through the application of the monitoring and evaluation by the NGOs and other institutions, including the government.

2.4 Theory of waste management

Theory of waste management advocates for a universally accepted knowledge pool on waste management. This theory is to emphasize the importance of waste management as a tool towards prevention of any harm to mankind and to the environment as stated by Amegashie and Nuertey (2014).

As USAID (2011) described in low-income countries, the challenges associated with the pharmaceutical wastage include the weak capacity of its supply management system. Thus, the management of pharmaceutical waste is of great importance due to its potential environmental hazards and public health risks. However, pharmaceutical waste was often transported outside the city and fired to dispose and landfills or improper treatment facilities in Ethiopia. The environmental regulatory agencies established to better waste generators and manage the wastes. However, weak monitoring and evaluation is applicable until recent years to control improper pharmaceutical waste.

MSH (2012) also stated that the selection and quantification of medicines without providing data/evidence and techniques result in wastage due to expiry. Poor medicine storage conditions such as storage on the floor; lack of a systematic arrangement of stock; presence of dust and pests; inadequate protection from direct sunlight; and lack of provision of temperature monitoring charts and facilities to monitor room temperature can lead to degradation of medicines. Poor inventory management also leads to the expiry of medicines. It contributes between four to 9% of overall waste in supply systems.

As indicated in the policy of WHO (2005), the disposal of PWM is to neutralize the infectivity of the wastes, which is the most hazardous medical waste property. However, if not correctly monitored and evaluated in operation, incineration led to high levels of heavy metal emissions as it releases these substances into the environment.

Rada (2016) stated the environmentally safe waste management may always be a problem because societies would continue to produce more waste due to the drivers of their growth and the demands for developing modern societies. FMHACA through Proclamation No. 661 (2009) directives stated that the collaborative effort resulted in the development of a medicines waste management and disposal.

The management process of PWM must be conforming to minimum international and national standards, including the WHO standards for PWM. To guide the effective implementation of the directives, a national strategic framework on medicines waste management and disposal was developed. The directive has acknowledged multiple feasible alternatives for managing the medicines waste disposal, including the private sector providing medicines waste disposal services, which was not allowed previously in Ethiopia as studied by Hailu et al. (2012).

2.5 Theory of monitoring and evaluation

Vedung (2010) pointed out that evaluation was born at a time when policymakers and management/administrators believed in building a better society through rational interventions and social engineering based on the lessons of past successes and failures. This indicates the development process of evaluation and monitoring theory is aligned with the economic theory and theories of rational choice.

Muronga (2011) pointed monitoring and evaluation is deeply embedded in participatory development. This indicates the participatory monitoring and evaluation has always been an approach to participatory development. Participatory monitoring and evaluation has been a direct consequence of the rise of participatory development. This is because participatory monitoring (PM) and participatory evaluation (PE) are some of the key methods of attaining participatory development. Thus, the rise of participatory development evolved simultaneously with the rise of participatory monitoring and participatory evaluation.

Crawford and Bryce (2003) pointed that monitoring and evaluation are intimately linked project management functions and as a result, there is a lot of misunderstanding in trying to make them work on projects. To solve the confusion in implementation the Log-frame that results from the logical framework approach developed and serves as a useful tool to review progress and take corrective action.

2.5.1 Monitoring and Evaluation in Ethiopia

A Ministry of Planning and Economic Development (MoFED) (2008) stated that in Ethiopia during the Dergue Regime the economic system was centrally planned command economics. The Central Planning Commission was responsible for the overall monitoring and evaluation of public sectors project's activities. Quarterly, bi-annual, and annual progress reports, field inspection

interviews and discussions held with public sector projects implements were used as the basic tools for data gathering for monitoring and evaluation.

The MoFED (2008) indicates, the overall public sectors project monitoring and evaluation of the past system had suffered from the following basic limitations like monitoring and evaluation system was too rigid and lacked dynamism and project managers had limited autonomy of decision making. On the other hand, there was delay of monitoring and evaluation feedbacks to both managers and the implements. There was the high cost of monitoring and evaluation and outcome evaluation did not get attention. In the early 1990s, the responsibility of coordinating and consolidating public sectors, projects monitoring and evaluation was provided to the MoFED. During this period, the Ministry had developed the standard formats that were used for both financial and physical project performance data collection and communication.

Proclamation No.41 (1993) vested power and responsibility on the MoFED to follow up and evaluate the implementation in public sectors. Based on it MoFED has developed standard guidelines and formats for federal public sectors to conduct public sectors development projects monitoring and evaluation accordingly. The importance of monitoring and evaluation in Ethiopian government departments and public-sector transformation is not articulated clearly in a document as a policy; however, monitoring and evaluation is the lifeblood of sound and efficient planning and implementation, it hasn't been institutionalized at all levels.

The Proclamation No.1 (1995) of the constitution, federal democratic republic of Ethiopian Article 92 stated that the design and implementation of programs and projects of development should not damage or destroy the environment. The decentralized administrative system adapted, and the Federal Government is becoming responsible to design and implement vertically coherent and horizontally consistent National Development Plans which are based on national development needs and priorities. Under the national policy frameworks, regional states and city administrations are obliged to prepare and implement plans and programs that reflect their local objective realities.

As the Addis Fortune of the weekly magazine (2016) stated, Ethiopia is to launch its first national level monitoring and evaluation policy. The policy is expected to provide the guidelines for the monitoring and evaluation process of all government projects and offices around the country.

NPC (2018) pointed monitoring and evaluation System established in 1996 as Welfare Monitoring System (WMS). GTP2 Policy matrix (mainstream SDGs and their targets) consisting of sets of

annual targets and indicators is developed to properly monitor and evaluate the implementation of the national development plan at different levels (macro and sectoral). The monitoring and evaluation system follows the national planning process and is a sectoral approach, and the national monitoring and evaluation System is exercised in a participatory and transparent manner.

The monitoring and evaluation system enabled to monitor and evaluate the performance of the national plan at different levels such as macro and sectoral. Beside this, the system further enabled us to monitor and evaluate internationally agreed goals (SDGs) as effectively mainstreamed in the national development plan. Based on analyses of data/information from the survey/administrative sources, the annual progress report of the national development plan (which is mainstream with GTP2) is prepared, the progress report is approved by the council of ministers and then subject to public consultation. Assessment studies were conducted to identify critical gaps and draw lessons from selected countries on monitoring and evaluation system to be used as an input in the formulation of the National Monitoring and Evaluation guideline which was finalized and approved by the council of ministers at the first week of January 2018.

FMoH (2019) specified that pharmaceutical supply chain management and pharmacy service activities are an integral part and a cross-cutting activity of the health care system. Managing pharmaceutical supply chain, pharmacy service and medical device is a key to fulfilling basic customer satisfaction with regards to obtaining the right product with the right quantity and right condition, at the required time. Therefore, the monitoring and evaluation plan must be used to strengthen the pharmaceutical supply chain management, pharmacy service and medical device management of the country to ensure uninterrupted supply of pharmaceuticals to the ultimate customers. The monitoring and evaluation framework is also expected to help FMOH to build the capacity of professionals working at different levels of the system to properly manage pharmaceuticals SCM, pharmacy service and medical devices.

This indicates the importance of having implementable monitoring and evaluation (monitoring and evaluation) framework that is continually help improve pharmaceutical supply management (PSM) pharmacy service (PS) and medical equipment management (MEM) performance. However, the framework provides less emphasis on the use of monitoring and evaluation performance in pharmaceutical waste management.

2.6 Empirical literature

The pharmaceutical waste treatment varies in different countries of the world. The use of monitoring and evaluation in waste management system also differs from country to country. In Africa, public institutions allocated a huge sum of money to intensify their efforts to develop monitoring and evaluation tools. Despite this sustained effort, monitoring and evaluation is yet to reach its acceptable level. The monitoring and evaluation systems are mainly concerned with inputs and outputs rather than the outcomes and impacts. These monitoring and evaluation systems are inadequate and generally weak as stated by Nyonje et al. (2012).

The Kenya social protection sector review (2012) states that not many programmes in Kenya have a functional monitoring and evaluation system. Monitoring and evaluation rarely influenced the decision-making process, its information was being used to inform project and programme designs as well as inform policies. The review also notes that the country relies much on monitoring and evaluation international consultants and therefore, recommends the capacity building of national and local public workers because they will stay in the sector over the long term.

Keboi (2018) has identified that 74% of health facilities in developing countries had schedules for conducting monitoring and evaluation while 26% did not have schedules for conducting monitoring and evaluation. The researcher's findings imply that most health facilities had schedules for conducting monitoring and evaluation as a basic requirement for any health project and as a requirement in any project planning process. However, 39% of health facilities were conducting monitoring and evaluation as was scheduled while 61% of health facilities were not conducting monitoring and evaluation as was scheduled.

A study in Uganda by Okello and Bongomin (2014) identified human capacity to be a key determinant in the effectiveness of monitoring and evaluation in improving health service delivery with a 70% positive relationship. The study further revealed that 58.3% of health sector projects in Uganda were in need of specialized human capacity in monitoring and evaluation.

Berhanu et al. (2011) stated that any institution working on implementing a development project is concerned with the need to assess, understand its performance and to improve relevance, effectiveness and efficiency of a project through monitoring and evaluation. Berhanu et al. (2011) have also pointed that the effects of monitoring and evaluation also change from focusing on

assessing inputs and progressive monitoring to the assessment of the contribution of intervention to development project outcomes or changes.

Bido (2014) stated there must be good at having effective projects, monitoring and evaluation practice in place for sustainable improvement and quality of performance in any organizational activities. However, ECPE (2010) in Ethiopia, most of the government organizations do not use the monitoring and evaluation system in an appropriate manner for their projects.

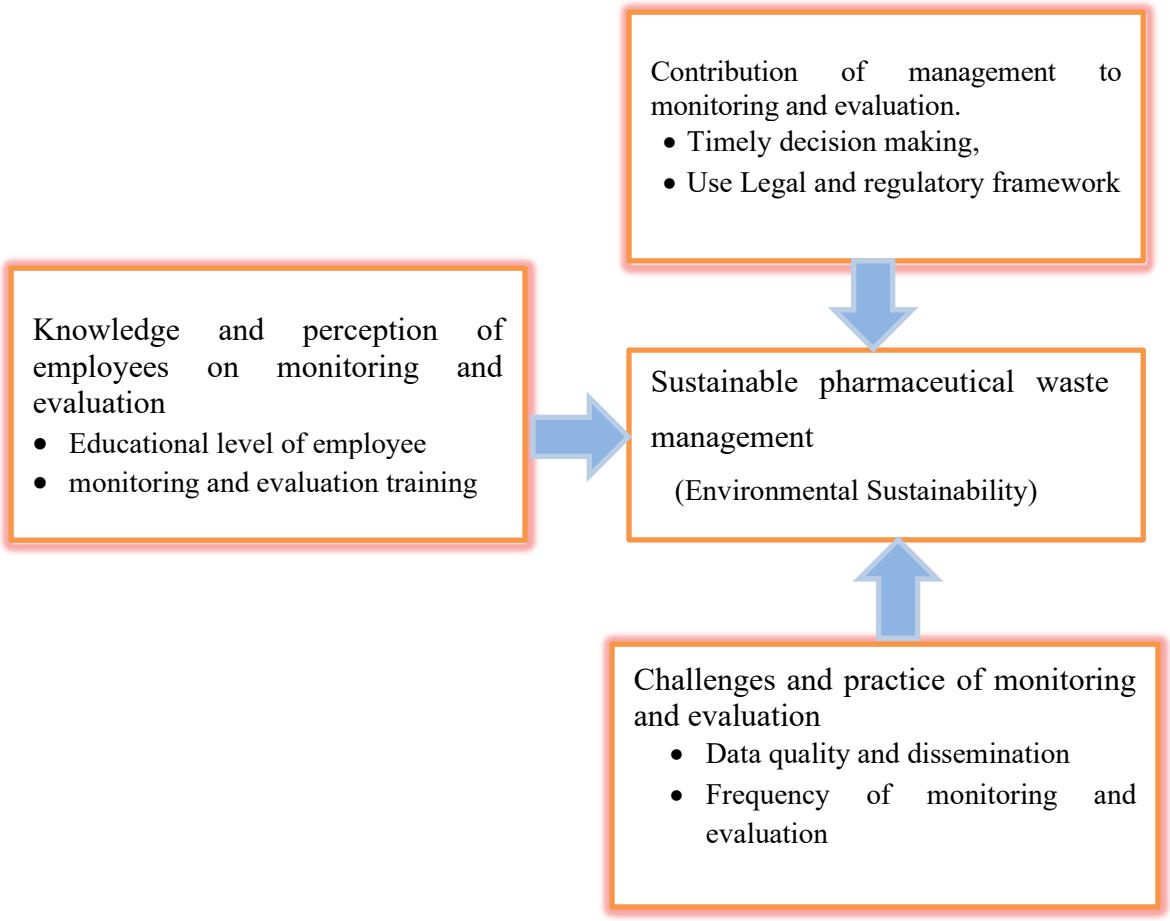
Chang et al. (2011) described that waste management is a complex problem with technical, socioeconomic, legal, ecological, political, and even cultural components. Therefore, traditional management approaches to this problem must be revisited as they create unsustainable societies as studied by Seadon (2010).

2.7 Conceptual framework

Most of the studies have been undertaken on focusing the content of the monitoring and evaluation systems such as the monitoring and evaluation plan (framework) having tools and methods, rather than on how they were performed fruitfully and the effect it results in towards sustainable development like in waste management. Unlike the previous study this study, does not focus on the process of monitoring and evaluation itself, rather, it focuses on the effect of monitoring and evaluation when harmonizing with poor pharmaceutical waste management.

In this study the explanatory variables are contribution of management to monitoring and evaluation effect, challenge and practice of monitoring and evaluation, knowledge and perception of employees on the monitoring and evaluation system that cannot be directly controlled. In a similar case the dependent variable of this study is the sustainability of PWM in the study area.

The study assessed monitoring and evaluation implementation at EPSA. Conceptual framework developed based on theory of change to solve complex social problem of poor pharmaceutical waste management systems and to improve environmental sustainability. Thus, this framework is also proposed to examine how the institutionalization of monitoring and evaluation effect that supports meaningful implementation to improve PWM in EPSA.



Source: Own formulation

Figure 2.1: Conceptual framework: Effect of monitoring and evaluation on PWM

CHAPTER THREE

Methodology

3.1 Descriptions of the study area

EPSA is a government organization under the FMoH established under Negerit Gazeta Proclamation No. 553 (2007). Its mandate is to establish pharmaceutical procurement and distribution systems; establish a modern storage management system; supply essential pharmaceuticals of quality, safety and efficacy; deliver pharmaceuticals directly to hospitals and health facilities via an effective transport network system.

EPSA has 19 branches operated in Ethiopia in different regions to afford pharmaceutical availability in the country out of which five branches and the Head Office were selected for this study.

3.2 Study design

The study used a descriptive analysis to investigate in detail how to enhance PWM in EPSA. Descriptive research used to set methods and procedures that describe the variables and discover the relationship between variables as identified by (Warfa, 2016).

The researcher also used qualitative and quantitative research methods. This study used non-probability purposive sampling and probability sampling of stratified random sampling design. Stratified sampling design used as a representative sample since the employees are placed in different directorates, branches, and departments (strata). Professional experts that are related to monitoring and evaluation and PWM activities were used as the main criteria for classification of the population of this study into a stratum. Thus, the study's sample focuses on staffs of five branches and fifteen directorates of the head office.

3.3 Target population

Sekaran and Bougie (2010) population is defined as the entire group of people the researchers want to investigate. Therefore, the target population for this study is 1340 and sample frames were 384 staffs that worked on PWM in EPSA. Thus, the sample size of 161 was taken to provide complete information on the experience, views and opinions regarding monitoring and evaluation and PWM.

3.4 Sample size and sampling techniques

Nicholas (2011) stated about a large group of individual people or things, it is normally difficult to get all of them to answer our questions or examine all the things. It would take much too long and be far too expensive. The solution is to just ask or examine some of them and hope that the data we get are a representative (sample) of all the rest.

Based on this, the study conducted on selected 5 branches from the total of 19 branches in EPSA namely, Nekemte, Hawasa, Adama, Addis Ababa Number 1, Addis Ababa Number 2 branches and head office. The professional experts that are related to the pharmaceutical supply chain of waste management and monitoring and evaluation have a total number of 48, 46, 54, 56, and 28 from branches and 152 from head office professionals' experts, respectively which is also the sample frame of the study.

The study used stratified sampling and simple random sampling technique to select the samples from directorates, departments and involve identifying and selecting individuals or groups of individuals that are knowledgeable about or experienced with a phenomenon of monitoring and evaluation and PWM to remove bias and get correct information.

The sample size calculated using the following formula developed by Yamen (1967) with 94% confidence level to know the strength and the relationship between dependent variable and independent variable.

$$\frac{N}{1 + N(e)^2}$$

Where; n = the desired sample size (correction of sample size)

N = Population size of the professional staff

e = level of precision

Thus, using the formula, the desired sample was calculated as:

$$n = 384/ (1+ 384 (0.06)^2 = 384/2.3824 = \mathbf{\underline{161}}$$

To calculate the sample size for each branch and head office first, the researcher calculated percentage value for each of them. The summary of sampling techniques to get the desired samples was done as indicated in table 3.1 below:

Table 3.1: Summary of sampling techniques, sample frame and samples size

No.	Name of branch/Area	Sample frame of area	Sample size for each branch calculation	Result of Sample size for each study area	Percentage for each sample area
1	Addis Ababa No 1	56	n = 56/384*161	23	15
2	Addis Ababa No 2	28	n = 28/384*161	12	7
3	Adama branch	54	n = 54/384*161	23	14
4	Hawasa branch	46	n = 46/384*161	19	12
5	Head Office	152	n =152/384*161	64	40
6	Nekemte branch	48	n = 48/384*161	20	12
Total		384		161	100

The table above indicates that the study used stratify sampling and a simple random sampling technique to select the samples from the total population of 1340 and sample frames of 384 samples. Thus, data was collected from the sample of 161 sizes (desired sample) of specified from monitoring and evaluation officers, warehouse managers, warehouse and inventory management, pharmaceutical distribution officers and related pharmacy professionals of staffs in five branches. Similarly, from the head office of EPSA, who have worked on designing, planning, and implementing EPSA's pharmaceutical supply chain addressed using the self-administered questionnaire. Thus, the selected sample size is representative and sufficient.

3.5 Data collection method

Data was collected from primary and secondary sources. The methodology in primary data collection included the use of questionnaires open and close-ended. Structured interview and observation for the collection of primary data sources were conducted. The following is a brief explanation how the primary data were used.

- **Interview:** Information was gathered from the individuals, especially from branch managers and team leaders and directors that lead the organization**.** The mail, telegram and phone call were used for the interview at the time the leader is not accessible for a direct interview.
- **Questionnaire:** Data was collected from the sample population area such as warehouse managers, pharmaceutical distribution officers and monitoring and evaluation experts who work in EPSA.
- **Observation:** The situation was observed what seems at the key supply chains that use for the study was accomplished to validate and augment the information about handling of expired, damaged and disposal pharmaceutical wastes in the study area.

Secondary data was gathered through the process of document review. The researcher used document analysis to gather information that is not captured in the responses in the questionnaires and interview from reviewing of related documents, scholarly published literature, journals, books, thesis, and different period plans and reports.

3.6 Data collection instruments

Data collection instruments are self-administered questionnaire developed based on the objectives of the study. It consists of sets of parts, namely demographic information, contribution of management in monitoring and evaluation performance, sustainable pharmaceutical waste management, knowledge status and perception of employees on monitoring and evaluation and also challenges and practice of monitoring and evaluation performance which is comprised of a five-point Likert scale and open-ended questionnaire. It also included an interview guide.

3.7 Method of data analysis

After the data was collected from various sources, it was analyzed to identify the main relevant correlation between the contribution of management, knowledge status of employee on monitoring and evaluation, challenges and practice of monitoring and evaluation performance with relation to enhance pharmaceutical waste management in EPSA.

Quantitative data were analyzed using descriptive statistics, whereas qualitative data were analyzed using content analysis. Quantitative data were analyzed by integrating and triangulated with qualitative data findings. The collected data was tabulated, organized, analyzed and interpreted systematically. For the present study, SPSS version 21.0 was used for analyzing the collected data. The findings were presented using percentages and frequencies, tables, pie charts and bar graphs.

3.8 Explanation of factors and its variables

Contribution of management in monitoring and evaluation: This indicates sustainable management, use of monitoring and evaluation to ensure the achievement of pharmaceutical waste management objectives. The managements should make the right and timely decision with the legal and regulatory framework based on reliable information to sustain waste pharmaceuticals in the environment. The management is responsible for making the environmentally effective decision and prepares strategic planning for pharmaceutical waste management. Under the determinant factor of contribution of management in monitoring and evaluation performance, the variable, such as timely decision-making and the use of the legal and regulatory framework in the system of making sustainable waste management, is accessed by the researcher.

Challenges and practice of monitoring and evaluation effect on PWM: This is to ensure the right approach of monitoring and evaluation implementation strategies in PWM. To enhance PWM, it needs a performance of monitoring and evaluation in a scheduled manner and the finding data disseminated accordingly. The data quality and dissemination and frequency of monitoring and evaluation are taken as variables that determine the factors of challenges and practice of monitoring and evaluation performance on PWM.

Knowledge and perception of employees on the monitoring and evaluation system: This ensures an individual who is directly in charge of the monitoring and evaluation as a main function

and identification of different personnel for the different activities of the monitoring and evaluation such as data collection, analysis, report writing, dissemination of the monitoring and evaluation findings to use in PWM.

The access to monitoring and evaluation training is important in the capacity building of personnel, and this is discussed under this factor as a variable. monitoring and evaluation training starts with the understanding of the monitoring and evaluation system and ensuring that the team understands with complementary to PWM system and the results framework as well as associated indicators. Thus, commitment, satisfaction and education can lead to creating awareness of waste management benefits. However, monitoring and evaluation develops perception of employees and organizational learning towards pharmaceutical waste management. Generally, the factor that took as a determinant under the knowledge and perception of employees is the access to training and educational level of employees selected in this study.

Sustainability of pharmaceutical waste management: Pharmaceutical wastes are expected to be managed in environmentally friendly ways; that is, during disposal, and it must consider environmental sustainability. Therefore, PWM should perform with consideration of social, economic and environmental impact evaluation that sustains pharmaceutical waste management to ensure the objective of required quality.

3.9 Ethical consideration

During data collection, ethical consideration is seriously considered to ensure the protection, integrity, anonymity, consents, and other human elements of the informants. The respondents were not identified by names, and their consent was required during contact. Avoiding bias, incorrect reporting and inappropriate use of information was also considered. The other ethical issues considered when conducting this study were: informed consent of the participants, unpaid participation and privacy of possible and actual participants. Furthermore, the respondents were informed that the data collected was projected for an academic purpose, and that can be treated confidentially.

3.10 Reliability and validity test

To ensure the reliability of research, the reliability test was calculated using Cronbach alpha test that can be carried out in SPSS Statistics using the reliability analysis to determine the reliability

level of the data collection instrument in a defined and concise way. The questionnaire was pre-tested with a small group (pilot) with selected professional employees before going into the actual data collection to check the consistency of the questions in the questionnaire. The employees who were part of the pilot test were not part of the main study.

Cronbach's alpha (α) value greater than 0.6 indicates the satisfactory internal consistency reliability (commonly accepted level) (Griethuijsen et al., 2014). Based on the finding, the study showed that the overall Cronbach alpha value is greater than 0.6 and all items under each construct have a factor loading greater than 0.5. Therefore, the proposed constructs of the questionnaire are satisfactory consistency reliability level.

The table below shows the reliability test of Cronbach alpha values (average correlation of items) for each construct of the questionnaire.

Table 3.2: Reliability test of Cronbach's alpha values for computed variables

Computed Factors/Variables	Number of items	Scale	Cronbach's alpha	Mean
Contribution of management on monitoring and evaluation	5	1-5	.52	3.23
Knowledge and perception of employees on monitoring and evaluation	10	1-5	.60	3.39
Challenges and practice of monitoring and evaluation	10	1-5	.55	3.10
Sustainable pharmaceutical waste management	5	1-5	.56	3.20

Source: Survey Result

CHAPTER FOUR

Research Findings, Analysis, and Interpretation

4.1 Introductions

This chapter contains the findings of the study, analysis of the data and discussions on the findings results.

4.2 Response rate of respondents

A total of 161 self-administered questionnaires were distributed to EPSA's monitoring and evaluation and pharmacy professionals related to pharmaceutical waste management and 125 questionnaires were filled and returned, which represents a 78.4 % response rate. The response rate decreases because of participant's fear of transmission of COVID-19 as the virus is transmitted through paper contact. However, the response rate greater than 70% and over is very good (Mugenda, 2003). Therefore, the response rate was accepted to be good.

4.3 Respondents profile (Demographic characteristics)

Out of the 125 employees (respondents), 78.4% (98) were male and 21.6% (27) were females. As the finding indicated, the majority, 68 (54.4%) of employees were in the age group 31-40 years. Most of the participants, 55 (44%) of employees have more than five to eight years' experience in EPSA. Most of the respondents, 85 (68%) graduated in university undergraduate degree level, followed by 25 (20%) of the respondents who graduated in university master levels.

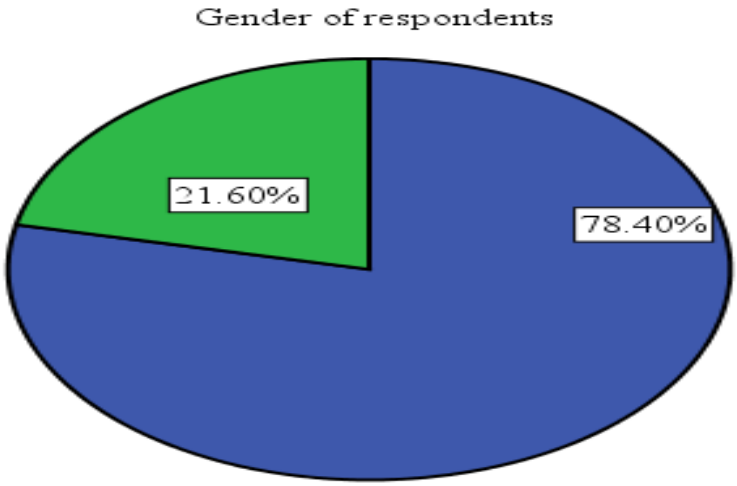


Figure 4.1: Percentage of respondent's by sex

Table 4.1: Summary of demographic characteristics

Demographic characteristics		**Frequency**	**Percent (%)**
Sex	Male	98	78.4
	Female	28	21.6
	Total	125	100
Age	21 to 30	53	42.4
	31 to 40	68	54.4
	Above 41	4	3.2
	Total	125	100
Level of education	Diploma	15	12
	Degree	85	68
	Masters	25	20
	PhD and above	0	0
	Total	125	100
Experience	1 to 4	52	41.6
	5 to 8	55	44
	Above 8	18	14.4
	Total	125	100

The age of respondents, 54.4 % between 31 to 40 and most employees have experience of 5 to 8 years.

This implies that matured professionals exist in EPSA, and they can be able to change the outcome of the developments in all age categories if sustainable management, capacity building and change in perception and awareness towards PWM using monitoring and evaluation exist.

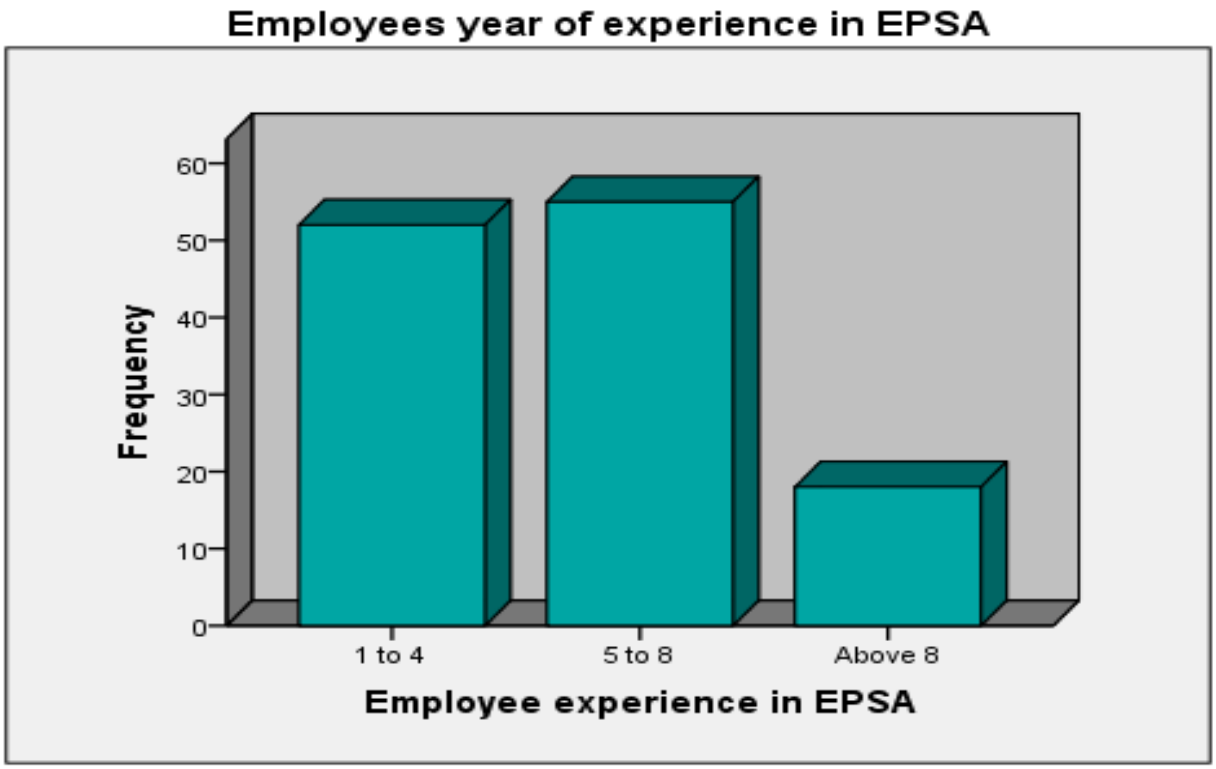


Figure 4.2: Respondent employee's year of experience

To triangulate some of the quantitative data with qualitative data, a semi-structured interview was conducted with selected team leaders, managers and directors (expected a total of twenty but success is fourteen) in EPSA. Except for two, all the key informants were males. Most of them were in the age group of 30 to 35 years and with a bachelor's degree and their work experiences of the respondents ranged from 5 to 7 years.

4.4 Finding and Discussion

4.4.1 The contribution of management to monitoring and evaluation performance for PWM

The study sought to determine the extent of respondents who agreed with the factor groups of the contribution of management to monitoring and evaluation performance. The contribution management of monitoring and evaluation performance group factors is described in table 4.2. In-depth interviews were also conducted to gather information about the current situation of monitoring and evaluation performance in their branch/Head Office Warehouse, factors that contribute to sustainable waste management, the effect of monitoring and evaluation on improving pharmaceutical waste management.

Table 4.2: The contribution of management on monitoring and evaluation performance

Factors	Strongly disagree	Dis-agree	Neutral	Agree	Strongly Agree	Mean	SD
There are PWM problems/challenges in practical managing process like collection, handling, storage, transportation, and disposal in most managing activities.	0	9	25	54	37	3.99	0.888
The management facilitates for managing of Pharmaceutical Waste (PW) using monitoring and evaluation system.	19	38	23	37	8	2.82	1.201
Improper PWM cause is significantly due to lack effective using of monitoring and evaluation which can robust sustainable management of PWM.	3	15	30	55	22	3.62	0.989
Pharmaceutical wastes are disposed according to standard of authorized body guidelines and using monitoring and evaluation.	13	27	35	34	16	3.10	1.190
Your organization has appropriate and sustainable monitoring and evaluation plan and regulatory strategies with performance report of PWM.	22	43	25	28	7	2.64	1.174

Based on the research findings, there is an indicator that PWM problems/challenges exist in practical managing processes of EPSA like collection, handling, storage, transportation, and disposal as most respondents' answers imply in most managing activities which have the highest mean score of 3.99 and standard deviation 0.888. The managements are not dedicated to using the monitoring and evaluation system to enhance management of pharmaceutical waste which is shown by a low mean of 2.82.

Almost all key informants also agree that the role of sustainable management is very important in the effects of the monitoring and evaluation system that enhances pharmaceutical waste management. As it is also noted by interviewee number (9), that:

"Pharmaceutical waste management is a challenging problem in EPSA, and the use of management through the structure and designation of duties as the best choice in monitoring and evaluation on performance in pharmaceutical waste management. … But I do not participate in any monitoring and evaluation system which may enhance pharmaceutical waste management in many ways, such as monitoring and evaluation designing-change of objectives, monitoring and evaluation modifications, planning of monitoring and evaluation, implementation of monitoring and evaluation systems and resource allocation."

Improper pharmaceutical waste managements are caused significantly due to the lack of effective using of monitoring and evaluation by management as indicated by the high mean of 3.62 and standard deviation of 0.989. Pharmaceutical wastes are inappropriately disposed according to the standard of authorized body guidelines and using the monitoring and evaluation system in a less extent by management in the EPSA as specified and showed by a mean of 3.10 and 1.190.

Several points were mentioned about information from the monitoring and evaluation systems is used in making decisions and formulating policies, planning, pharmaceutical waste impact assessment and PWM improvement. It is system as widely important to minimize the impacts of pharmaceutical wastes on the environment if it is consumed by management. In this regard, the management is too responsible for the performance of monitoring and evaluation activities in PWM. However, the management in EPSA is rarely used and depends on the information of monitoring and evaluation in PWM. To this effect, interviewee number (7) stated:

"There is no timely generated and appropriate information transmission of pharmaceutical wastage monitoring data, and poor utilization of the waste management information exists in the organization … Until now I have not used it to make decision …."

The management is responsible for making right decisions and strategic planning of the project as well as managing of the monitoring and evaluation system (IFRC, 2011). The success of the monitoring and evaluation system depends on the support it gets from the management (World Bank, 2011). The management as well as has to be relying on the information provided by the

monitoring and evaluation system for its decision-making (Gaitano, 2011). In this regard, one key informant also suggests that:

"… There should be an involvement of management in the monitoring and evaluation system that related to PWM. The management also has to be taken into consideration the next generations and make environmental sound responding to pharmaceutical waste impacts, especially by using the right information when decision making."

There is also not an appropriate and sustainable monitoring and evaluation plan and regulatory strategies with a performance report of PWM exist in the organization as it is shown by the lowest mean of 2.64 and standard deviation of 1.174. This indicated the limited transmission of monitoring data has resulted in poor utilization of the waste management information obtained and also a difficulty in achieving an adaptive environmental management.

The lack of improvement and use of monitoring and evaluation results in harmonized with PWM and the implementation of a legal and regulatory framework in the organization is also mentioned as a reason. Concerning this one interviewee who is number (5), pointed out that:

"There are no appropriate and sustainable monitoring and evaluation plan and regulatory strategies to enhance PWM in the organization …. When we implement the interconnection between monitoring and evaluation, PWM and environmental sustainability it has extreme advantages."

4.4.2 Knowledge and perception of employees on Monitoring and Evaluation

The study also tries to find the extent of respondents who participated to respond on the factor groups of knowledge status and perception of employees in the monitoring and evaluation performance implementation that enhance PWM in EPSA. The analyses of employees on monitoring and evaluation factors are presented in table 4.3 and also the results of interviews summarized as below.

Table 4.3: Knowledge and perception of employees on monitoring (M&E) and evaluation factors

Factors	Strongly disagree	Dis-Agree	Neutral	Agree	Strongly Agree	Mean	SD
Monitoring and evaluation (M&E) applicable with scheduled manner for pharmaceutical waste disposal to promote environmental protection.	18	42	31	21	13	2.75	1.203
The existence or/not of M&E in the process of waste disposing like incineration and landfill can make difference on impact of pharmaceutical waste on the environment.	2	4	19	63	37	4.03	.851
During the segregation/categorizing of pharmaceutical waste the M&E use in the process to facilitate PWM	8	21	41	37	18	3.29	1.106
If there is M&E during waste treatment plant, it minimizes the effect of wastes and used to save the environment impact of PW	2	2	24	56	41	4.06	.855
Weak of data quality and disseminating in M&E encountered limitations and challenges and these results for poor PWM	0	8	15	71	31	4.00	.793
Timelessness of M&E results to weak PWM and makes PW staying for a long time in the environment.	4	6	16	67	32	3.94	.931
The organization has own M&E indicators for waste management implementation and work to minimize environmental pollution.	26	33	32	24	10	2.67	1.230
There are no clear and simple procedures of M&E that can be applied and the high costs incurred by this organization for pharmaceutical waste taken to disposing center.	4	12	38	53	18	3.55	.963
Waste management installations are operating in a fashion way of using M&E that minimizes toxicological risks to human health.	12	33	34	34	12	3.01	1.146
There exists computerized waste generation records/data and dissemination that can used for appropriate decision making on PWM.	22	39	27	29	8	2.70	1.193

According to the finding of the research, monitoring and evaluation is not satisfactorily implemented with a scheduled manner for pharmaceutical waste disposal and to promote environmental protection as it was shown by the lowest mean of 2.75 and standard deviation of 1.203.

A Majority of 10 out of 14 (72%) of the interviewees remarked that there exists lack of scheduled time for monitoring and evaluation implementation of monitoring and evaluation and lack of environmentally sound management in the implementation of PWM (pharmaceutical waste management) in EPSA. One key informant said that:

"For me, I think the lack of scheduled and smart monitoring and evaluation indicator related to pharmaceutical waste management is the major problem in EPSA …."

The existences or non-existence of monitoring and evaluation in the process of waste disposing like incineration and landfill make a difference on the impact of pharmaceutical waste in the environment as shown on the very high mean of 4.03 and standard deviation of 0.851. Concerning this, about 50.4 % of employees agreed on the importance of monitoring and evaluation in the PWM, and in returns to reducing environmental degradation.

Most key informants also revealed that the major pharmaceutical waste disposal methods are that it's not aligned with the environmental strategy of the country and lack of proper national policy and monitoring and evaluation that enforce the management of pharmaceutical wastes. Regarding this, the interviewee stated that:

"We don't have operating standard manuals that are implemented for handling and disposing of pharmaceutical wastes, disposal methods are also not aligned with the environmental strategy of the country … and no monitoring and evaluation system also established with integration of PWM in our organization."

Relating to the other factor of pharmaceutical waste that must be concerned during the segregation/categorizing of it and monitoring and evaluation use in the process for facilitating PWM, respondents are reacting to some extent showed with a medium mean score of 3.29 and standard deviation of 1.106. On the other hand, respondents were interviewed about their opinion on the use of monitoring of waste data in a timely manner during collection, segregation, and movements of waste streams and about evaluation of its results in an improvement in

environmental safety. There exists a rare implementation of activity monitoring. Concerning this, one key informant suggests that:

"The main problem identified for pharmaceutical waste management is unclear activity monitoring in EPSA as it was a deficiency in transmitting monitoring information between different levels within the organization due to the lack of clear structure that work on PWM (pharmaceutical waste management)."

Most of the responds (56%) agreed on that if there is monitoring and evaluation during waste treatment plant, it minimizes the effect and used to save the environmental impact of pharmaceutical waste as the finding showed by the highest mean of 4.06 and standard deviation of 0.855.

For the factors asking that the timelessness of monitoring and evaluation results in weak PWM and makes pharmaceutical wastes stay for a long time in the environment, the participant answer is shown by a high mean of 3.91 and standard deviation of 0.931, and this means that whenever the monitoring and evaluation was performed in a timely manner in PWM, it has a great importance.

Most of the key informants also mentioned that monitoring and evaluation is rarely implemented with scheduled manner to control pharmaceutical waste disposal and promote environmental protection. On the notion of frequency of monitoring and evaluation schedule interviewee number (7) stated that:

"The current monitoring and evaluation implementation and using its results for pharmaceutical waste management is poor. The results of the pharmaceutical wastes are only presented within the annual and sector reports and are mainly used for external purposes for political concern."

Another one added to this:

"... good implementation of monitoring and evaluation has a significance role in the PWM in reducing environmental impact."(Interviewee number 1)

The finding also indicated that the organization doesn't own enough monitoring and evaluation indicators for waste management implementation assessments and work to minimize environmental pollution as showed by the lowest mean of 2.67 and standard deviation 1.230. Concerning this, one key informant said that:

"For me, I think the lack of scheduled and monitoring and evaluation indicator related to waste management is the major problem of EPSA too …" (Interviewee number 3)

Similarly, interviewee number (11) further pointed:

"The organization doesn't own relevant and smart monitoring and evaluation indicators for waste management implementation and work to minimize environmental pollution …. I feel this is not fair, and the organization has to be considered environmental sustainability and pharmaceutical waste management should not be sustainable since it has no clear (smart) indicator."

About (76%) of participants agreed that there was weak data quality and disseminating in monitoring and evaluation encountered which to the limitations and challenges, and these results for poor PWM as showed by a mean of 4.00 and standard deviation of 0.793.

About (42%) agreed that there were no clear and simple procedures of monitoring and evaluation that can be applied, and the high costs incurred by the organization for pharmaceutical waste practice when taken to the disposing center as it is shown by a mean of 3.55 and standard deviation of 0.963.

Thus, monitoring and evaluation can help for the measurement of environmental performance if it's implemented in a fashion way in pharmaceutical waste management. In this regard, the interviewee number (8) suggests that:

"The organization did not implement acceptable standard methods outlined by the World Health Organization for the PWM and control through monitoring and evaluation that is applicable, the documentation system of waste management is poor and responsible officers are also not recruited …."

The findings indicated that waste management installations are operating slightly in a fashion way of using monitoring and evaluation that minimizes toxicological risks to human health as it is shown by a mean of 3.01 and standard deviation of 1.146. The existence of computerized waste generation records/data and dissemination that can be used for appropriate decision-making on PWM is also shown by the mean of 2.70 and standard deviation of 1.193 which indicate poor implementation in EPSA. Concerning this, interviewee's number (13), it was stated:

"There is no timely generated data that is available and also no computerized data management system that is implemented for the use of pharmaceutical waste management in EPSA."

4.4.3 Challenges and practice of Monitoring and Evaluation performance

The study findings also indicate the extent of respondents who participated to reply on the factor groups of challenges and practice of monitoring and evaluation performance/implementation that enhances PWM in EPSA. The analysis of different factors is described in Table 4.4 and the results of interviews summarized as below.

Table 4.4: Challenges and practice of monitoring and evaluation performance factors

Factors	Strongly disagree	Dis-agree	Neutral	Agree	Strongly Agree	Mean	SD
If there is sufficient staff training/capacity building on monitoring and evaluation in PWM, this can improve environmental safety.	14	12	13	39	47	3.74	1.349
Most employees have enough knowledge of PWM policy/guidelines pharmaceutical waste and monitoring and evaluation of that used is to work with environmental protection.	30	43	37	11	4	2.33	1.038
You are satisfied with implemented way monitoring and evaluation of pharmaceutical waste management (PWM) in your organization.	39	45	29	15	2	2.17	1.053
Most employees have experience of using monitoring and evaluation that used to sustain PWM.	19	51	39	16	0	2.42	.900
Employees have willingness to participate in monitoring of PWM that affect the environment, if it is not properly managed.	6	13	45	41	20	3.45	1.035
It is obligation of staff/employee to protecting the environment and if they can use monitoring and evaluation in PWM they can achieve to do so.	6	4	25	65	25	3.79	.961
However, employees use their own judgment; they are not actively participating in PWM to monitor environmental pollution.	2	24	39	52	8	3.32	.912
Currently staffs have a gap of knowledge on monitoring and evaluation in PWM even if they are committed to control environmental pollution.	3	15	23	62	22	3.68	.980
The organization has enough staff with monitoring and evaluation competences and effectively implanted monitoring and evaluation in PWM.	22	52	30	19	2	2.42	1.001
Monitoring and evaluation can help the employee to actively participate in PWM and enhance mechanism to control environmental pollution.	4	9	30	54	28	3.74	.991

Based on findings, if there is sufficient staff's training/capacity building on monitoring and evaluation that complementary to PWM, this can improve PWM and environmental safety as showed by the highest mean of 3.74 and standard deviation of 1.349.

Most of the respondents (37%) reply they are strongly agreed and (31%) agreed on that training/capacity building on monitoring and evaluation in PWM has high potential of improving the PWM and which in returns leads to environmental safety. However, as the findings of research indicate, some employees don't have enough knowledge of how monitoring and evaluation can be used with PWM policy/guidelines and working with environmental protection, which is showed by a low mean of 2.33 and standard deviation of 1.038. Employees are also not too satisfied with implementing the monitoring and evaluation system in pharmaceutical waste management (PWM) at the organization, and they have low experience of using it as shown by the low means of 2.33, 2.42 and standard deviations of 1.038, 0.900 respectively.

Based on this, most of the informants also mention a gap of knowledge on monitoring and evaluation systems in PWM. They explain there is high need for access to training in monitoring and evaluation systems implementation in PWM, and how to integrate it with environmental sustainability. Interviewee number (4) referred to the use of training to the general effectiveness of the monitoring and evaluation and PWM as having an important role. He stated:

"... I think the contribution of the monitoring and evaluation training is critical elements for the successful pharmaceutical waste minimization. It helps the employees to be fully aware of the contents of the pharmaceutical waste management plan including regulations that apply, and how to segregate the type of waste that generates, use of monitoring data, choose environmentally preferable materials and properly dispose of infectious and hazardous wastes."

However, a few of the respondents do not agree with the above. They argued that there was no knowledge gap. One key informant explained that:

"... rather than the gap, commitment and awareness of the personal toward the issues are determined. The employees are professionals and know the consequences of pharmaceutical waste even though they are not participating in its management ...."

However, as indicated in numerical factors of research, currently staffs have a gap of knowledge on monitoring and evaluation in PWM even if they are committed to control environmental

pollution as it is also showed by the high mean of 3.68 and standard deviation of 0.980. The study indicates there is a high need for monitoring and evaluation training in EPSA for PWM like segregation, strict implementation, and monitoring of PWM which will help change the current practices.

The capacity building of personnel and increase in staff, technical expertise was found relevant. Monitoring and evaluation human resource management, both in quality and quantity, is required to have an effective monitoring and evaluation staff (World Bank, 2011).

Employees have willingness to participate in monitoring of PWM that affects the environment as shown by one of the high means of 3.45 and standard deviation of 1.035. For the factors asking that it is the obligation of staff/employee to protect the environment and if they use monitoring and evaluation in PWM, they can achieve to do so, most participants (52%) agreed. It's also showed by the highest mean of 3.79 and standard deviation of 0.961.

The organization does not have enough professional staff competencies and not effectively implemented PWM as it's also showed by a lower mean of 2.42 and standard deviation of 1.001. About 43% of respondents reply that monitoring and evaluation can help the employee to actively participate in PWM and enhance the mechanism to control environmental pollution as it's also showed by the high mean of 3.74 and standard deviation of 0.991.

Key informants mention that there is poor access to capacity building on monitoring and evaluation to change its performance, and in returns it enhances PWM and environmental safety. As noted by interviewee number (2) that:

"One of the main challenges in enhancing monitoring and evaluation performance to make pharmaceutical wastes sustainable is the lack of well-educated and well-trained human resources that are needed for the monitoring and evaluation system and pharmaceutical waste management with integrated manners."

Regarding the capacity building and needs, interviewee number (14) further stated that:

"Improvement in the structure of the organization can increase the quality of the monitoring and evaluation human resource…. Understanding the positions of the monitoring and evaluation system and assigning the responsible person in the area is important, but no such improvement exists in the organization."

4.4.4 Sustainable pharmaceutical waste management

The study findings also indicate the extent of respondents who participated in reply on the factor groups of sustainable pharmaceutical waste management in EPSA. The analysis of its different performance factors is presented in Table 4.5 and interview results are summarized as below.

Table 4.5: Sustainable pharmaceutical waste management factors

Factors	Strongly disagree	Dis-agree	Neutral	Agree	Strongly Agree	Mean	SD
If there is sustainable monitoring and evaluation applicable during wastes disposing methods, it can minimize environmental pollution of PW	7	8	17	50	43	3.91	1.115
Improper PWM is due to weak monitoring and evaluation applicability in every step like in collection, handling, storage, transportation, in disposal area.	2	17	31	41	34	3.70	1.063
Management takes in consideration environmental pollution control for making timely decision about sustainable PWM using monitoring and evaluation	14	26	41	31	13	3.02	1.153
Managers and designated persons are involved in the design, budgeting, implementation and reporting on monitoring and evaluation system of PWM	19	35	36	28	7	2.75	1.133

When monitoring and evaluation is applicable during waste disposing methods, it can minimize pharmaceutical wastes that pollute the environment as employees agreed that EPSA had to implement strong monitoring and evaluation in PWM which is showed by the highest mean of 3.91 and standard deviation of 1.115. Mahdi (2017) has pointed concerning this issue that the progress in implementing a sustainable waste management system should be assessed in each

method. Those effects like damaging to ecosystem, damage to human health, and damaging to resources should be monitored and evaluated.

However, there is weak and improper PWM in EPSA at every work activity of waste management like collection, handling, storage, transportation, and disposal area as shown by a high mean of 3.70 and standard deviation of 1.063. Respondents were interviewed about their opinion on the use of monitoring of pharmaceutical waste data in a timely manner during collection, segregation, and movements of waste streams, and evaluation its results for an improvement in environmental safety. There exists a rare implementation of activity monitoring. Concerning this interviewee number (6) stated:

"The main problem identified for pharmaceutical waste management is unclear activity monitoring of EPSA as it was a deficiency in transmitting monitoring information between different levels within the organization due to a lack of clear structure that work on PWM (pharmaceutical waste management)."

The management takes a little consideration for environmental pollution control when planning about sustainable PWM. Monitoring and evaluation occur in EPSA in a little existential as indicated by a mean of 3.02 and standard deviation of 1.153 which is presented in the table above. Several points were also mentioned by the informant about management outlooks and consideration for using monitoring and evaluation systems during decisions making about the improvement of PWM and environmental issues. Interviewee number (4) pointed that:

"… Environmental impacts caused by pollution from pharmaceutical waste or hazardous, however, as I think, less consideration is given to its management in our organization. Enforcing PWM practice through the monitoring and evaluation strategies leads to sustainable results to control environmental pollution."

Managers and designated people are not considerably involved in the design, budgeting, implementation and reporting on the monitoring and evaluation system of PWM as shown by the lowest mean of 2.75 and standard deviation of 1.133. This implies only 22.4 % of employees agreed that management and designated people are involved in the system. As interviewee number (12) noted that:

"There is no enough participatory monitoring and evaluation system that employees can involve in pharmaceutical waste management issues in many ways, such as monitoring and evaluation designing-change of objectives, modifications and planning of monitoring and evaluation, implementation and resource allocation."

In general, informants mention many reasons in system of waste management, such as integrating for the planning at all organization levels. The success of PWM programs depends on good planning, management, proper use of applicable monitoring and evaluation. Sustainable PWM process focus on eliminating unnecessary injections, conducting proper segregation and containerization, having a secure system of storage and transportation to treatment and disposal sites, providing workers at all levels with adequate training and education, and applying the necessary monitoring to maintain the system over time by taking into consideration the environmental sustainability.

4.5 Correlation analysis

Correlation is a bivariate analysis that measures the strength of association between two variables and the direction of the relationship. In this study to measure the strength of the linear relationship between variables, a Pearson Correlation was employed. According to Pearson's Correlation, coefficients (r) can range from -1 to one. And r about -1 indicates a perfect negative linear relationship between variables; a r of zero indicates no linear relationship between variables, and a r of one indicates a perfect positive linear (strong) relationship between variables.

In this study, the correlation test was conducted by computing variables to find the correlation between the factors affecting sustainability of pharmaceutical waste management (correlation between effect of monitoring and evaluation performance); the analysis result was presented in table 4.6 as below.

Table 4.6: Correlation coefficients

Computed factors of variables	The contribution of management on monitoring and evaluation effect	Knowledge and perception of employees on monitoring and evaluation	Challenges and practice of monitoring and evaluation effect	Sustainable pharmaceuticals waste management
The contribution of management on monitoring and evaluation effect	1			
Knowledge and perception of employees on monitoring and evaluation	.415**	1		
Challenges and practice of monitoring and evaluation effect	.365**	. 436**	1	
Sustainable pharmaceutical waste management	.472**	.286**	.490**	1

Source: Survey result

**. Correlation is significant at the 0.01 level (2-tailed).

The finding of the correlation coefficient results shows challenges and practice of monitoring and evaluation effect on has a strong positive relationship to sustainable pharmaceutical waste management within EPSA with ($r = 0.49$, $P<0.01$) followed by contribution of management in monitoring and evaluation. As indicated by ($r=0.47$, $P<0.01$) and also by strong positive relationship with knowledge and perception of employees on monitoring and evaluation with ($r = 0.415$, $P<0.01$).

Thus, based on this result, the sustainable pharmaceutical waste management of EPSAs is affected by the identified three input factors. This includes contribution of management in monitoring and evaluation, challenges and practice of monitoring and evaluation and knowledge and perception of employees on monitoring and evaluation performance for making sustainable pharmaceutical waste management program.

CHAPTER FIVE

Summary and Policy Recommendations

5.1 Summary

The management of wastes, especially from the pharmaceuticals supply chain, is a serious public health issue. Thus, attention is needed to develop the best methods and strategies to manage these wastes. The finding showed that explanatory variable factors such as contribution of management to monitoring and evaluation, knowledge, and perception of employees on monitoring and evaluation, challenges and practice of monitoring and evaluation performance have a significant effect on monitoring and evaluation enhances pharmaceutical waste management (PWM) in EPSA.

For the majority validation of respondent's confirmation, there is a high management influence in monitoring and evaluation activities. The researcher asserted the fact that management's contribution in determining what can be achieved in implementation and strengthening of monitoring and evaluation systems have a fantastic role and decisions made based on monitoring and evaluation performance results and have a significant effect on pharmaceutical waste management. The use of a legal and regulatory framework also needs the commitment and involvement of management. However, the researcher found out that managements have rarely participated in the monitoring and evaluation implementation to improve PWM.

The study found that employee training determines to a great extent the effectiveness of monitoring and evaluation performance hat used for promoting pharmaceutical waste management. The finding also showed that the managements and staffs are influenced by a gap of knowledge and perception of monitoring and evaluation performance to harmonize it with PWM for reducing impacts on the environment in the long-run.

The majority of respondents also remarked that the monitoring and evaluation implementation in harmonizing with PWM is poor practice, and there are limitations in sustainable PWM in EPSA study areas; these are poor computerized information system and documentation, lack of smart monitoring and evaluation indicator and scheduled for monitoring and evaluation implementation, poor data quality and disseminations and lack of environmentally sound management in implementation of PWM.

The findings showed that parallel to just technologies, there is no strong system of waste management that is integrated at all organization levels; however, the success of waste management programs depends on good planning, proper use of sustainable monitoring and evaluation system.

5.2 Policy Recommendations

Based on the research findings, the following are the recommendations by the researcher:

- Creating information based on environmentally sound and sustainable management who actively participate in pharmaceutical waste management through designing and implementing of monitoring and evaluation indicators integrated with PWM.
- Improving the measuring and quantifying amount of pharmaceutical waste generated at every level of the EPSA periodically; avail the PWM plan to all branches and departments then a regular program of monitoring and evaluation can be undertaken so that a responsible body (waste management officer) must employ a day-to-day operation and monitoring for wastes in EPSA.
- Generate information periodically and use reports of pharmaceutical waste when a decision is made on waste management and take into consideration the environmental issue.
- Develop staff awareness and motivation to improve pharmaceutical waste management practices like wastage handling, implementation of policies and environmental health, safety, future impacts of waste and its protection.
- Establish and implement guidelines for regulations and standards that facilitate pharmaceutical waste management and pharmaceutical waste management plan at all levels to improve waste source reduction and management strategies.

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Appendices

Appendix 1: Operational definition of terminologies used in the study.

Monitoring: It is the continuous systematic process of collecting and analyzing data and information to track the efficiency of an organization in achieving its goals.

Evaluation: It is systematic process and objective assessment of an ongoing or completed policy, program, or projects in terms of design, implementation, and results to judge issues such as programme relevance, effectiveness, impact, and sustainability.

Medical waste: Include materials that are produced during health protection, medical treatment, and scientific research; it forms a separate category of medical or health care waste. However, it seems that the fraction of waste produced in medical institutions, known as special or regulated medical waste.

Monitoring and evaluation: Is the systematic process of gathering, processing, analyzing, interpreting, and storing data and information thereby setting into motion a series of managerial actions for the purpose of ascertaining the realization of set objectives and goals.

Monitoring and evaluation systems: Is a set of components which are related to each other within a structure and serve a common purpose of tracking the implementation and results of a project in organization. Monitoring provides essential inputs for evaluation and therefore constitutes part of the overall evaluation procedure.

Monitoring and evaluation Practices: Set of activities done periodically or regular basis to provide information on project status and progress.

Performance monitoring and evaluation system: Is the ability of measuring planning activities to provide users of the system access to quality and accurate information that can be used for organizational learning and decision making for sustainable management.

Pharmaceuticals: Is any substance or mixture of substances used in diagnosis, treatment, mitigation, or prevention of disease and includes medical equipment and supplies as stated in Federal Negaret Gazeta (2007).

Pharmaceutical waste: Pharmaceutical waste is any waste that contains medicinal drugs that are expired, unused, contaminated, damaged or no longer needed.

Practice: Practice is the actual application or use of monitoring and evaluation system within the organization.

Sustainable Management: It is an operational solution considering the concepts of the environment, the needs of present and future generations, and the economy.

Waste management: the practice of collecting, transporting, processing, or disposing of, managing, and monitoring various waste materials.

Sustainable pharmaceutical waste management is the act of reducing/managing the amount of pharmaceutical waste in the environment in efficient manner.

Appendix 2: Questionnaires

Addis Ababa University

College of Development Studies

Questionnaire to be filled by professionals in EPSA

Dear respondents,

The intention for this questionnaire is to collect data needed for the completion of a study entitled "**Effect of Monitoring and Evaluation on Sustainable Pharmaceutical Waste Management in Ethiopia: Case study on Ethiopian Pharmaceutical Supply Agency."** Thus, your response is by far crucial to the successful completion of this research. Moreover, your opinion is meant to be only for academic purposes and accessed by the researchers only. So that, information you provided is kept strictly confidential and anonymous. Therefore, this is to kindly ask your genuine response to the questionnaire and to put your level of agreement by circling the choice in corresponding to questions and by writing on the blank spaces where necessary. In addition there is no need write to your name. **Thank you very much in advance!**

Questioner ID: _____

I. Please tick (mark) the appropriate answer

Section A: Respondent Background Information

1. Sex

a. Male ☐ b. Female ☐

2. Age _____

3. Branch /Head Office / name _____location (city) _____

4. What is Respondent (your) Current Position in the EPSA? _____

5. Highest education levels

a. Diploma ☐ c. Master ☐

b. Degree ☐ d. PhD and above ☐

6. Number of experience in EPSA _____ year /months _____

II. Please tic (mark) your appropriate opinion for each question using the following scales:

1= **Strongly disagree (SD), 2= Disagree (D), 3= Neutral (N), 4= Agree (A) and 5 = Strongly agree (SA).**

No	**Part1. Contribution of monitoring and evaluation (monitoring and evaluation) to improve pharmaceutical waste management (PWM)**	SD	D	N	A	SA
	Questions	1	2	3	4	5
1.1	There are PWM problems/challenges/ in practical managing process like collection, handling, storage, transportation, disposal and in most treatment activities.					
1.2	The management facilitates for managing of pharmaceutical paste (PW) using monitoring and evaluation system.					
1.3	Improper PWM cause is significantly due to lack effective using of monitoring and evaluation which can be used to robust sustainable management.					
1.4	Pharmaceutical wastes are disposed according to standard of authorized body guidelines and using monitoring and evaluation.					
1.5	Your organization has appropriate and sustainable monitoring and evaluation plan and regulatory strategies with performance report of PWM					
	Part 2: Sustainable pharmaceutical waste management	**SD**	**D**	**N**	**A**	**SA**
2.1	If there is sustainable monitoring and evaluation applicable during wastes disposing methods, it can minimize environmental pollution of PW					
2.2	There is improper PWM due to weak monitoring and evaluation applicability in every step, like in collection, handling, storage, transportation, in disposal area.					
2.3	Management takes in consideration environmental pollution control for making timely decision about sustainable PWM using monitoring and evaluation.					
2.4	Managers and designated persons are involved in the design, budgeting, implementation and reporting on monitoring and evaluation system of PWM.					
2.5	Management always demands and uses monitoring and evaluation reports for decision making in PWM					

	Part 3. Challenges and practice of monitoring and evaluation implementation in Pharmaceutical Waste Management (PWM)	SD	D	N	A	SA
		1	2	3	4	5
3.1	Monitoring and evaluation applicable with scheduled manner for pharmaceutical waste disposal to promote environmental protection.					
3.2	The existence or/not of monitoring and evaluation in the process of waste disposing like incineration and landfill can make difference on impact of pharmaceutical waste on the environment.					
3.3	During the segregation/categorizing of pharmaceutical waste the monitoring and evaluation use in the process to facilitate PWM.					
3.4	If there is monitoring and evaluation during waste treatment plant, it minimizes the effect of wastes and will use to save the environment impact of PW (pharmaceutical waste).					
3.5	Weak of data quality and disseminating in monitoring and evaluation encountered limitations and challenges and these results for poor PWM.					
3.6	Timelessness of monitoring and evaluation results to weak PWM and makes PW staying for a long time in the environment.					
3.7	The organization has own monitoring and evaluation indicators for waste management implementation and work to minimize environmental pollution.					
3.8	There are no clear and simple procedures of monitoring and evaluation that can be applied and the high costs incurred by this organization for pharmaceutical waste taken to disposing center.					
3.9	Waste management installations are operating in a fashion way of using monitoring and evaluation that minimises toxicological risks to human health.					
3.10	There exists computerized waste generation records/data/ and dissemination that can used for appropriate decision making on PWM (pharmaceutical waste management).					
	Part 3. Knowledge and perception of employee on monitoring and evaluation system to strengthen sustainable (PWM)	SD	D	N	A	SA
		1	2	3	4	5
4.1	If there is sufficient staff's training/capacity building on monitoring and evaluation in PWM, this can improve environmental safety.					
4.2	Most employees have enough knowledge of PWM policy/guidelines pharmaceutical waste and monitoring and evaluation of that used is to working with environmental protection.					

4.3	You are satisfied with implemented way monitoring and evaluation of pharmaceutical waste management (PWM) in your organization.					
4.4	Most employees have experience of using monitoring and evaluation that used to sustain PWM (pharmaceutical waste management).					
4.5	Employees have willingness to participate in monitoring of PWM that affect the environment, if it's not properly managed.					
4.6	It is obligation of staff/employee to protecting the environment and if they can use monitoring and evaluation in PWM they can achieve to do so.					
4.7	However, the employees use their own judgment; they are not actively participated in PWM to monitor environmental pollution.					
4.8	Currently staffs have a gap of knowledge on monitoring and evaluation in PWM even if they are committed to control environmental pollution.					
4.9	The organization has sufficient number of staff with monitoring and evaluation competences and effectively implanted monitoring and evaluation in PWM.					
4.10	Monitoring and evaluation can be helping the employees to actively participate in PWM & enhance the mechanism to control environmental pollution.					

III. Please describe your opinion for each of the following questions

1. Do you think that it is important to implement sustainable monitoring and evaluation (monitoring and evaluation) to appropriate disposing process of pharmaceutical waste management in this organization?

   ---

2. What do you think possible solutions that could contribute to positively enhance/strengthens your organizations monitoring and evaluation system that sustain PWM (pharmaceutical waste management)?

   ---

3. What do you think that makes pharmaceutical waste disposal practice efficient and modernizes and also sustainable to reduce it's damaging on the environment?

   ---

4. What do you think about the influence of applying Monitoring and Evaluation system on pharmaceutical waste management implementation and environmental sustainability?

   ---

5. What do you think that important for managements have to know and consider for managing waste sites in a manner that minimizes toxic impacts in the current and future generations?

   ---

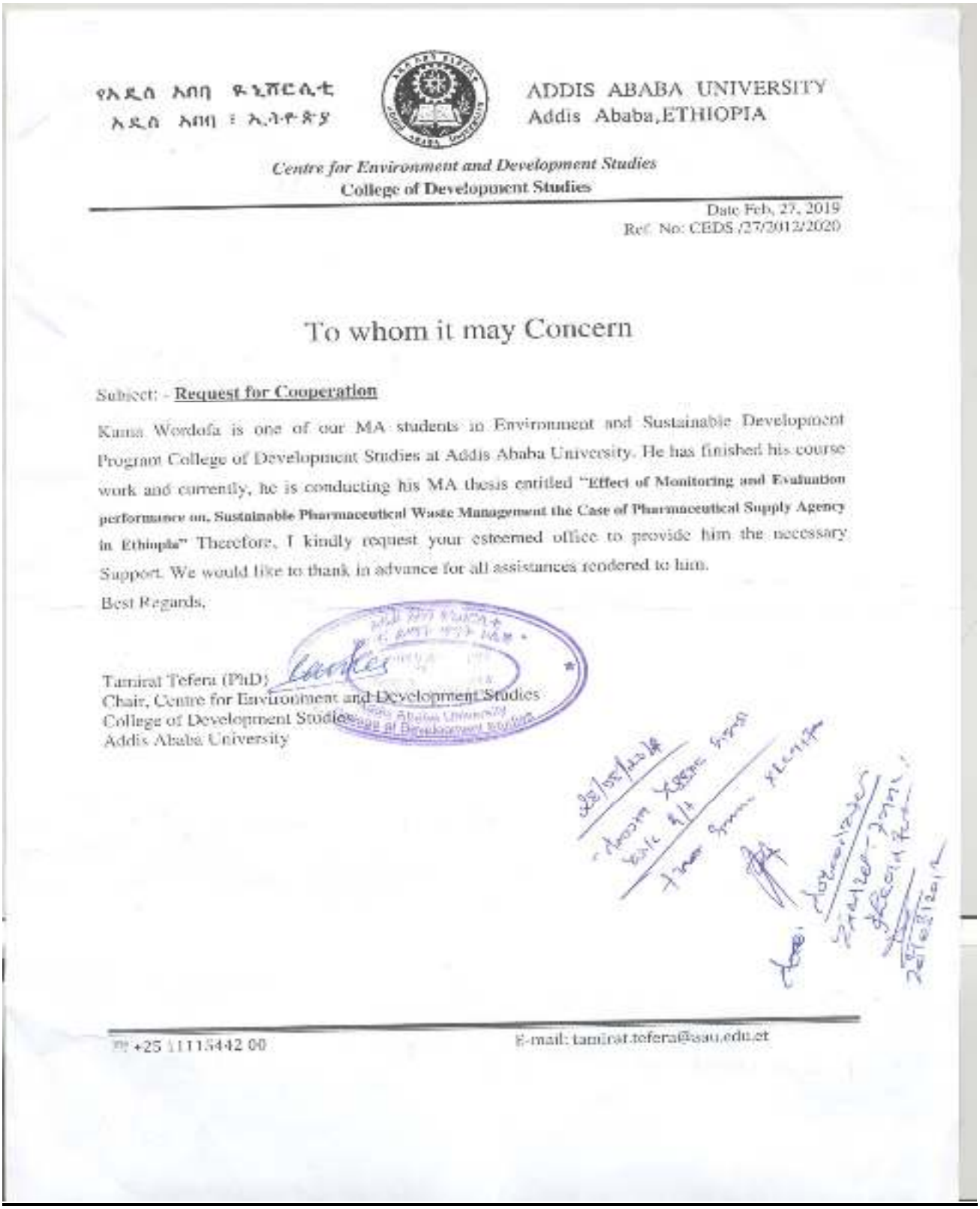
6. What do you think any best strategy for pharmaceutical waste disposal? Please comment on the overall situation of monitoring and evaluation in your organization in relation to pharmaceutical waste management?

Thank you for your participation!

Appendix 3: Interview guide questions

1. How do you monitor and manage pharmaceutical waste?
2. Do you keep records of waste generation to use for monitoring and evaluation and for decision making in PWM?
3. What conditions facilitate for sustaining monitoring and evaluation performance in your organization that used for pharmaceutical waste management?
4. What mechanism/guide should be applicable to manage sustainably the pharmaceutical waste?
5. What is your recommendation in improving the monitoring and evaluation performance in pharmaceutical waste management?

Appendix 4: Permission to conduct research on the EPSA organization.



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ADDIS ABABA UNIVERSITY
Addis Ababa,ETHIOPIA

Centre for Environment and Development Studies
College of Development Studies

Date Feb, 27, 2019
Ref. No: CEDS /27/2012/2020

To whom it may Concern

Subject: - **Request for Cooperation**

Kuma Wordofa is one of our MA students in Environment and Sustainable Development Program College of Development Studies at Addis Ababa University. He has finished his course work and currently, he is conducting his MA thesis entitled "**Effect of Monitoring and Evaluation performance on, Sustainable Pharmaceutical Waste Management the Case of Pharmaceutical Supply Agency in Ethiopia**" Therefore, I kindly request your esteemed office to provide him the necessary Support. We would like to thank in advance for all assistances rendered to him.

Best Regards,

Tamiral Tefera (PhD)
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